

CAT© For Industry (CAT-I)

User Manual



# CAT-I User Manual



© Sandia National Laboratories

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# Introduction

A Chemical Inventory Management System (CIMS) is an important mitigation strategy to reducing safety and security risks at a facility that uses and stores chemicals. Effective implementation requires management of chemicals throughout their life cycle, from procurement to disposal. For a foundational discussion on chemical inventory management, the reader is referred to a publication in the *Journal of Chemical Education*.1 The following chapters provide guidance and an example of on how the Chemical Asset Tracker (CAT©) software was adapted for the chemical industry (CAT-I). The CAT© software is an easy to use chemical inventory database system that supports a CIMS. For more information on the CAT© software, please review the CAT© user manual and installation guide.

1 “Improving Chemical Security with Material Control and Accountability and Inventory Management,” *J. Chem. Educ*. 2020, 97, 1809-1814. An open-source copy of the accepted manuscript can be found here, <https://www.osti.gov/servlets/purl/1770351>.

# Installation and Setup

Detailed instructions on the hardware, software, and configuration options can be found in the *Chemical Asset Tracker (CAT)© Installation Guide*. This section provides basic requirements and instructions for setting up the CAT© software on the user’s computer.

|  |
| --- |
| **NOTE** |
| These steps should only be followed after completing the CAT© installation on a hosting server. |

### Hardware requirements

Hardware requirements to operate the CAT© software include a modern computer with a browser that supports modern web technologies. For optimum graphic display, Mozilla Firefox and Google Chrome are the recommended browsers for use with CAT©. Microsoft’s® Internet Explorer is not capable of displaying CAT© pages correctly.

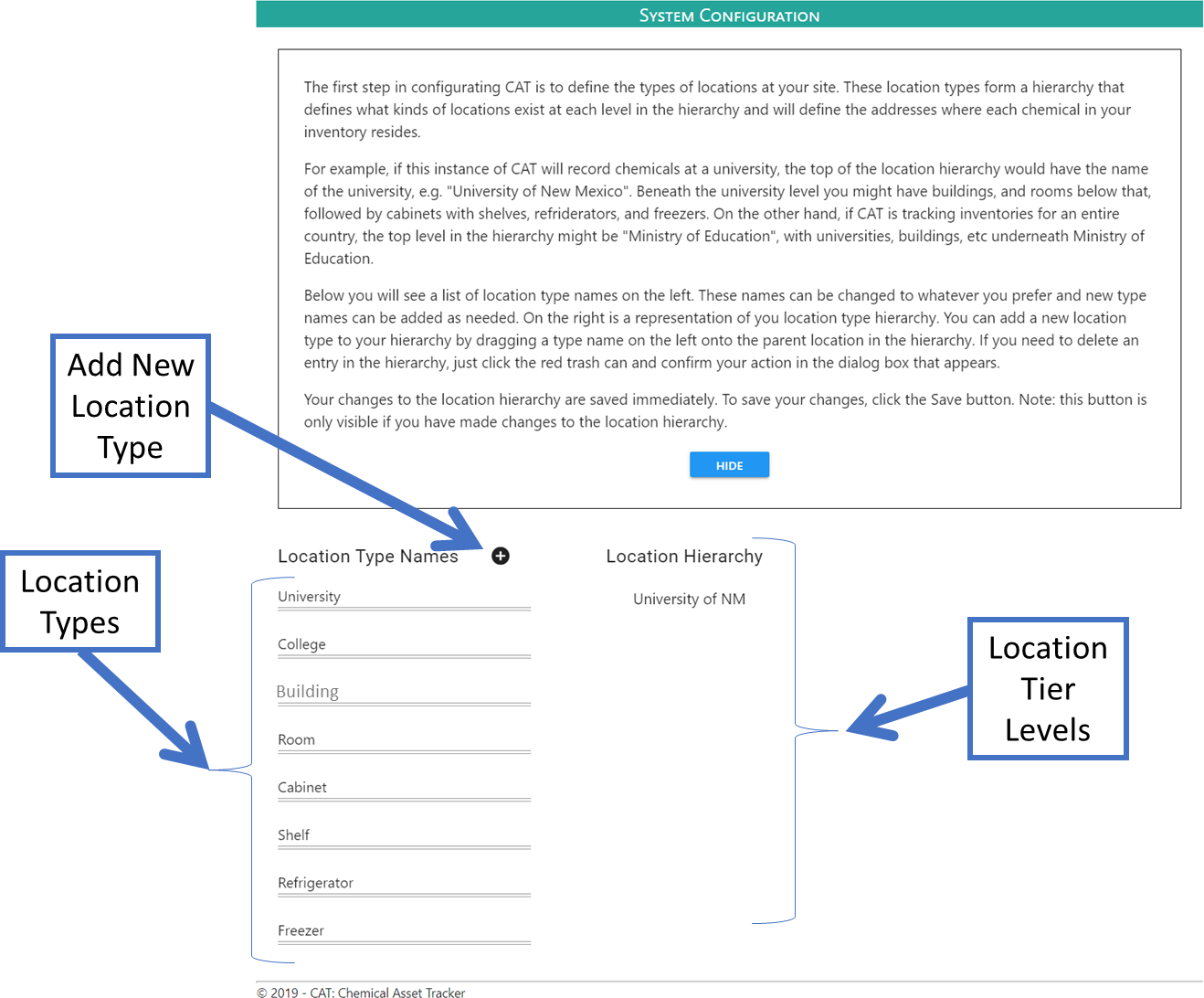
### Software Installation

Follow the below steps to install the CAT© software application on the user’s computer.

* 1. Open a web browser (Mozilla Firefox and Google Chrome are the recommended browsers)
  2. Navigate to the appropriate URL for the configured hosting server (e.g., CAT.stateuniversity.edu or CAT.mohe.example.gov)
  3. For future quick access to the CAT© software:
     1. Save the URL as a bookmark in the web browser
     2. Save a URL shortcut to the computer’s desktop

### Software Setup

Following the initial CAT© installation on a hosting server, the administrator will need to configure the software for designated inventory item [owners,](#_bookmark63) inventory [locations,](#_bookmark67) and software [users.](#_bookmark65) If the location tier levels are not set up during the CAT© server installation (see the *Chemical Asset Tracker (CAT)© Installation Guide*), the “Root” user will be prompted to set up the location tier levels during their first login (see Figure 1 below). These steps **must** be followed before proceeding with the software setup.



*Figure 1. Root User Location Setup Page*

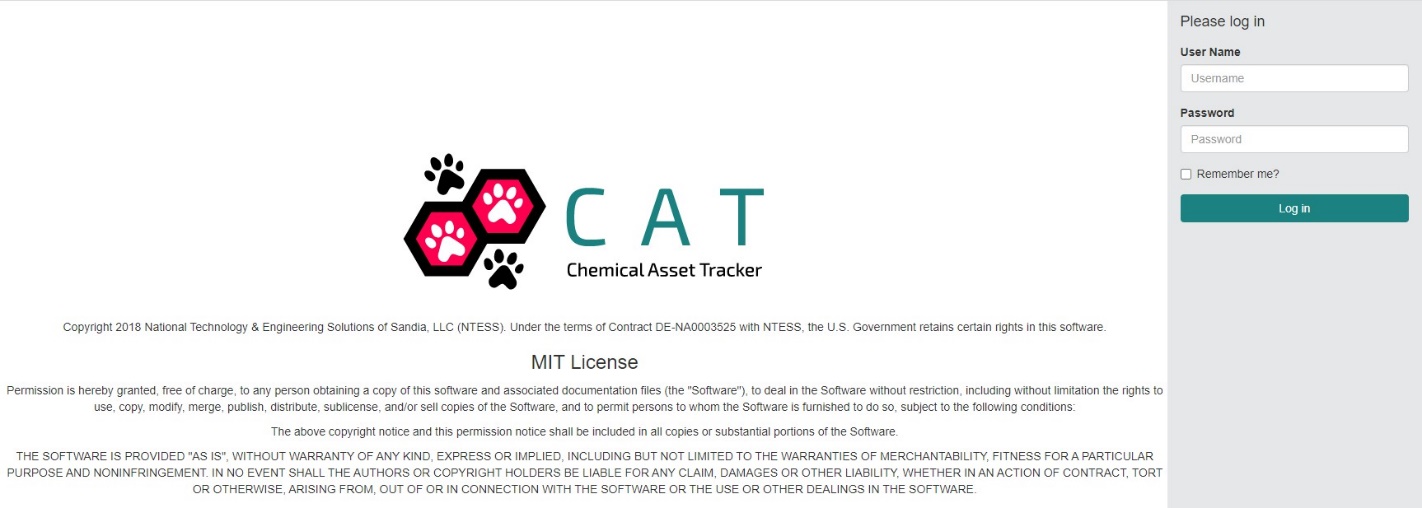
# Overview of User Login and Software Navigation

*The steps provided in this section demonstrate the CAT-I user login process and basic navigation through the software.*

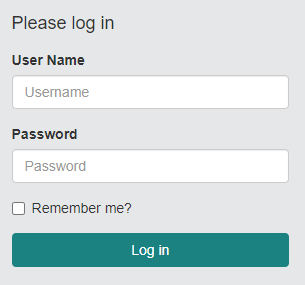
### User Login

As discussed in Section [2,](#_bookmark4) the CAT© software is a web application configured with a hosting server. The instructions provided below assume that the user has completed Section [2.2](#_bookmark6) in order to create a bookmark in the web browser or a shortcut on the computer desktop.

* 1. Click on the CAT© shortcut or open a web browser and find the CAT© bookmark.
  2. The main login screen will look like this:



*Figure 2. CAT© Main Login Screen*

* 1. Enter your username and password in the fields on the right side of the screen. Click “Log in.”
  2. If your login information is correct, the browser will

open the “Home Screen” (Section [3.2.1](#_bookmark15)).

|  |
| --- |
| **NOTE** |
| User login information is created by the administrator. If you don’t have or don’t remember your username or password, please contact your administrator. |

### Basic Navigation

*This section provides information on the navigation and basic features of the CAT© software.*

#### Home Page

The Home page appears after the user logs into the software. This screen is a tile view of icons. Depending on the user permissions, the user may see fewer icons than the ones shown below.



*Figure 3. CAT© Home Screen*

Below is a brief description of each icon from left-to-right, and top-to-bottom. This manual features a detailed section about each icon.

**Inventory Icon** is used to view the inventory that the user has permission to see.

**Search Icon** is used to search the entire inventory database.

**Reports Icon** includes options for generating reports on the inventory.

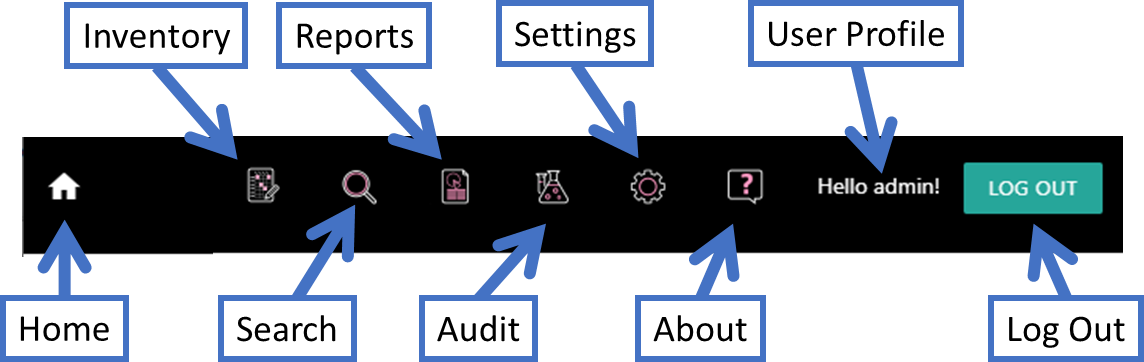
**Audit Icon** is used when completing a physical inspection and audit of the inventory.

**Settings Icon** is only viewable for the administrator and includes many sections to manage and edit the software.

**About Icon** includes information about the software version being used and the license agreement.

#### Navigation Bar

The navigation bar appears at the top of the web browser when any icon on the home screen is clicked. The icons in the navigation bar are the same as those seen on the Home Screen. The Home icon at the far left will return the user to the Home Screen. The navigation bar also includes the Log Out button at the far right and the greeting “Hello [username].” See the sections below for more information on these two features of the navigation bar.



*Figure 5. Overview of the CAT© Navigation Bar*

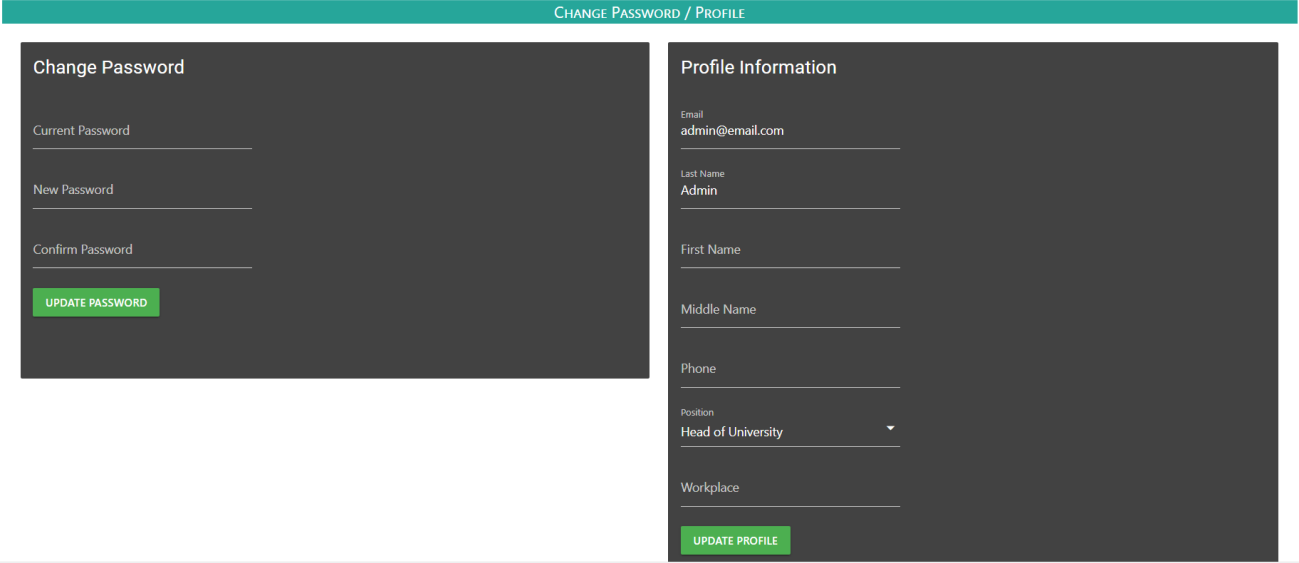
##### Log Out

The CAT© software will automatically log the user out after 30 minutes of inactivity. The user can manually log out of the software by clicking the LOG OUT button on the navigation bar.

##### User Profile

The user profile can be accessed by clicking the greeting “Hello [username]” on the navigation bar at the top of the screen. On the Profile page, the user can update their information and change their password (see [Figure 6](#_bookmark19) below).

NOTE: The user profile does not define the user root location in CAT©. This is defined by the administrator (see Section [8.1.3](#_bookmark65) for more information).



*Figure 6. CAT© User Profile Page*

#### Text Size and Zoom

CAT© is an adaptable platform, and its appearance will change based on the user’s device settings. Because the CAT© software launches in a web browser, the user can control text size or zoom in and out using the web browser functions.

# Inventory Icon

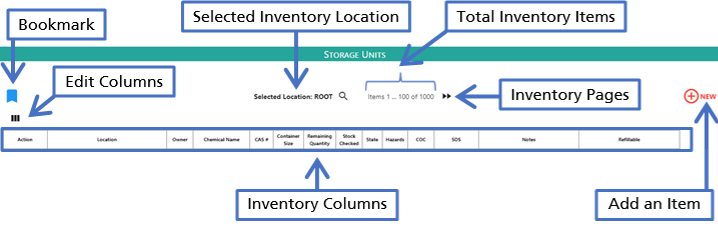
*This section provides basic instructions for creating and updating your chemical inventory.*

Clicking on the CAT© Inventory icon takes the user to a list of chemicals. All users have access privileges to see the Inventory page. However, the inventory items available to view will depend on the user permissions (see Section [8.1.3](#_bookmark65) for user setup). All user levels, *except* Viewer, can add, edit, or delete inventory items. A previous inventory created in the CMS© software or CIMS Excel- based inventory spreadsheet may be imported by the Root and Administrator (see Section [8.1.5](#_bookmark68)).

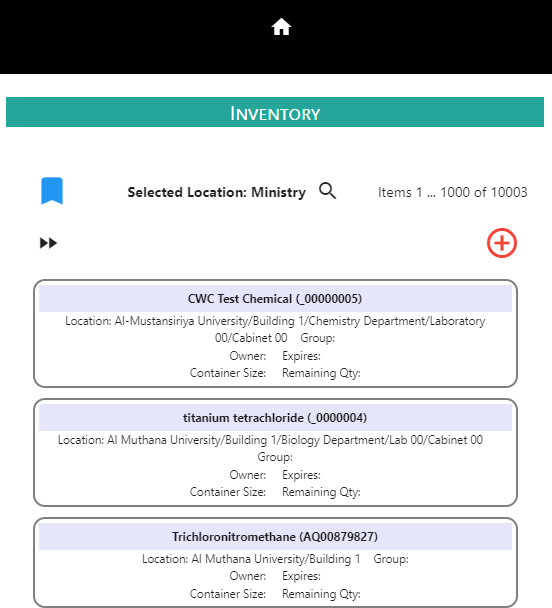
|  |
| --- |
| **NOTE** |
| The images presented here include both mobile and computer system views of the CAT© adaptable platform. |

### Overview and Basics

A teal-colored Inventory banner appears on the page. Below is a quick overview of the basic features and buttons on the Inventory page. The Inventory pages are automatically set to display only 1,000 items per page. For instructions on how the administrator can change this setting, see Section [8.](#_bookmark61)



*Figure 7. Overview of the CAT© Inventory Page*



#### *Figure 8. Example of an inventory list on a mobile device or small-screen computer*

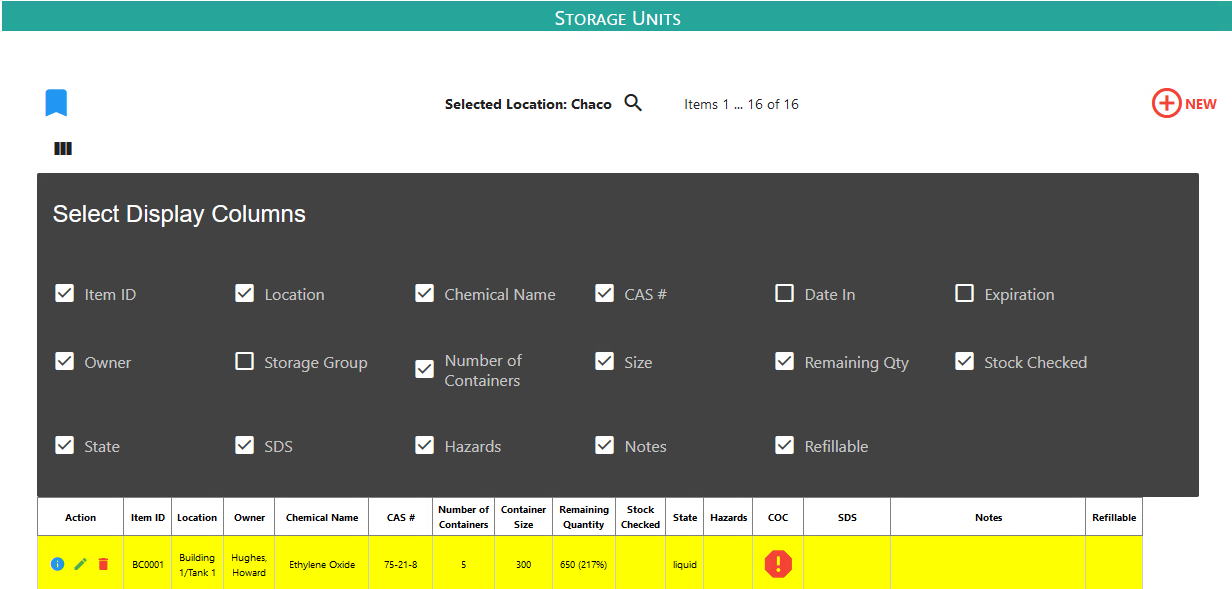
* + 1. Bookmark

To bookmark the Inventory page on a computer or mobile device, click on the blue icon at the top left.

* + 1. Display Inventory Columns

Inventory columns are only visible on a large screen or computer system. The user can customize the columns displayed on the Inventory page by clicking on the symbol of the three black bars (). Clicking the symbol opens a “Select Display Columns” menu.

The checked boxes correspond to columns that appear in the inventory spreadsheet [(Figure 9](#_bookmark27)). The user can check and un-check the boxes to select which columns will be displayed on the inventory spreadsheet. The following sections provide information on the individual column types.

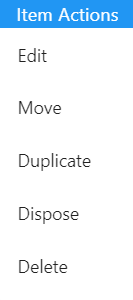


*Figure 9. Example of an Inventory List on a Mobile Device or Small-Screen Computer*

* + 1. Basic Navigation Features

Because CAT© uses a web browser, and the navigation will be those in the browser settings for zoom, scrolling, etc., the user can scroll up or down through the inventory items using any of the scrolling features available on their web browser (e.g., page up/down buttons, keyboard arrows, the touch pad, joystick, or mouse).

##### Item Actions



Right-clicking on an Inventory item provides quick access to Inventory actions. The Item Actions dropdown menu will pop up on the screen. This menu allows the user to edit, move, duplicate, dispose, or delete the inventory item. Below are explanations for each of these available options.

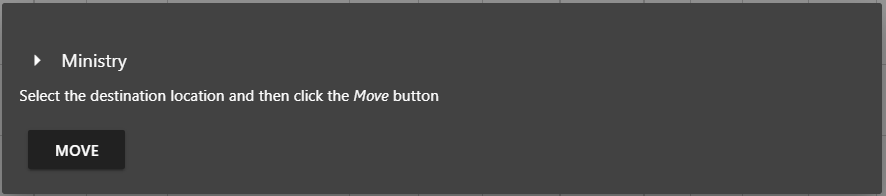
###### 4.1.3.1.1 Edit

Clicking on Edit opens the “Edit Item” screen. (See Section [4.4.1.2,](#_bookmark40) Edit Icon, for more information.

###### 4 .1.3.1.2 Move

The Move feature is a quick and easy way to move an item’s location in the software without going into the Edit window.

Clicking Move opens a popup box for selecting a new location for the inventory item. Select a new location by clicking the right arrow and choosing from the dropdown menu. Then click MOVE.



###### 4.1.3.1.3 Duplicate

The Duplicate feature is an easy way to copy the chemical hazard information for use in another item entry. Click on Duplicate and a “New Inventory Item” window will appear with the pre-populated chemical name, CAS number, and hazard information. Fill in the remainder of the inventory information (see Section [4.3](#_bookmark34) below) and click “ADD NEW.”

###### 4.1.3.1.4 Dispose

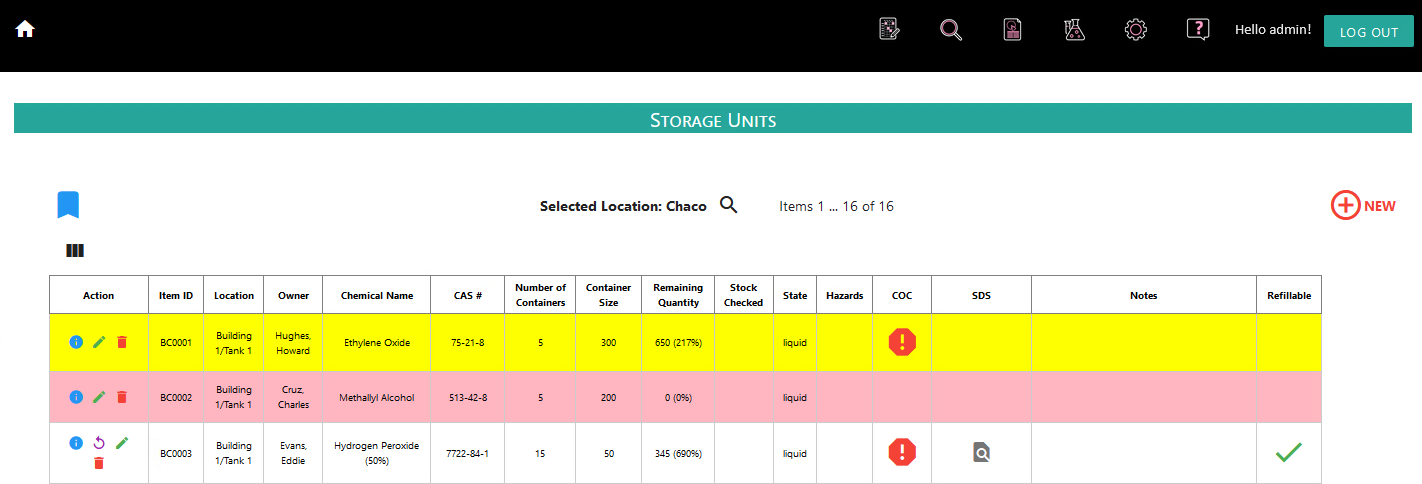
Dispose is an optional feature used to indicate that an inventory item is ready for disposal. The feature is useful if your institution has a review or documentation process for the removal of items from the inventory database. Once Dispose is clicked, the inventory row will be highlighted pink (see Section 4.1.4 for more information).

###### 4.1.3.1.5 Delete

The Delete feature is a quick way to select one or multiple items to remove from the inventory database.

* + 1. Inventory Row Colors

Depending on your browser setting, the main inventory spreadsheet will appear as a white background. The CAT© software includes two automatic highlight colors—pink and yellow—for the inventory rows (Figure 10)

*Figure* 10*. Example of the CAT© Inventory Row Colors*

###### Pink Inventory Row

A row highlighted in pink indicates an inventory item that has been marked for disposal. Such inventory items could be empty, expired, contaminated, or no longer needed. To mark an item ready for disposal:

1. Right click on the inventory item.
2. When the “Item Actions” window appears, click “Dispose.”



1. The inventory item will now be highlighted in a pink (or light red) color.
2. To cancel or undo the action, right click on the item, and select “Cancel Disposal” from the Items

Actions menu.

###### Yellow Inventory Row

A row highlighted in yellow indicates a chemical that is expiring. The color is based on the date the item is entered into the inventory (see Section 4.3 for adding a new chemical). The row will turn yellow if the chemical is expired or will expire within 60 days. This is an optional program feature that only works if the “expiration date” field is used.

### Inventory Location and Search

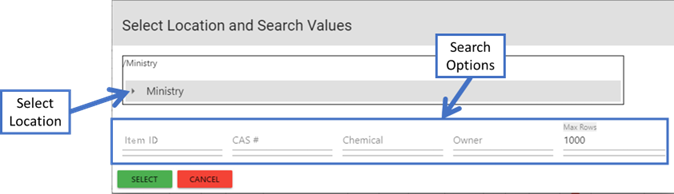
The CAT© Inventory page contains all the chemicals that the user has access permission to see. The default location that appears in the Selected Location field is the highest location level the user has been assigned to (see user setup in Section [8.1.3](#_bookmark65)). The page is limited to the first 100 items in the inventory, and the user can use the double arrows to see additional pages of inventory items.



The user can change the location or search for items in the inventory by clicking on the eyeglass or Search icon (  ).



Clicking the Search icon will open a popup window to select the location and search or filter within a designated location. This filter is saved for each user each time they log in to see the Inventory page.



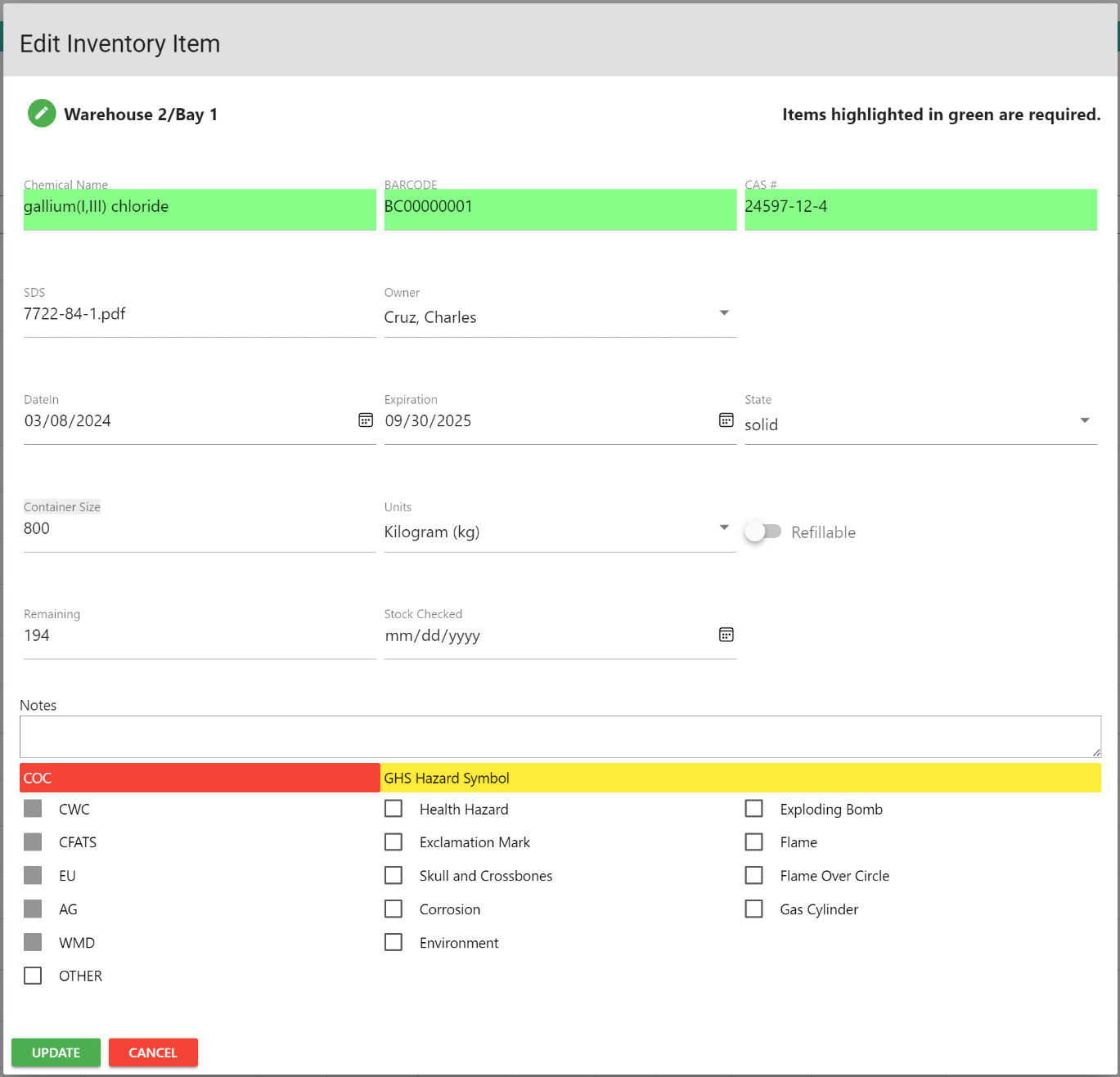
*Figure 11. Overview of the CAT© Search Page*

1. Select the right arrow to open the full location list the user has permission to view.
2. Select the location by clicking on the new location.
3. Enter any search values.
4. Click “SELECT.”

### Adding a New Chemical



1. Open the CAT© software, click on the **Inventory** icon.
2. Click on the symbol located in the top right corner.
3. A “New Inventory Item” popup window will appear to enter the chemical information. [(Figure](#_bookmark35) [12](#_bookmark35)):



*Figure 12. Example of the CAT© New Inventory Item window*

* 1. Click the green Pencil icon. This will allow the user to select the location for the new inventory item.

A Select Location popup window will appear with the location level tiers (see section [8.1.4](#_bookmark67)) to select the inventory item location. Click the arrow to open the location level and click on the location. Click “Select” to save the location and return to the New Inventory Item window.



* 1. Enter the remaining chemical information into the New Inventory Item window. The first row of green highlighted boxes is all required for an inventory item. Be sure to check that the information is complete and accurate. See the detailed information on each field below:
  2. **Name**: This chemical name field is limited to 256 characters but depending on your web browser setting, fewer characters may be viewable in the Inventory page.
     1. Try to use a consistent naming protocol. For example, always use only one name to refer to “isopropanol” in your inventory. Do not use multiple names for the same chemical (e.g., 2-propanol, isopropanol, isopropyl alcohol, or rubbing alcohol).

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| --- |
| **NOTE** |
| *To help with consistent nomenclature for chemicals in your inventory, make it part of the SOPs. Create a protocol regarding which chemical names are to be used; add a list of preferred names for common chemicals to the SOP for CAT©.* |

* 1. **Barcode**: This field is designed to be a unique number to identify each chemical item or sample in your inventory. Scan (with a barcode scanner) or type in a barcode with up to 64 characters. This number should be unique for each item and should appear on the chemical container (see Section [9.2](#_bookmark79) more information on Labeling Containers). You can use a barcode scanner/reader connected to your computer or your mobile device to automatically populate the “Barcode Field.” For more information on barcode and compatible barcodes see the “Barcodes” section in Appendix [9.1.](#_bookmark74)
  2. **CAS #**: The number provided by the Chemical Abstracts Service (or the CAS Registry number) and is limited to 12 characters (up to 10 numbers and 2 hyphens). A CAS number is a unique identifier associated with a specific chemical and is very useful for overcoming the problems created by chemicals with many synonyms. Inputting the correct CAS number is especially important. The automatic alerts will populate upon entry of the CAS number for certain hazardous materials.

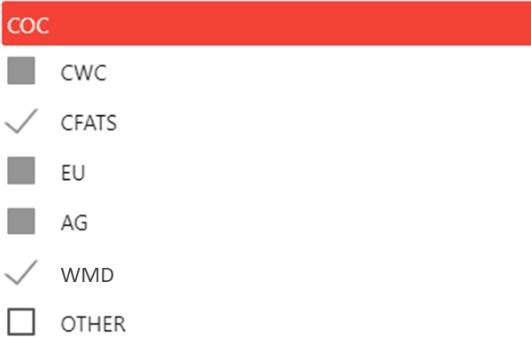
|  |
| --- |
| **NOTE** |
| It is important to ensure that the CAS registry number is correct. ***Automatic alerts are generated based on CAS number***—not chemical name or barcode. For more information on CAS registry numbers, see Section [9.](#_bookmark73) |

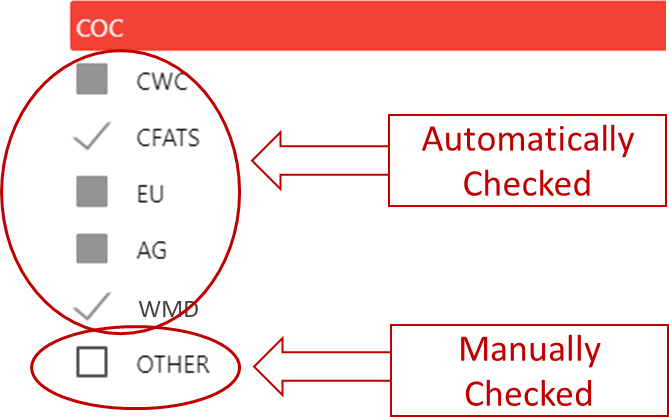
* 1. **SDS**: This field will be automatically completed based on the CAS #. If the CAS # is not in the database, the administrator can upload it (see Section [8.1.6](#_bookmark69)).
  2. **Owner**: This field is used to designate the name of the person responsible for the safe and secure stewardship of that chemical during its entire lifecycle at the institution. The owner is not affiliated with a user in the software. A dropdown box is provided in order to list the “owners” created during the inventory setup (see section [8.1.1](#_bookmark63)).
  3. **Group:** The “Group” field is optional. It is intended to indicate a storage group for the chemical item. A dropdown menu is provided in order to list storage groups created during the inventory setup (see section [8.1.2](#_bookmark64)).
  4. **Date In**: The date when the chemical was received or when responsibility for that chemical was transferred to the listed owner. CAT© auto-populates this cell with the present date. Adjust if needed.
  5. **Expiration**: This is an optional field for tracking chemical expirations. Enter the date when the chemical may expire, the date at which it should no longer be used, or the date when the

chemical should be subject to periodic scrutiny (e.g., checking peroxides in peroxide-forming chemicals). Once this field is completed, the inventory row will turn yellow 60 days before expirations (see Section [4.1.4.2](#_bookmark31))

* 1. **State**: State of matter of the chemical (e.g., solid, liquid, gas). A dropdown menu lists the states of matter.
  2. **Container Size**: Provide only a numerical value of the chemical’s original container (e.g., 250, 500, 1). “**Units**” will indicate the volume or mass unit to this numerical amount (e.g., kg, L, mg, etc.).
  3. **Remaining Quantity**: Use this column to indicate how much of the chemical material is left after usage. This optional field entry is for numerical values (e.g., 2.1, 3.0, etc.) only.
     1. When importing a previous CIMS file, the “**Quantity**” column will be imported into the

CAT© **Remaining Quantity** column.

* 1. **Units**: Use units (e.g., volume (L, ml) or weight (mg, g, kg) to indicate the proper measure. A dropdown menu lists the common units.
  2. **Notes**: Insert any additional information associated with the chemical that you want to be included. Examples: “Don’t store near water,” “Damaged in shipping,” “Very expensive use sparingly,” “Lock up this chemical,” etc. This field is limited to 256 characters but depending on your browser setting fewer characters may appear on the Inventory page.
  3. **COC**: This field—the acronym for “Chemical of Concern”—is used to indicate that a chemical may be a security concern.
     1. The grey boxes automatically populate based on the CAS number and cannot by changed by the user. These boxes identify chemicals listed in the Chemical Weapons Convention (CWC), Chemical Facility Anti-Terrorism Standards (CFATS), Council Regulation (EC) No 428/2009 of 5 May 2009 (EU), Australia Group (AG), and weapons of mass destruction (WMD) (see the Appendix for more information). When the CAS number appears in any of these lists, the grey box will appear as a “√,” and an alert symbol will appear on the Inventory page under the COC column (see section [4.4.2](#_bookmark43)).



* + 1. The white “Other” box can be manually checked to indicate a security concern designated

by your facility or institution.

* + 1. When boxes are marked, a red alert symbol for the item will appear in the COC column on the Inventory page (see Section [4.4.2](#_bookmark43)).
  1. **GHS Hazard Symbol:** This field lists the terms for the various pictograms defined by the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). See the Appendix for more information on GHS. Hover over each word for its corresponding pictogram.
     1. The boxes can be manually marked with a “√” or unmarked by clicking on the box.
     2. These boxes may be automatically marked with a “√” if data exists in the Hazard Information (See Section [Hazard Column](#_bookmark45)). When the boxes are automatically marked, the red statement at the bottom of [Figure 13](#_bookmark36) will appear. You have the option to add or remove checked boxes which will remove the statement.
     3. When boxes are marked, the corresponding GHS pictogram will appear on the Inventory page under the Hazard column (see Section [4.4.3](#_bookmark45)).

1. Be sure to check that the information is complete and accurate and click Add New.
2. The new chemical should now appear in the inventory.



*Figure 13. Hazard Symbol Check Boxes*

### Inventory Columns



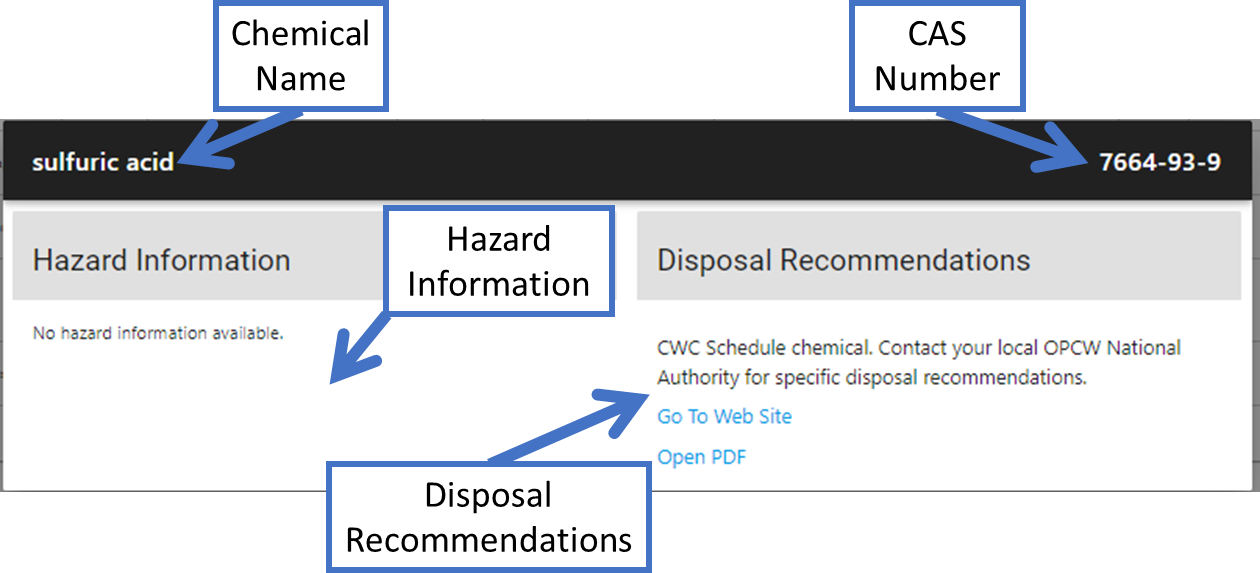
Most of the columns on the Inventory page correspond to information entered into CAT© for a new item. This section addresses additional columns that are not included in the sections above.

#### 4.4.1 Action Column

The “Action” column is the first on the left side of the Inventory page. It has four icons (shown here) that are used to see information “i” for the inventory item, “Refill” the item quantity, “Edit” the inventory item, or “Delete” the inventory item.

###### Hazard Information Icon

Clicking the blue information icon  opens a separate popup window (see Figure 14) to display additional information that may be available for the chemical. The “Hazard Information” section will appear on the left and “Disposal Recommendations” will appear on the right. See the description for these sections below.



*Figure 14. Overview of the CAT© Hazard Information Popup Window*

4.4.1.1.1 Hazard Information

The Hazard Information includes the hazard codes for this chemical that are listed in the 14th ATP (Adaptation to Technical Progress) of Annex VI of the CLP (Classification, Labelling and Packaging Regulation) regulation (EU REGULATION [EC] No 1272/2008) published on 28 October 2008. Refer to Section [9.4](#_bookmark91) for more information.

4.4.1.1.2 Disposal Recommendations

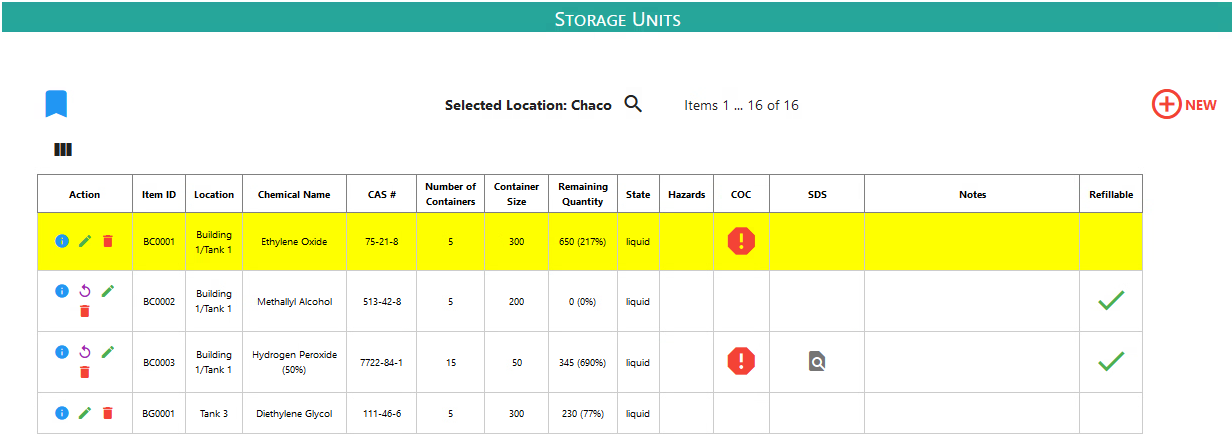
The Disposal Recommendations include a literature review of neutralization and disposal information on CWC schedule chemicals. The information is available through the weblink, or you can download and

save the PDF version of the report. For specific information on disposal recommendation, contact your local Organisation for the Prohibition of Chemical Weapons (OPCW) National Authority.

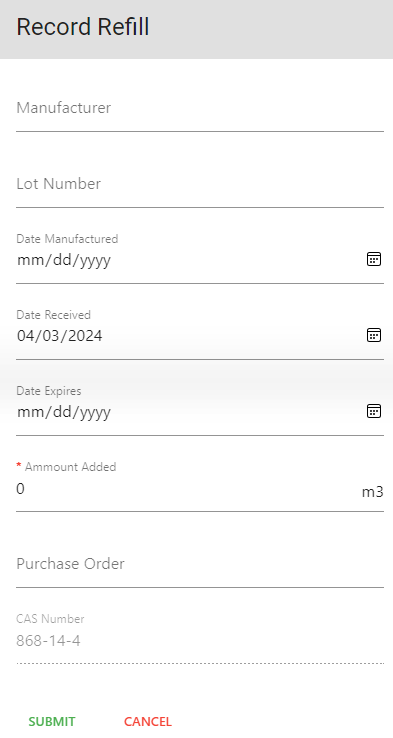
##### 4.4.1.2 Refill Icon

The purple, circular arrow-shaped icon  is used to track refills of an existing inventory item. Root, Administrator, Manager, Auditor, or Editor access is required in order to make changes in the inventory. Steps to update items in the inventory:

* + - 1. Select the Inventory icon and look for the chemical you want to modify.
      2. Click on the purple, circular arrow-shaped icon  in the Action column to update the chemical’s quantity (Figure 15).



*Figure 15. Inventory Page Action Column*

* + - 1. You can make the necessary changes to any information regarding that item in the window that appears. Click Update when you have finished editing the item.

###### 4.4.1.3 Edit Icon

The green pencil icon  is used to make changes to the inventory item. Root, Administrator, Manager, Auditor, or Editor access is required in order to make changes in the inventory. It is important that institutional rules and policies be enforced when changes in the inventory occur. Requirements should include communication, authorization, and tracking procedures for any changes to the inventory, e.g., when chemicals are moved from one lab to another or when ownership of chemicals is transferred.

Developing an appropriate SOP is highly recommended. For security purposes, moving or making other changes regarding certain chemicals should require additional specific authorization.

Steps to update items in the inventory:

1. Select the Inventory icon and look for the chemical you want to modify.
2. Click on the green pencil icon  in the Action column to edit the information about the chemical [(Figure 15](#_bookmark41)).
3. You can make the necessary changes to any information regarding that item in the window that appears. (See Section [4.3](#_bookmark34) for detailed explanation of the fields in the inventory window). Click Update when you have finished editing the item.



###### 4.4.1.4 Delete Icon

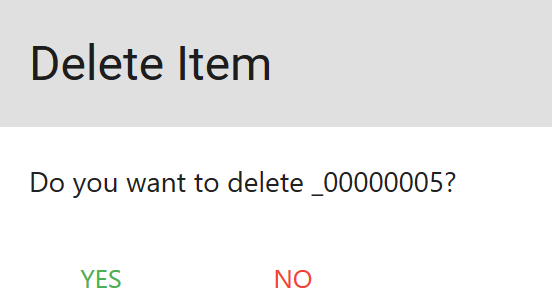
The red trash can icon is used to delete a specific inventory item. Administrator, Manager, or Auditor access is required for all deletions from the inventory. Thus, removal of chemicals from the inventory is formally communicated by all CAT© users to the Administrator, Manager, and Auditor. When chemicals are used up, no longer needed, or declared as waste, they need to be removed from the inventory. It is recommended that each the university or facility develop an SOP for labs using CAT© to keep the inventory updated regarding chemical disposal.

Steps to remove items in the inventory:

1. Select the Inventory icon and look for the chemical you want to remove.
2. Select the red trash can icon in the Action column.



1. Click Yes in the Delete Item popup window that appears, and the chemical will be erased.



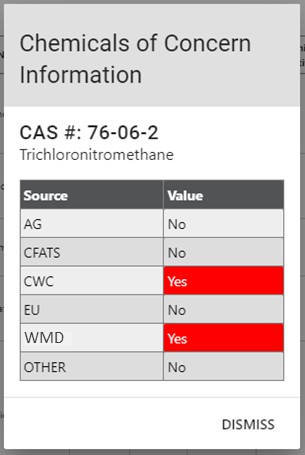
|  |
| --- |
| **NOTE** |
| There is no “undo” in the CAT© software. Be sure to confirm that the item should be deleted before doing so. |

1. If a chemical has been deleted by mistake, the only option is to restore the database to a previously saved version or to add as a new chemical following the previous instructions.

#### COC Column

A red alert icon will appear in the COC column when an inventory item has check marks in the COC field (See Section [4.3,](#_bookmark34) Adding a New Chemical. Clicking the red alert icon will open the Chemicals of Concern Information popup window [(Figure 16](#_bookmark44)). This window will display the chemical name and CAS number as well as the source that has listed the chemical as a security concern. See Section [9.4](#_bookmark91) for information on each source and a link for more information on the individual chemical lists.

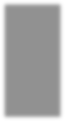




*Figure 16. CAT© Chemicals of Concern Information Popup Window*

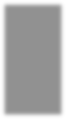
#### Hazard Column

The Hazard column will display any GHS pictogram selected for the inventory item. See Section [4.3](#_bookmark34) for more information on GHS pictograms and Appendix [9.4](#_bookmark91) for definitions.



#### Safety Data Sheets

A safety data sheet (SDS) may be viewed for each chemical listed in the inventory if the SDS has been uploaded into the database. (See Section 2.6, SDS File Upload,). The link to the SDS will automatically generate when a chemical name, barcode, and CAS number are added to the entry line.



To view the SDS:

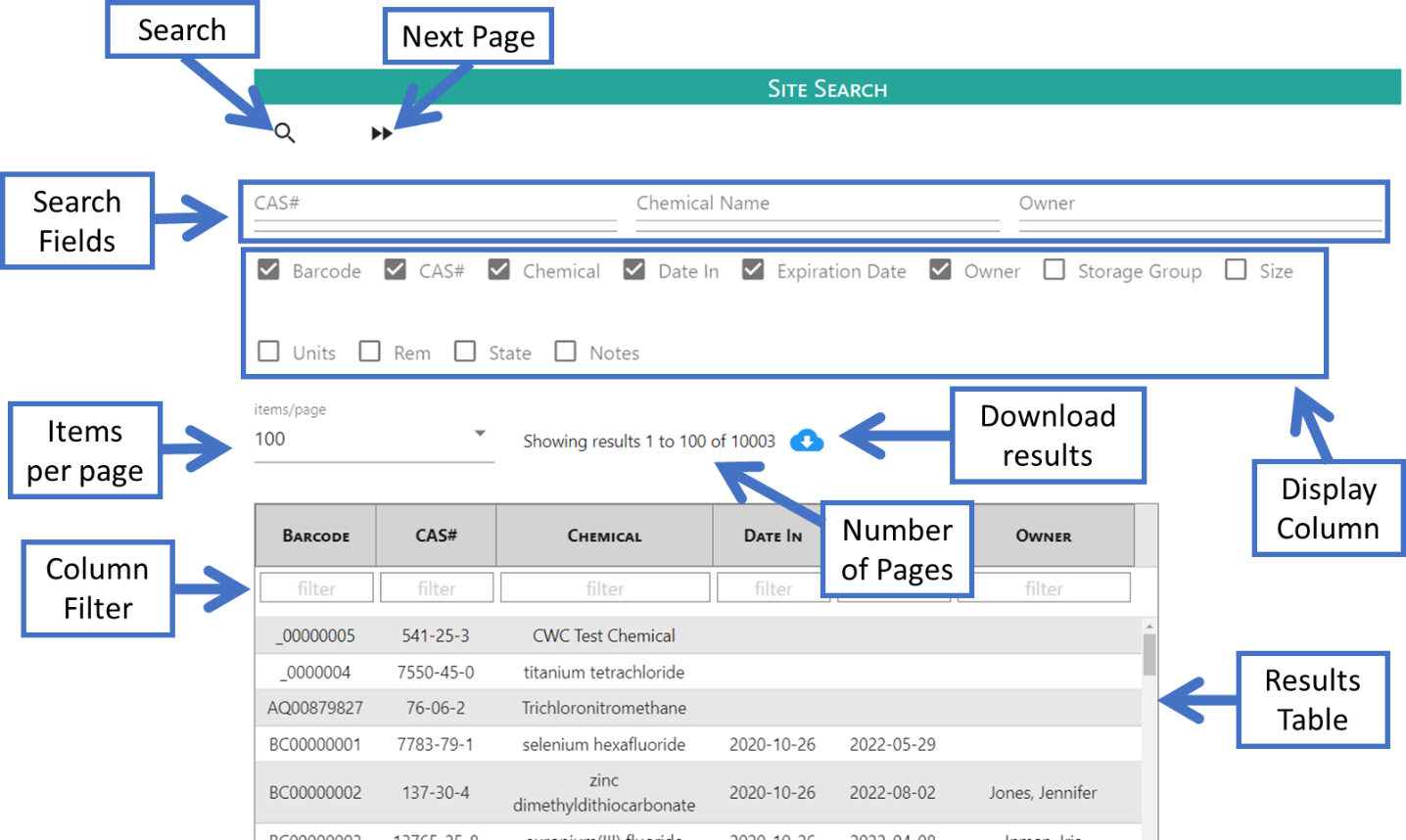
* + - 1. Click on the grey search icon in the row of the chemical. This grey search icon is located in the column labeled SDS on the inventory spreadsheet.
      2. The SDS will open in a separate window.

# Search Icon

*This section provides basic instructions for using the Search icon.*

### Overview and Basics

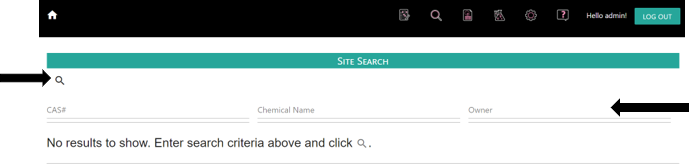
The Search icon is a global feature for finding a chemical in the inventory database. Any user across the entire database can perform a search. This function is especially helpful for a surplus sharing program. The search results will not include the chemical location but will provide the chemical’s owner who can be contacted regarding its potential use in a surplus sharing program. A quick look at the navigation options and features in the Search page is presented in [Figure 17.](#_bookmark49)



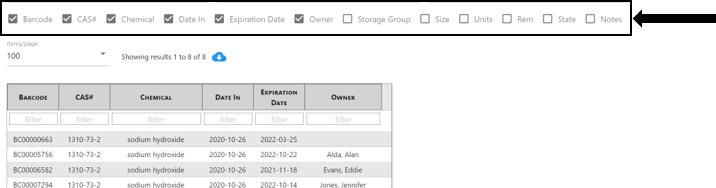
*Figure 17. Overview of the CAT© Search Page.*

* + 1. Searching the Inventory
       1. The user can begin an inventory search by completing one of the fields provided (CAS#, Chemical Name, or Owner).
       2. When you have entered information into at least one field, press the Search () icon or the

“Enter” button on your keyboard.



* + - 1. The results for the search will populate and appear in a table. The user can select the columns to be displayed by checking or unchecking the column boxes.



* + - * 1. Depending on your device, the search results may appear as a list without editable columns.
      1. Use the “Filter” boxes located under each column title in the table. The CAT© software will automatically begin filtering to narrow the results based on what is being typed.
      2. Download the search results by clicking the Download () icon.
      3. Contact the chemical owner for more information once a desired chemical is found.

# Reports Icon

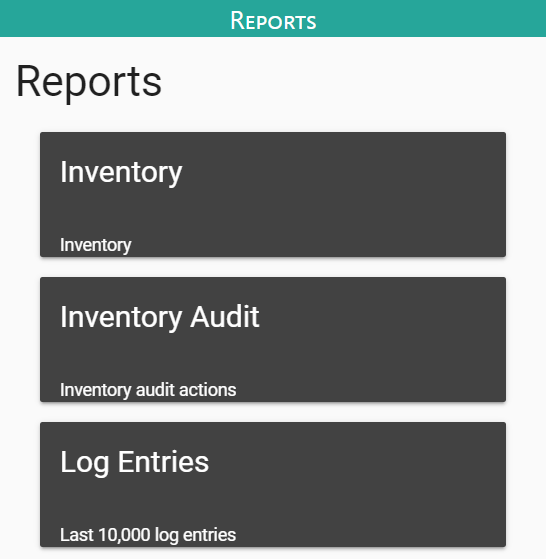
*This section provides information and instructions for the Reports icon.*

## Overview and Basics

Inventory and audit reporting are common practices used to report chemical quantities to national or international regulatory organizations like the CWC and CFATS (See Section [9.4](#_bookmark91) for more information). Depending on your institution and country, you may have to supply inventory reports to other regulatory organizations.

Reporting should be performed on a regular basis, but the schedule is typically defined by the institution and its country’s government regulations. The schedule of reporting and auditing should be included in your SOP (see Section [1](#_bookmark0)). Reporting requirements focus on specific chemicals and their total quantities. Please check with your institution to determine which reporting requirements pertain to your inventory.

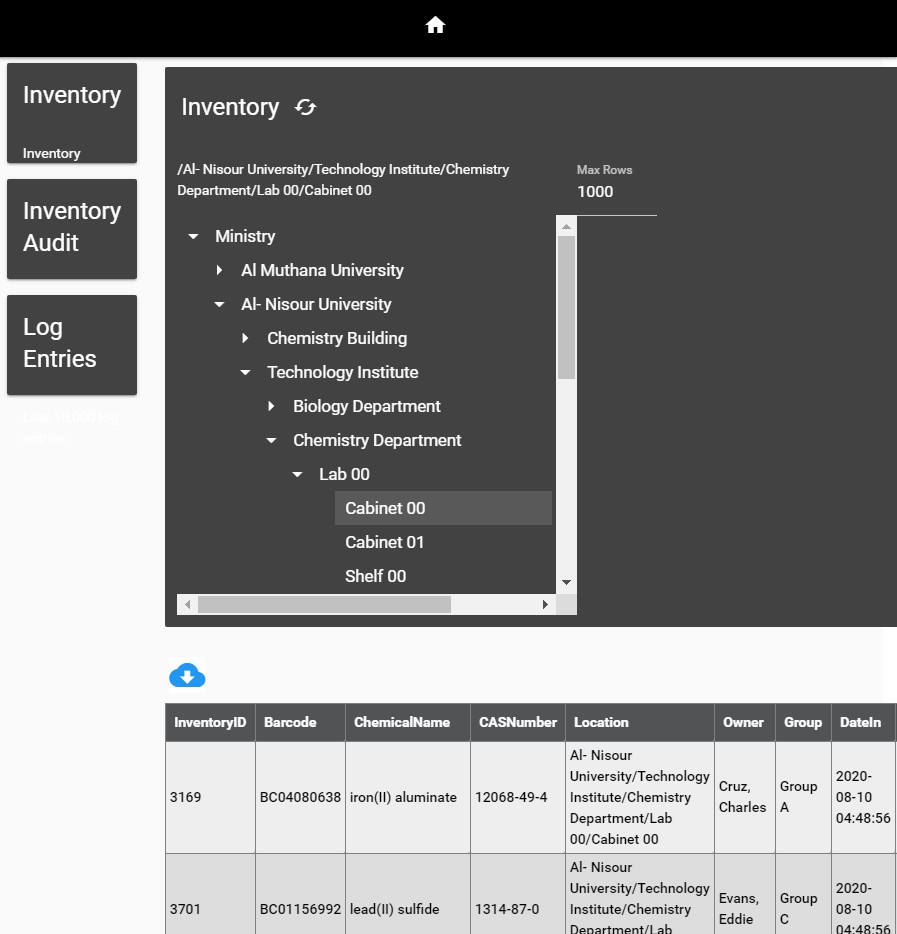
The CAT© software assists with satisfying reporting requirements by producing simplified, exportable reports. Three optional reports can be generated. The report results will be limited to the user’s Home Location (see Section [8.1.3.2](#_bookmark66)). See below for detailed instructions on Inventory, Inventory Audit, and Log Entry reports.



* + 1. Inventory Report

The Inventory Report lists all the chemicals within a selected location in alphabetical order. The Inventory Report displays each chemical barcode, name, CAS #, location, owner, container size, and remaining quantity. This report is designed to assist with (or simplify) quantity reporting of chemicals at a specific laboratory or other repository at the institution or facility.

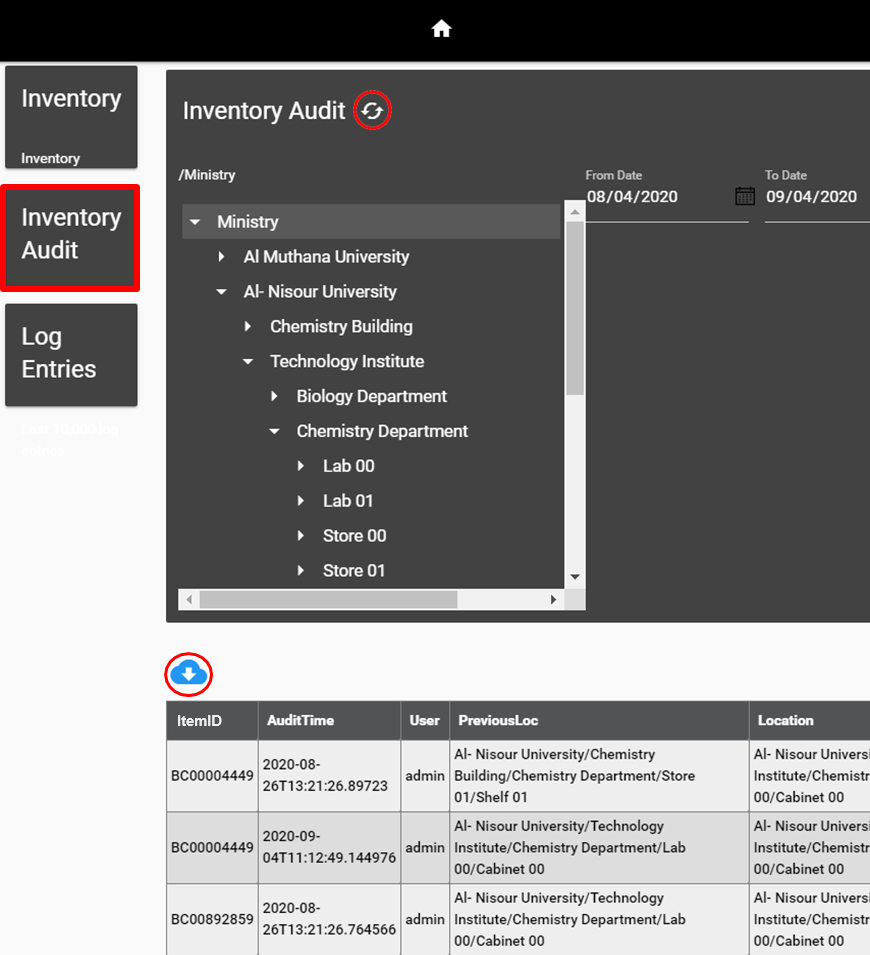
* + - 1. Click the Inventory box, and the report field will appear on the right side of the window.
      2. Click the triangle to open the location tiers and select a location. This location may house the entire inventory or represent that of a specific laboratory within a larger institution.
      3. Selecting a location will automatically run an Inventory Report, but you can also click on the circular arrow symbol ( ) to generate a report on the screen.
      4. To save or print the report, click the Download ( ) icon to save or open a CSV file of the report.



* + 1. Inventory Audit Report

The Inventory Audit Report lists all audit activities performed for a selected location within a selected time frame (the default time frame is the past month). The Inventory Audit Report displays the chemical barcode, audit date, user performing the audit, and the previous and current locations for each chemical.

* + - 1. Click Inventory and the report field will appear on the right side of the window.
      2. Click the triangle to open the location tiers and select the location (this may include the entire inventory or a specific location/laboratory).
      3. Select the time frame for the inventory audit. This can be done by choosing the desired start date in the “From Date” box and the end date in the “To Date” box.
      4. Click on the circular double arrows symbol (  ) to “Run Report.”
      5. To save or print the report: click the Download ( ) icon to save or open a comma-separated values (CSV) file of the report.

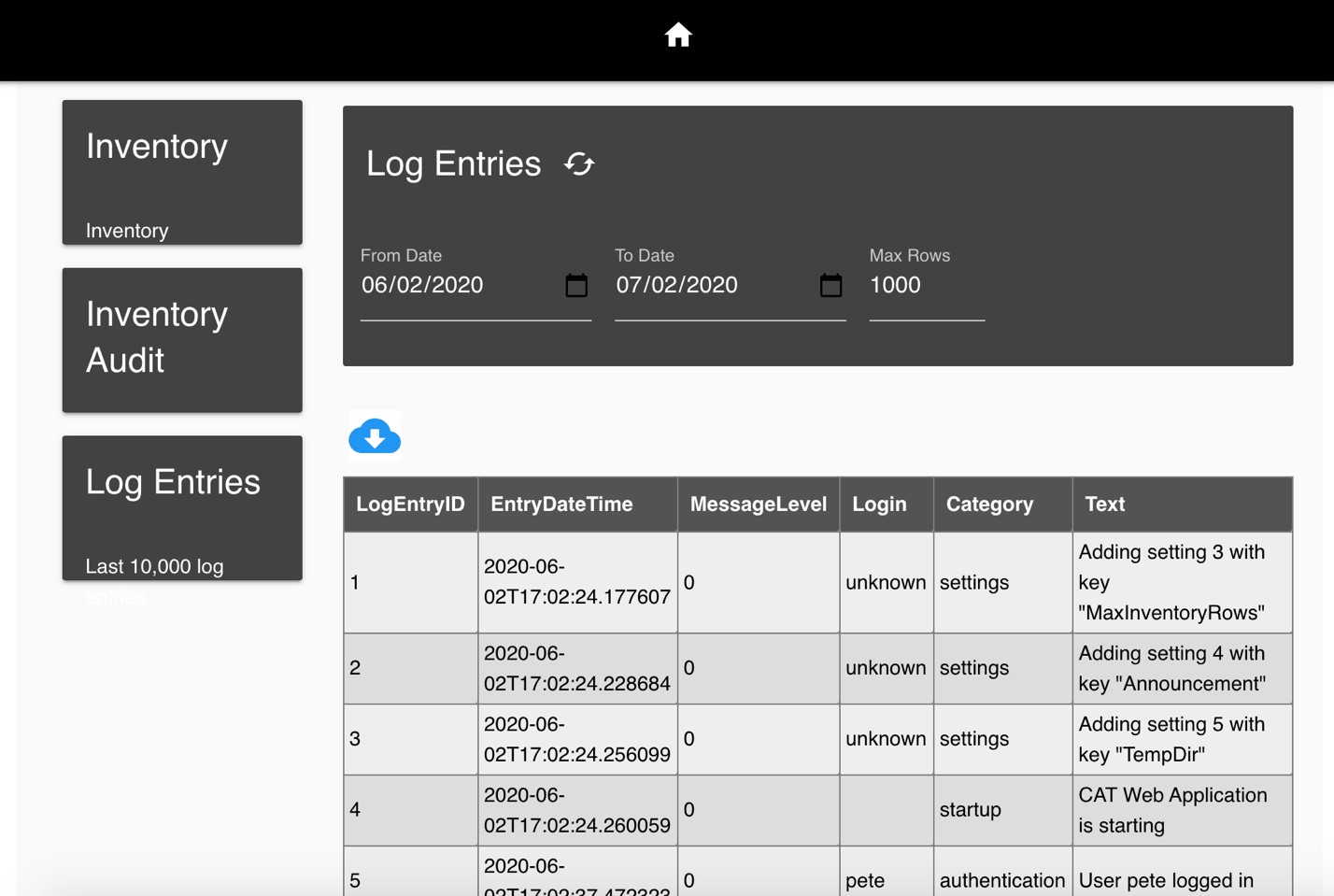


* + 1. Log Entries Report

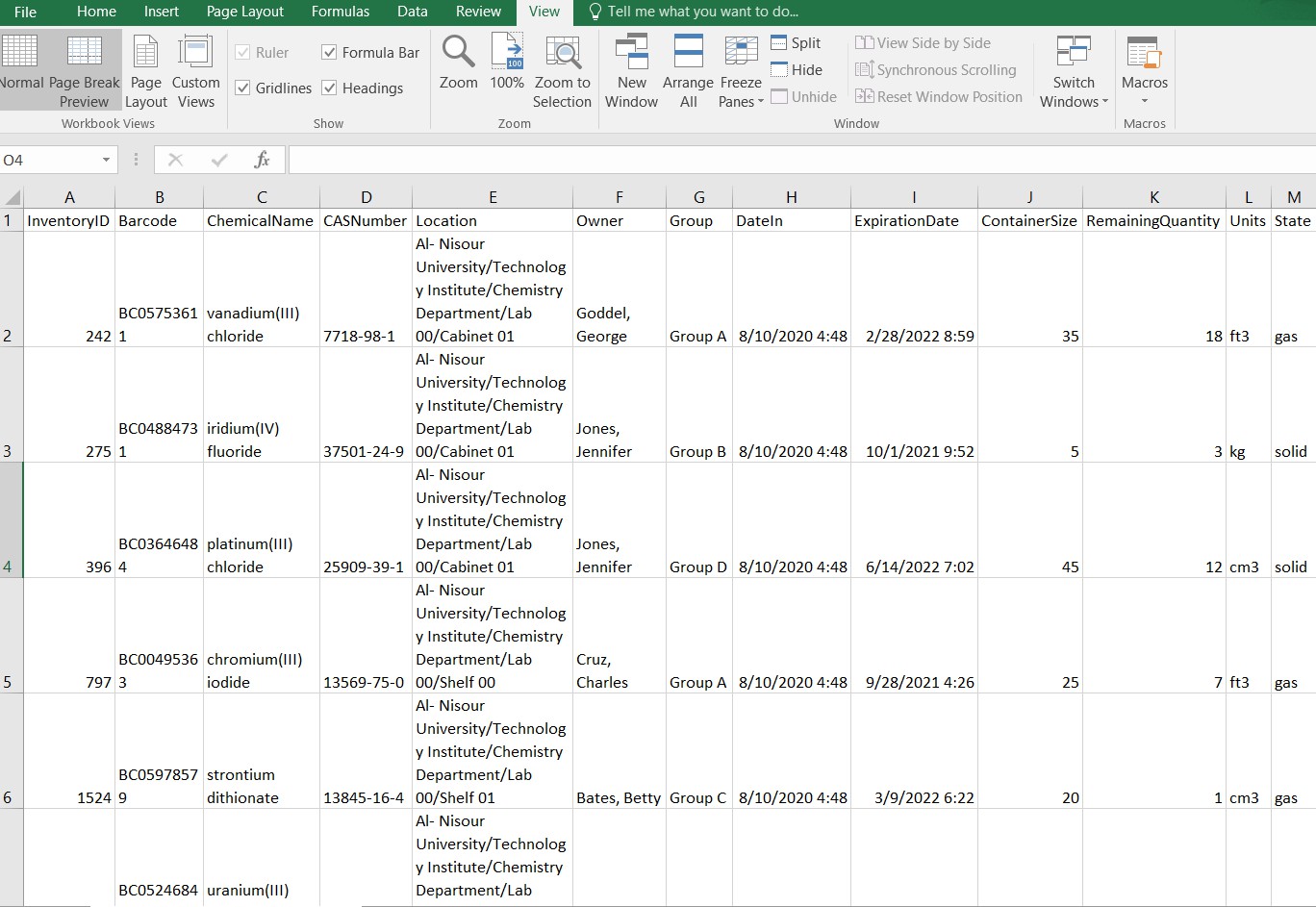
The last reporting option in the CAT© software is the Log Entries report. The report will automatically populate, as shown below, once you select Log Entries and the Run Report icon. This report displays all

activity performed in the program by date with each logged-in user and any changes made in regard to adding/importing items to the inventory.

* + - 1. Click on the circular double arrows symbol ( ) to “Run Report.”
      2. Select a date range to display all activities performed within that time frame.
      3. Click the Download () icon to save or open a CSV file of the Log Entries Report.



* + - 1. The downloaded report can be opened in an Excel® spreadsheet window (example shown in [Figure 18](#_bookmark56) below).

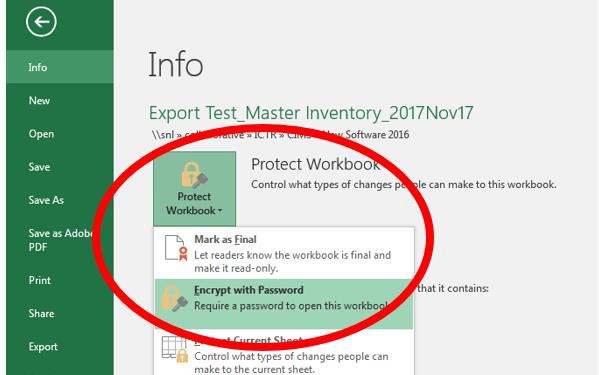


*Figure 18. Example Log Entries Report*

### Reports Security

Additional security measures are highly recommended for downloaded files in order to prevent unauthorized access to the inventory. The instructions below are for Microsoft® Excel 2016.

1. Click **File**.
2. Click “**Protect Workbook**” and select “**Encrypt with Password**”



1. A separate window will appear for a user to enter in the desired password and click OK.
2. Reenter the password and click OK.

# Audit Icon

*This section details the Audit icon for physical auditing and inspection of inventory items. Sometimes referred to as a “stock check,” this software feature will help to verify item locations and quantities.*

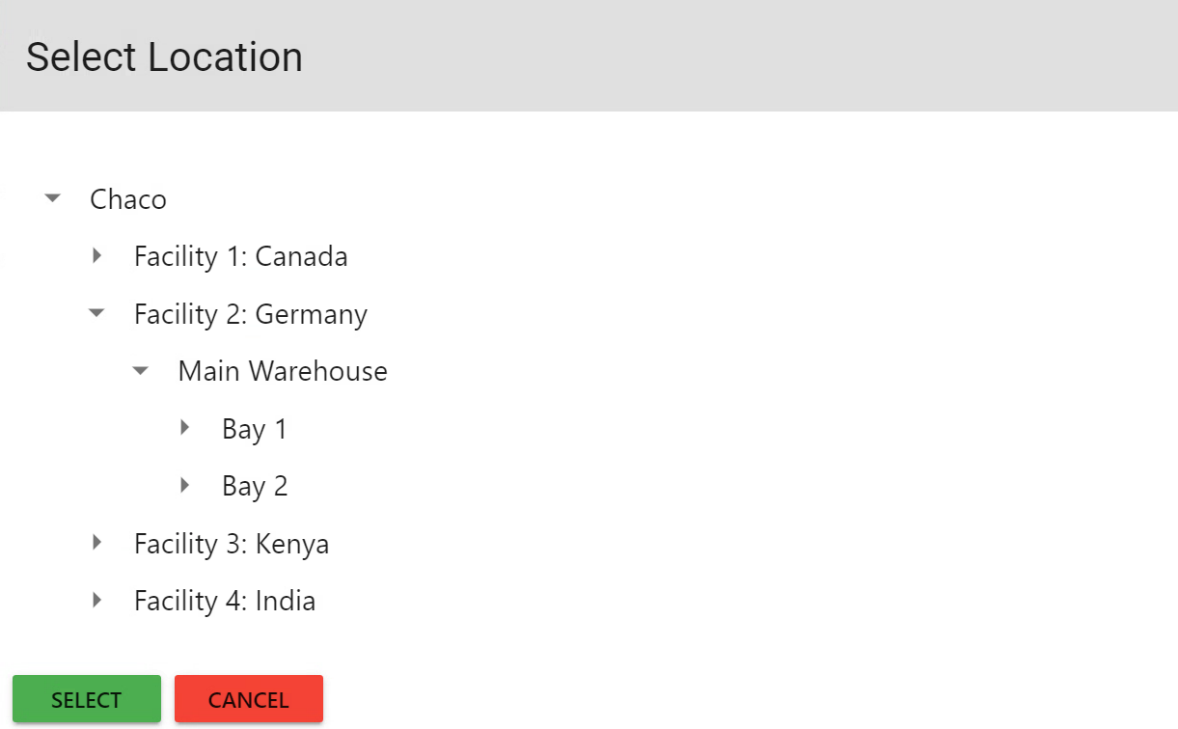
The Audit page is designed to be a live auditing feature in the CAT© software. It generates a specific, location-based inventory audit that allows for corrections to item locations. To complete an audit for multiple locations within your institution, see the instructions in Step 8. Root, Admin, Manager, Auditor, or Editor access is required in order to conduct an inventory audit. Reports based on the audit results can be generated (see Section [6.1.2](#_bookmark54)).

### Inventory Audit

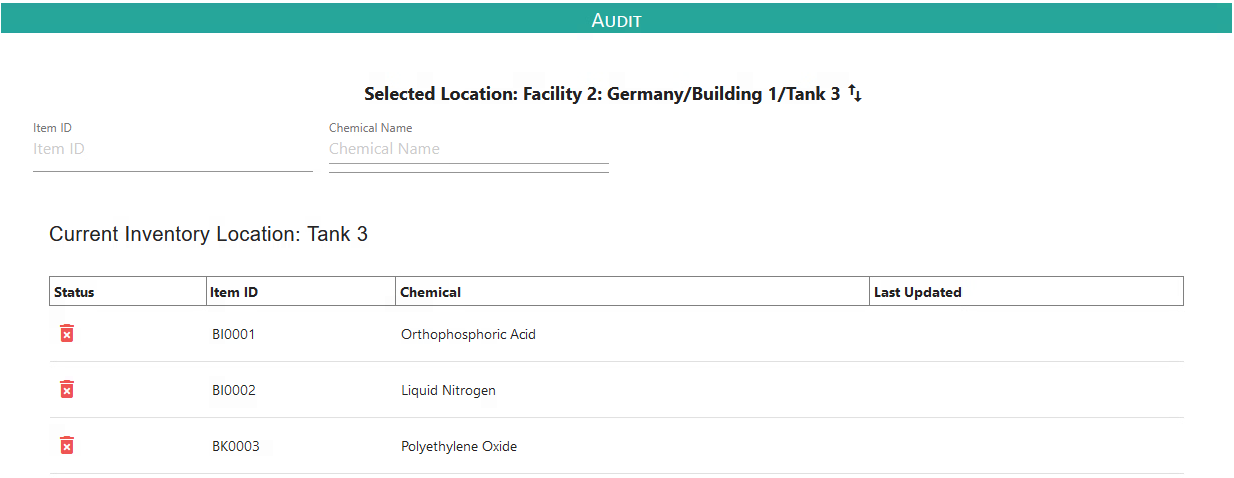
1. Select the **Audit** icon on the Home Screen. If you are not on the Home page, click the icon in the navigation bar to easily access the Audit page.
2. Choose a location from the “**Selected Location**” field by clicking the up/down arrows:



* 1. The location selected should be very specific as to the physical storage location that the auditor is prepared to review.



1. Once a location is selected, a list of all the chemicals in that location will be shown under Current Inventory.

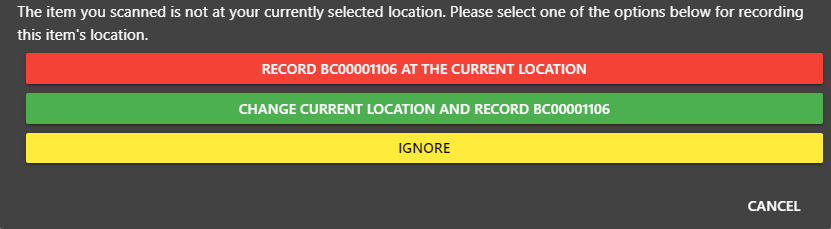


1. Scan (with a barcode scanner) or type an item’s ID or barcode into the “**Item ID**” field and click Enter.
   1. Item Found:
      1. If the item having the scanned barcode is listed in the selected location, the

**Status** icon will change from red to green (shown below).

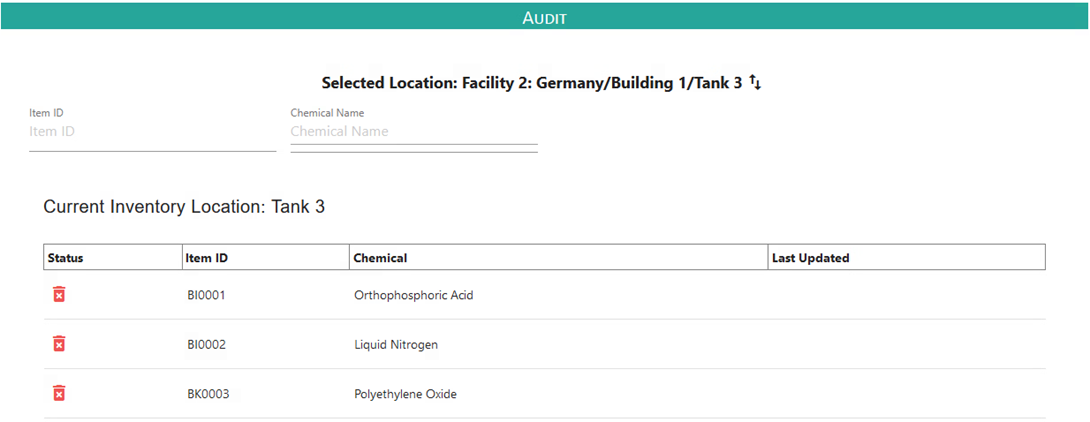


* 1. Item Not Found:
     1. If an Item ID or scanned barcode does not correspond to a chemical in the selected location, a popup window (shown below) will appear for the user to record the barcode at the current location, update the chemical’s current location, or ignore the entry. Selecting IGNORE or CANCEL allows the user to exit the popup window and remove the barcode entry.



* + 1. If an Item ID or scanned barcode does not correspond to any chemical in the entire database, a Not Accessible message will appear.
       1. Click DISMISS to exit the message window and remove the barcode entry from the audit.
       2. To add this chemical item to the inventory, see Section [4.3.](#_bookmark34)

1. To remove an item from the Current Inventory Location list, click the red trash can icon to delete it.



* 1. The Status will change to Location Unknown (), meaning the location is not verified in the audit, but this will not change the inventory location in the software.

1. The Admin and/or Manager should check the records and follow procedures from the institution’s SOP to determine how to approve, record, and/or report discrepancies between the inventory database and the item’s current location.

|  |
| --- |
| **NOTE** |
| Monitoring discrepancies may indicate common problems in SOPs or “practices and procedures” in the CIMS. Frequent discrepancies may require a review/update of SOPs and practices or additional training. Rewards or penalties—such as a team celebration for labs with the smallest number of discrepancies—can be used to promote proper implementation of inventory item in the databases. |

1. Once discrepancies are reviewed, the information should then be corrected in the inventory database.
2. If you are inspecting multiple locations, you can repeat steps 1–5 and correct the inventory discrepancies when the entire audit is finished.
3. CAT© can generate Audit reports. Click on the Reports icon to see a summary of the results from each audited location (see Section [6.1.2](#_bookmark54) for more information).

# Settings Icon

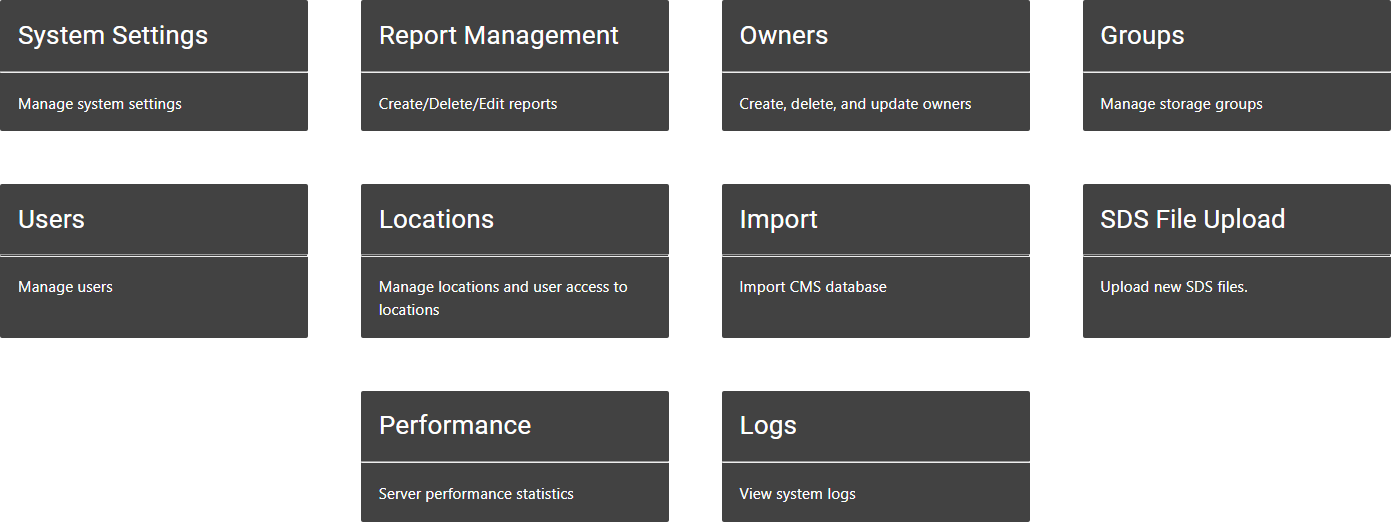
The Settings gear icon is only accessible to Root, Admin, and Manager roles for the purpose of editing specific software settings. Admin users are able to manage chemical owners, storage groups, users, locations, uploading SDS files, performance statistics, and system logs. Users in a Manager role will also see the Settings gear icon. Their

options, however, will be limited to importing a CMS database, uploading new SDS files, managing owners, managing storage groups, and managing users within their own assigned location.

## Settings Home Page

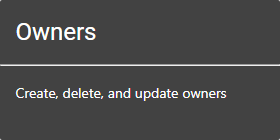
The Settings page can be accessed from the Home screen by clicking the Settings icon, or from the navigation bar by clicking the Settings (  ) icon.

Depending on a user’s permissions, the main Setting screen will include some or all of the options shown below.



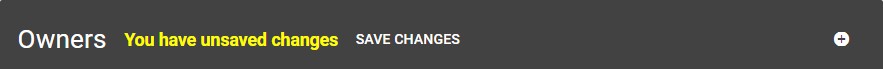
To return to this Settings home page click the Settings icon (  ).

* + 1. Owners

Click on the Owners box to manage owners. Owner is a category designated for the person responsible for that chemical. Administrators and managers determine and input the name of the person or Owner responsible for each chemical when it is added to the inventory (see Section [4.3](#_bookmark34)).

 *Add or Edit Owners*

* + - 1. To add an Owner, click on the small white plus sign icon () in the top right-hand corner of the Owners box.
      2. A “NEW OWNER” field will appear in the Owners box.
      3. Select the text NEW OWNER and input their name.
      4. When the name of the new Owner has been entered, click the “**Save Changes**” button that will appear at the top of the Owner’s box. Owners will be automatically organized in alphabetical order moving horizontally from left to right and descending.



* + - 1. To edit an existing Owner, click on the name update it, and then click **Save Changes**.

* + 1. Users

Click on the Users box to manage Users. Users are any personnel who need to access the chemical inventory. Administrators and Managers can assign users to certain roles that determine each user’s level of access to the inventory. Roles are assigned when adding a new user and are listed in descending levels of access.

8.1.2.1 User Role Definitions

CAT© includes the following six programmed user roles delineated by permission level:

**Root** – Highest level permission in the CAT© software. Should be limited to only server managers and software programmers.

**Admin** – Highest level permission recommended for any general CAT© software user. Should be limited to the highest inventory managers for your institution or organization. This Admin user role has access to edit and view everything in the inventory and add new users (including Admins at their Home Location level and location tiers below.

**Manager** – Highest level permission recommended for laboratory managers. The Manager role can add and edit inventory items and users at their Home Location level and below but cannot create other Manager roles.

**Auditor** – The Auditor is an optional role that can be used if your institution uses a third party for inventory audits. The Auditor role can only add and edit inventory items at their Home Location level or below.

**Editor** – Editor is an optional role that can be used by your institution to give editing permission to specific users. This may be useful if your institution has senior laboratory staff that manage a laboratory under the direction of the laboratory manager.

**Viewer** – The default user role for any person who has authority to see the inventory items. The Viewer only has access to see inventory at or below their Home Location level.

8.1.2.2 Add a User

It is important to refer to your institution’s policies and procedures on who to assign user permissions for inventory access. It is recommended to limit user access to those who have a need and have been trained to properly manage the inventory and protect the information.

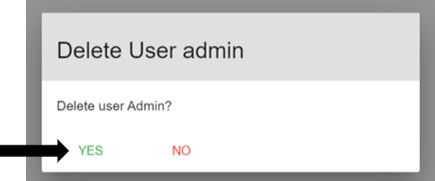
* + - 1. Click on the  icon to add a new user. This icon is located at the top of the Users box.
      2. A New User box will appear on the right. The Admin or Manager adding a new user will input the new user’s Home Location, email, last name, first name, middle name (optional), position (optional), workplace (optional), photo (optional), and role.
         1. The Home Location is the highest permission level that the user can view and/or edit inventory items in the Inventory page.
         2. User roles are listed at the bottom of the New User box and include all six available user roles. You can select multiple roles for the new user, but assigning only one role per user is recommended.
         3. Click the green Upload Photo box to assign a picture to the user. This is an optional feature to identify users.
      3. Careful review should be given to the Home Location and role assigned to user.
      4. Click Save to add the new user.

8.1.2.3 Edit a User

To edit the user information, click on the specific user. The User: Name box will appear on the right. Simply select the field to edit and click Save.

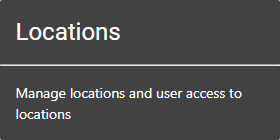
8.1.2.4 Delete a User

To delete a user, click the  icon located at the bottom of the box containing each user’s information. When this icon is clicked, a popup box will ask if this user would like to be deleted. Click **Yes** to delete the user.



|  |
| --- |
| **NOTE** |
| There is no Undo button. Once a user has been deleted from the CAT© software system, their information must be manually re-entered into the CAT© system. |

* + 1. Locations



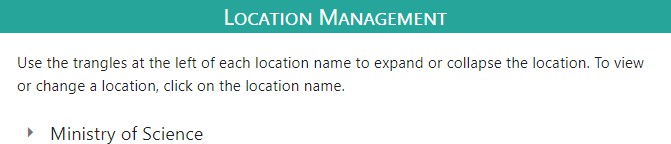
Click on the Locations box to manage storage locations. Locations are organized into the tier levels set up during the CAT© installation and are key to keeping a chemical inventory organized. Within the Locations page, a user can add, rename, or delete a location (based on user permissions).

Inventory locations shown on this page will be the only location options

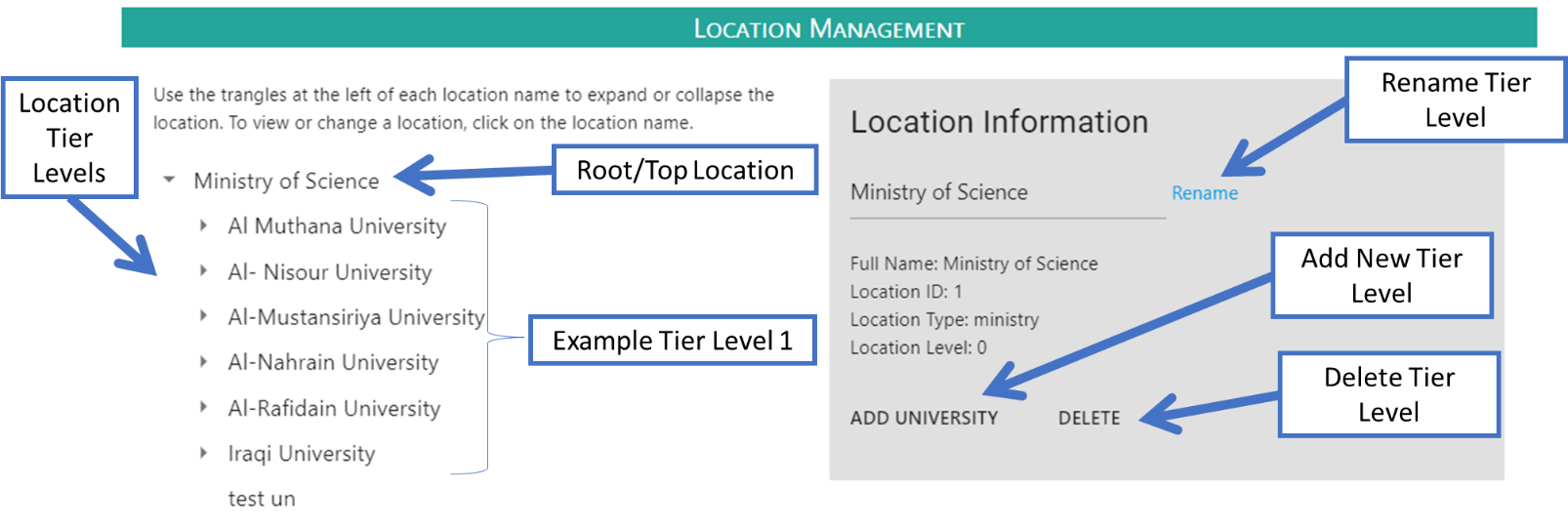
shown when adding or editing an inventory item.

8.1.3.1 Overview and Basics

When the user clicks on the Locations box from the Settings menu, they will be taken to a Location Management page (shown below).



The institution locations (originally created in the software setup) are organized on the left side of the screen. The user can expand or collapse the location by using the triangles at the left of each location name. The user can view or change a location by clicking on the location name. A box labeled Location Information will appear on the right side of the page. Depending on their permission level, the user will be able to make changes to the location (see instructions below to Add/Edit/Delete locations).



8.1.3.2 Editing Locations

* + - 1. Click on the tier level location that you want to edit.
      2. The Location Information window will appear on the right side of the page.
      3. Highlight the text in the Location Name field and click Delete or type in the new location name.
      4. Click the “Rename” button on the right side of the Location Name field.

8.1.3.3 Deleting Location

1. Click on the tier level location that you want to delete.
2. The Location Information window will appear on the right side of the page.
3. Click the Delete button that appears at the bottom of the Location Information box.

|  |
| --- |
| **NOTE** |
| Only locations that have no lower location tier or inventory items can be deleted. |

8.1.3.4 Adding locations

1. Click on the tier level location that you want to add a new location to. The location type options will vary depending on the location tier level set up by the Root user.
2. The Location Information window will appear on the right side of the page.
3. Depending on the user permissions and their Home Location, the user will be able to see which location type can be added at the bottom of the Location Information box.
4. Select the location type at the bottom of the Location Information box.
5. A popup box will appear in which the user can type the name of the location. Click the OK button at the bottom of the popup box to save the new location.
   * 1. Import

The Import section can be used to add or consolidate existing inventory data files into the CAT© software. CAT© is compatible with the

SNL-developed chemical inventory products CMS© and the Excel-based CIMS spreadsheet. This feature can import any database (“.db,” “.sqlite”) or

Microsoft® Excel spreadsheet (“.xlsx”) formats. To ensure a seamless import of the inventory data, preparation of the inventory location is recommended to compare the inventory items tier location between the CAT© locations and the importing file are consistent. The steps provided below are those for a generic import into CAT©. Detailed instructions for importing from the previous SNL-developed CMS© are in Section [9.3.](#_bookmark83)

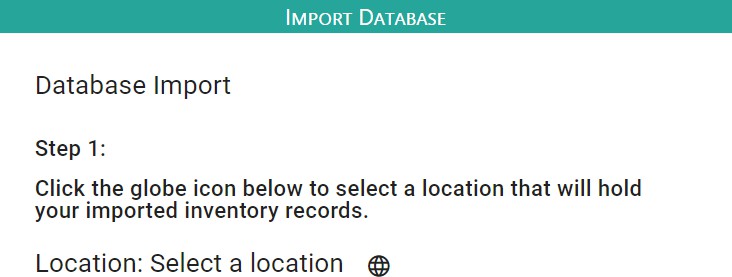
8.1.4.1 Importing into CAT©

* + - 1. Preparation:
         1. There are two required steps to prepare for importing an excel spreadsheet into CAT©

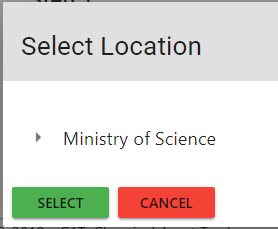
Review inventory columns to those used in the CAT© software. Required columns are Barcode, Name, CAS#, and Location

Update item location to the format of that of the location tier level at your institution. Location tier levels should be separated by a forward slash. Example: University/Building/Laboratory/Cabinet, University ABC/Chemistry Building/LAB 1023/Acid Cabinet A.

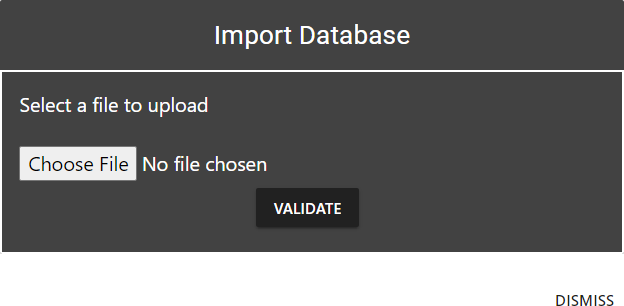
* + - 1. Click on Import from the Settings home page.
      2. Click the Globe icon.



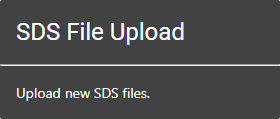
* + - 1. The Select Location popup window will appear for the user to select the import location (use the top location that corresponds to the location of the importing file). Click on the arrow on the left side to open the location tier levels.



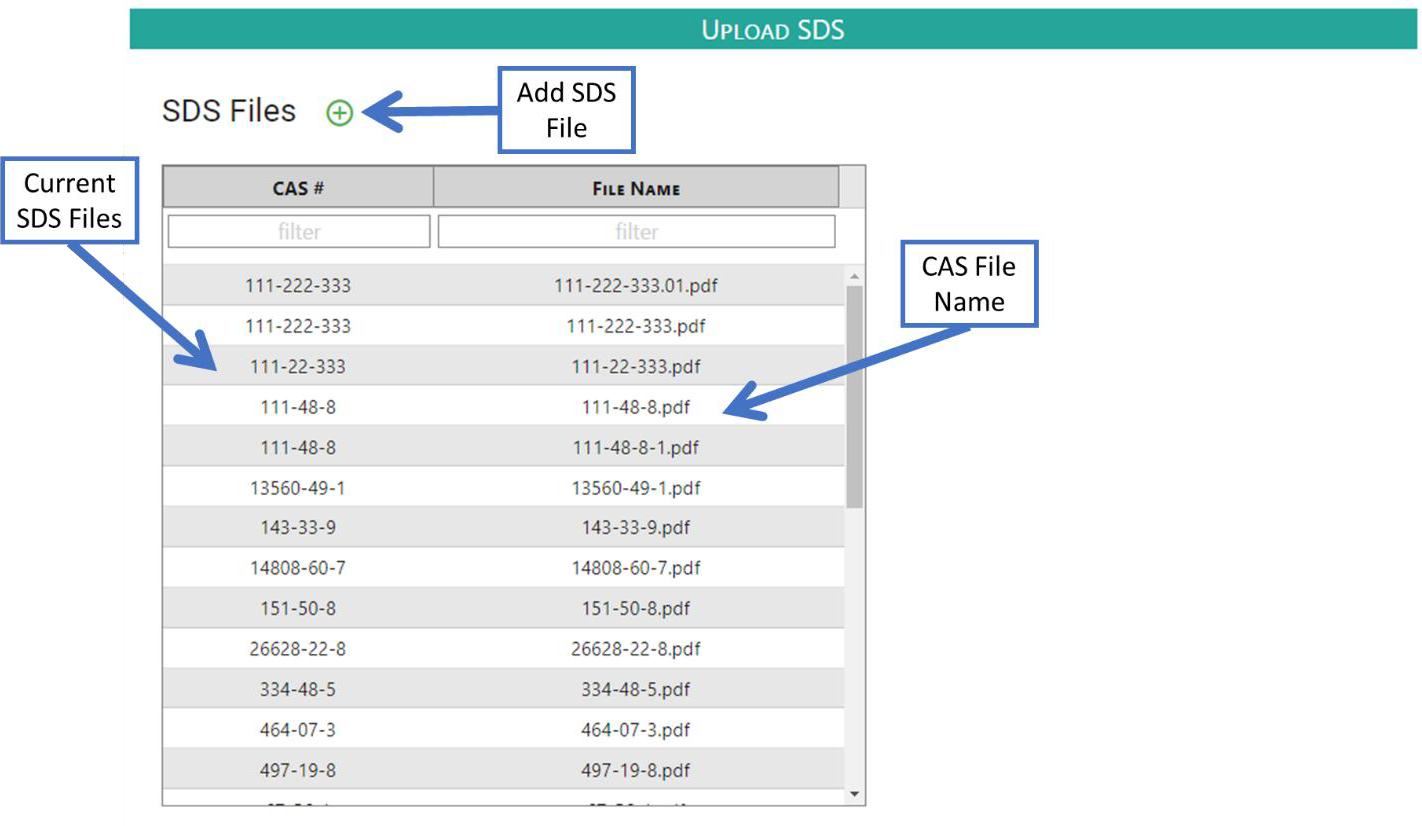
* + - 1. Click on the location name, and then press the SELECT button.
      2. The user will proceed to Step 2 which is the inventory file validation process. This validation process is used to help locate any discrepancies in the inventory file before importing. Click the VALIDATE button.



* + - 1. The Import Database popup window will appear. Click on Choose File to select a database file. The file extension must be a .db, .sqlite or .xlsx format. Click the black VALIDATE button.
      2. The user will proceed to “Step 3 to review the Validation Message. Click the green IMPORT button to import the file (proceed to step 9) or the red RETRY button to validate with another location (return to step 3).
      3. After clicking the Import button, a popup box will appear to confirm the import is complete. Click the DISMISS button to review the Import Results.
    1. SDS File Upload



The SDS File Upload feature allows the user to upload new SDS files into the CAT© software. Uploading more SDS files will build the database of available SDS for inventory items. Shown below is the main page for uploading and reviewing current SDS file.



*Figure 20. Overview of the SDS File Upload Page*

NOTE: More than one SDS file can be added for each CAS#, but CAT© will only link to the most current version.

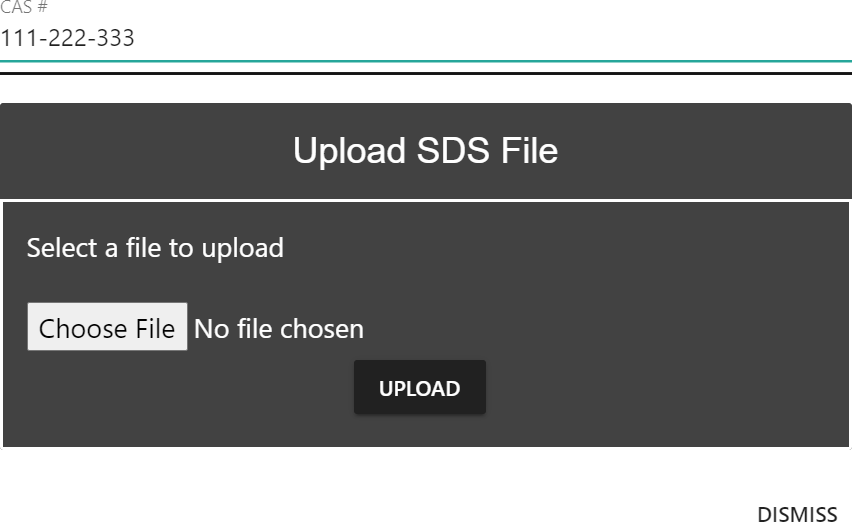
8.1.5.1 Upload an SDS

* + - 1. Click on the “SDS File Upload” box in the Setting home page.
      2. Click on the Add New button shown as a green plus (see below) and type in the CAS # of the chemical.

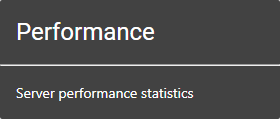


* + - 1. When the popup window appears, enter a valid CAS number in the CAS# field.
      2. Click the Choose File button and choose a file to be uploaded. Files should be in the form of

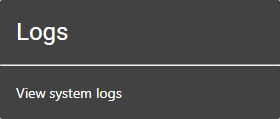
a PDF and should be named with the chemical’s CAS #.



* + - 1. Once file is chosen, press Upload button.
      2. The SDS file will appear in the SDS list on the Upload SDS page.
    1. Performance



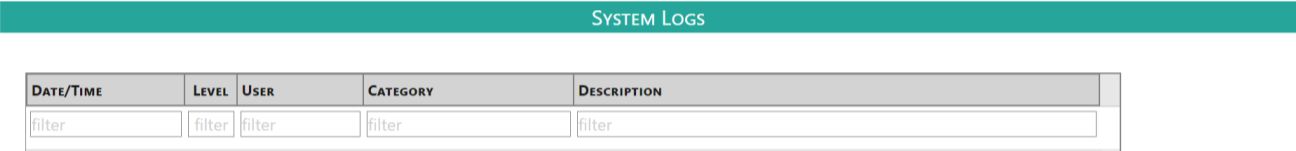
* + 1. Logs



The Performance feature is only accessible to the Root user role. This feature allows the user to view server performance statistics. It contains a table of performance statistics for operations completed in CAT©.

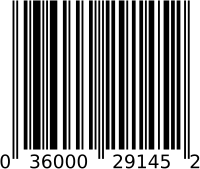
The Logs feature is only accessible to the Root user role. This feature allows the user to view system logs in CAT©. It contains a table that displays user report of who logs in and any operations or changes that were made within the inventory in an ascending order (newest on the bottom). Table columns

include the Date/Time, Level, User, Category, and Description of each update. Filter options are available at the top of each column (see below).



# Appendix

## Barcodes and Barcode Readers

Barcode is the generic term for a visual representation of information. The first barcodes were bars with varying widths and spacings and gave rise to the name. Now the term barcode is commonly used as a general category for any method used to generate a machine-readable (optical scanner) code of information. There are two basic types of barcodes: linear (one-dimensional) and 2D (two-dimensional) or matrix codes. Linear barcodes are limited to alphanumeric codes, meaning any combination of numbers and letters. There are a number of linear barcode types, but the two most common or recognizable formats are the Code 128 and UPC-A barcodes [(Figure 21](#_bookmark75)).

a) b)

*Figure 21. Linear Barcode Examples a) UPC-A and b) CODE 128*

2D or matrix codes have a greater flexibility to include coding of symbols with alphanumeric coding. They are, therefore commonly used on products or surveys to send people to a URL or website. There are many 2D or matrix barcode types but the two that are the most common or recognizable are the Aztec Code and the QR code for 2D barcodes [(Figure 22](#_bookmark76)).



*a) b)*

*Figure 22. 2D or Matrix Barcodes Examples a) Aztec Code and b) QR Code*

NOTE: The CAT© software application is only compatible with linear barcode “Code 128” and has a 64- character barcode limit.

* + 1. Generating Barcodes

There are a variety of software applications that can be used to generate barcodes, or you can purchase the barcodes printed on labels. Regardless of which you choose, there are several options, those options will depend on the resources that you have available and the chemicals you have. Options to explore for printing your own barcode label include adhesive, paper, ink, and protective coating types.

The CAT© is designed to monitor a single container in a single location, therefore duplicate barcodes will cause issues in physical inspections and audits. This is why it is important to consider the barcode labeling system that you want to use at your institution before creating or purchasing labels. For example, you can begin your barcode with an alphabetic code that can denote the location levels at the institutions. In addition, this design step will help determine the design (length and width) of the barcode. It is important

to review institution requirements for the barcode design as well as container limitations (see the Labeling Container Section [9.2](#_bookmark79) below for considerations on container dimension).

Barcode Example: Institution + Department + Laboratory + Number



* + 1. Barcode Readers

Barcode readers or scanners are, in simple terms, the equipment or machine that “reads” or decodes the barcode information. For the CAT© software application, you can use any barcode reader that can decode the CODE 128 barcode information into any of the barcode fields in the software. The user will need to set up the barcode reader with their computer or mobile device.

## Labeling Containers

The CAT© software application is designed to indicate a unique ID or barcode for each container. Regardless of whether you create or purchase labels (alphabetic or numerical) or you purchase or create barcodes, you will need to label the container. This section includes best practices for applying labels to a chemical container. The components of the label are an important consideration in labeling. There are a variety of options for labels, and depending on your institution’s resources, you will need to explore label adhesives, paper, ink, and protective coating types. Chemically resistant labels are best but can be expensive. An alternative option is a chemical-resistant tape over the label which is cheaper but still an expense for inventory management system maintenance.

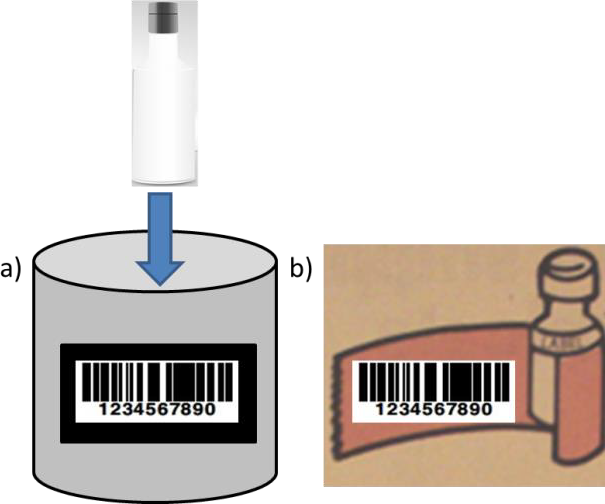
* + 1. Label Application

Find a clean flat surface on the chemical container and attach the adhesive label. For round chemical containers, attach the barcode label vertically [(Figure 23](#_bookmark81)), as the scanner may not be able to read the barcode due to curvature of the container:



*Figure 23. For Round Chemical Containers, Place the Barcode Vertically*

For very small chemical containers, it may be necessary to either (a) use a larger secondary container, plastic bag, etc. or (b) place the adhesive barcode onto a tag secured to the chemical container. Protect the adhesive barcodes and other chemical container labels from solvents or anything that might remove them or make them unreadable.



*Figure 24. For very small chemical containers, (a) use a larger secondary container, plastic bag, etc. or*

*(b) place the adhesive barcode onto a tag secured to the chemical container*

### Importing Inventory from CMS©

The CAT© Import function (in Settings) can be used to import inventory data from a CMS© database file or from the exported CSV file from CMS©. This section provides descriptions of this process for importing directly from the CMS© database (.db) file, but the process is the same for importing the CSV file.

* + 1. Preparation

There are two required steps to prepare for importing from CMS© into CAT©.

* + - 1. Location Preparation: During the import process, the user must ensure that all incoming locations from the CMS© file exist in the CAT© location tier levels before inventory data can be imported.
         1. Identify the locations that are used in your existing CMS© inventory.

Note that CMS© does not place any restrictions on the locations that are assigned to your inventory. It treats locations as labels only. In contrast, CAT© uses a well-defined hierarchy of locations of different types (see Section [8.1.4.](#_bookmark67)) For example, the top of the location hierarchy might be defined as “Ministry of Education.” Beneath the ministry would be universities, followed by labs, etc. This location hierarchy schema is defined by the CAT© system administrator (Root User), but users are able to add new locations at any point in the hierarchy.

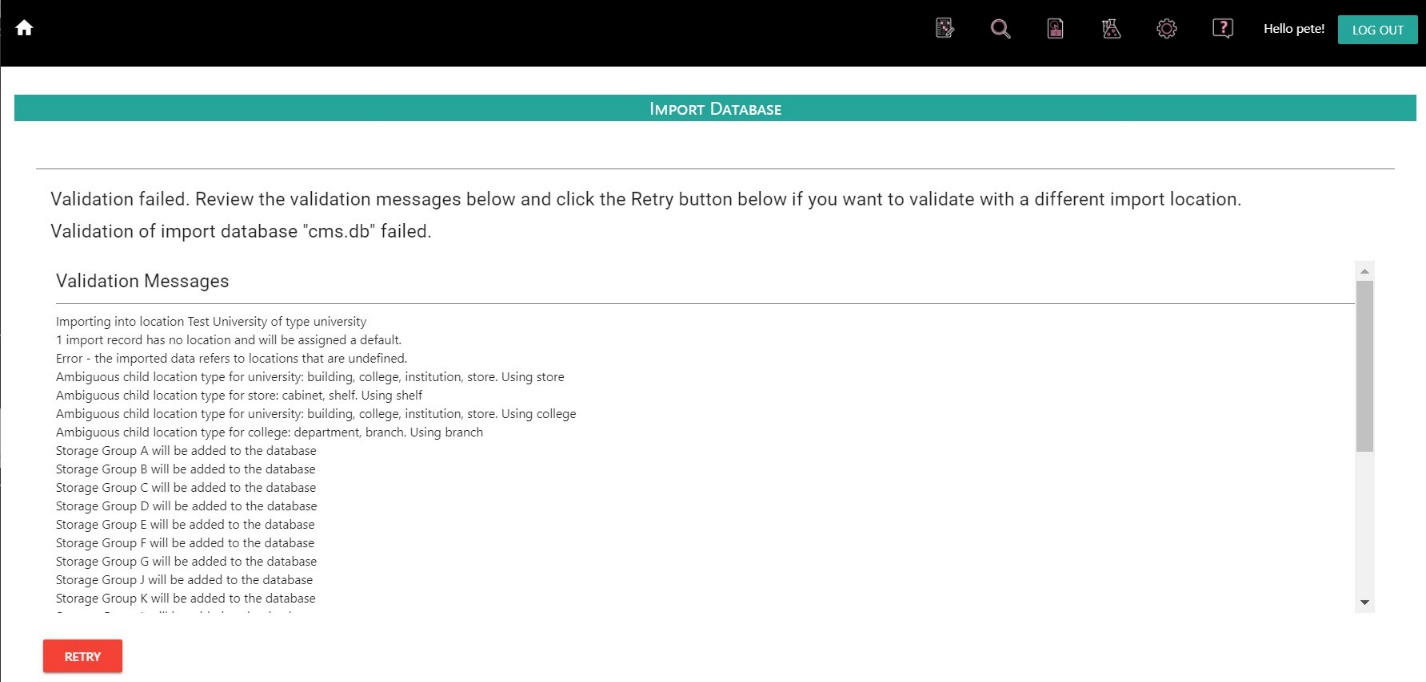
* + - * 1. Update the item location to the format of the location tier level at your institution. Location tier levels should be separated by a forward slash. Example: If your location tier levels for the laboratory location were: University/Building/Laboratory/Cabinet, then your CMS© software location would look like this: University ABC/Chemistry Building/LAB 1023/Acid Cabinet A.
      1. Locate the file location of the CMS database file that you want to import.
         1. When importing from CMS, the user must specify the full path of the CMS database file

on the user’s file system. This will typically be C:\ProgramData\CMS\cms.db.

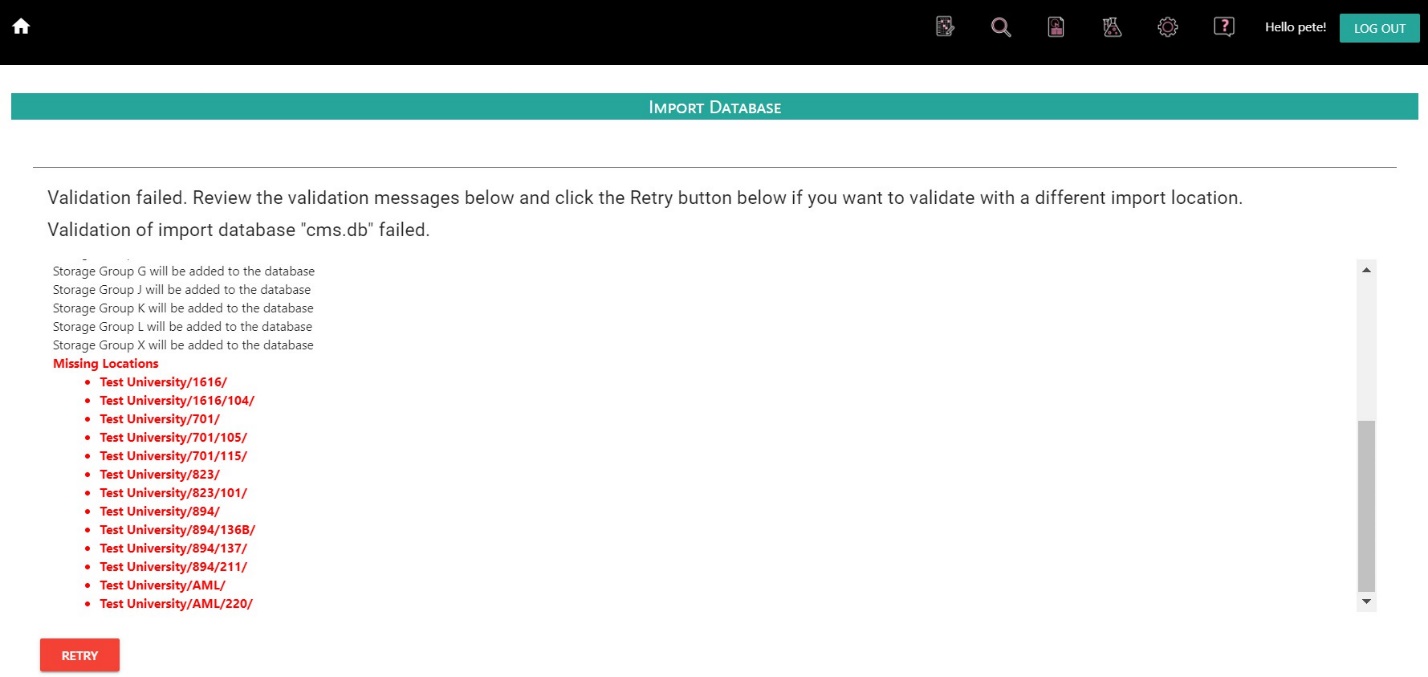
* + 1. Identifying Missing Locations

The CAT© import process will provide useful feedback when the import process is started. Importing new data is a two-step process.

* + - 1. Open the Settings page and select the Import box. This opens the Database Import page.
      2. Click the Globe icon  to select the location that will contain the new, imported inventory items.
      3. Click the VALIDATE button to open the Import Database dialog.
      4. Click Choose File to select the CMS© database file to import. (This file is typically in C:\ProgramData\CMS).
      5. Once the CMS© database file is selected, click the VALIDATE button for a report of the CMS© inventory items and to confirm that they can be imported (see example image below).



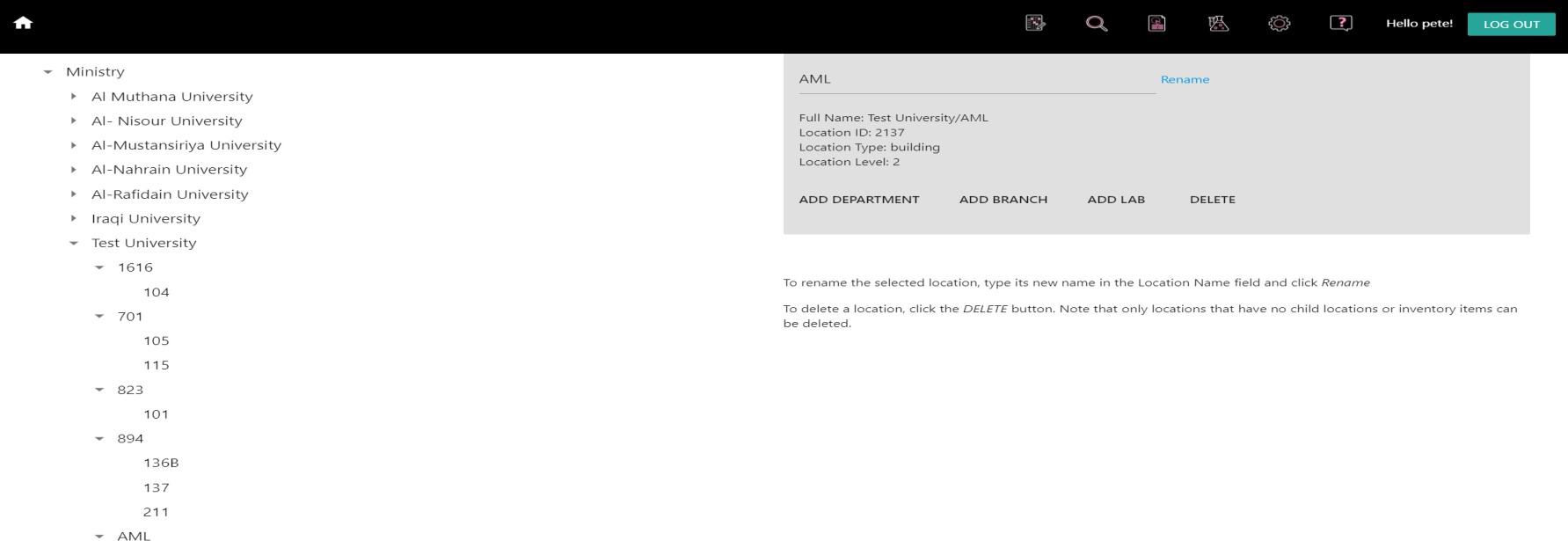
If there are missing locations (see example image below), copy them to the clipboard and save in Notepad or Word for reference when creating the missing locations. You will need to add any missing location(s) before the import process can complete. If you have missing locations, proceed to Section [9.3.3](#_bookmark86) below.



* + 1. Defining CAT© Locations

To complete the import process, the user must add any locations in the CMS© inventory that do not yet exist in CAT©. For the purposes of the example below, CMS© locations from BUILDING/LAB will be assumed, e.g., 1023/112b, 1023/212, Building XYZ/B22. We will also assume that you are importing data for a university that did not yet exist in CAT© Test University.

New locations are defined in the CAT© Locations page under the Settings home page (see Section [8.1.4](#_bookmark67) for detailed instruction on adding new locations). The user must add all the missing locations to the CAT© software [(Figure 25](#_bookmark87)) before proceeding to Section [9.3.4](#_bookmark88) to complete the CMS© import process.

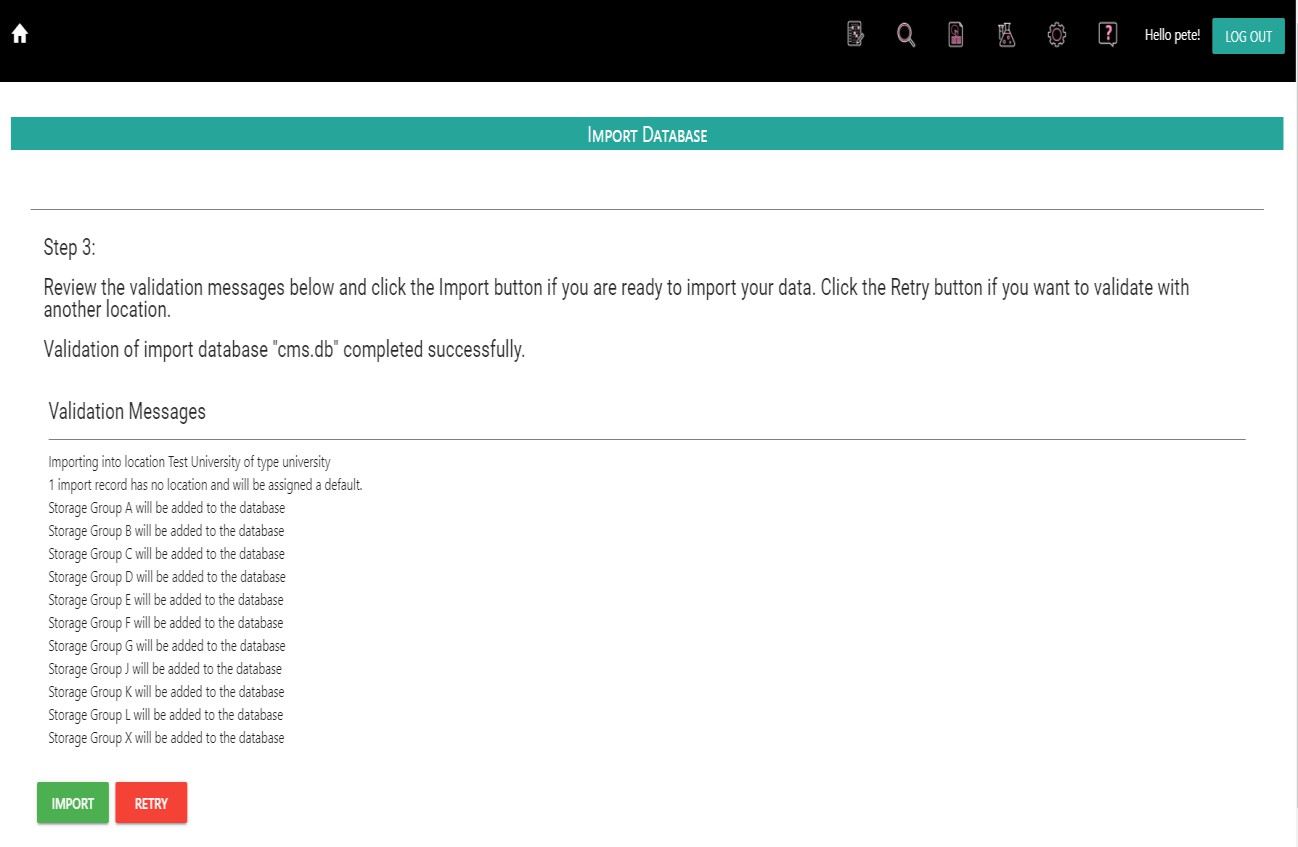


*Figure 25. Adding missing CMS© location to CAT©*

* + 1. Completing the Import Process

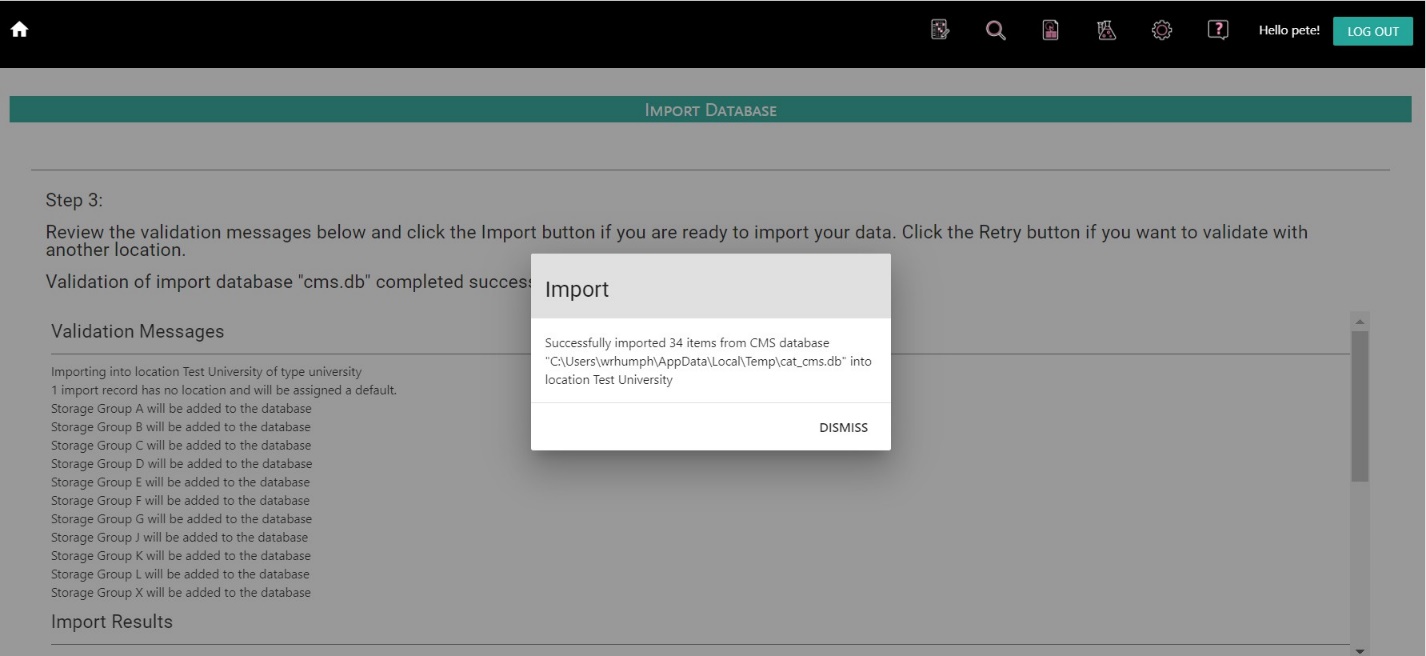
Once all new locations have been defined in the CAT© location hierarchy, the import process can be completed.

* + - 1. Return to the Import Page and select the import location, Test University.
      2. Click the VALIDATE button to bring up the Import Database dialog.
      3. Choose the CMS© data file to import and click the VALIDATE button in the Import Database dialog.
         1. If the validation process is successful, the new items can now be imported (example image shown below).



*Figure 26. Successful Validation Results*

* + - 1. Click the IMPORT button to complete the import process.



*Figure 27. Successful Import Results*

### Definitions

#### ABOUT ICON

The About icon includes information regarding the version of CAT© software being used and the license agreement. See Section [3](#_bookmark11) for more information.

#### ADMINISTRATOR ROLE

The Administrator user role allows access to all the information in the inventory file and control of the inventory (input of information and removal of items). A password is required to have Administrator privileges. See Section [2](#_bookmark4) for setup and detailed information.

#### AUDIT ICON

The Audit icon allows the Administrator, Manager, or Auditor to perform an inventory audit in the laboratory. Scanning the barcodes on the chemical containers will generate a list for the inventory audit. See Section [3.2.1](#_bookmark15) and Section [7.](#_bookmark58)

#### AUDITOR ROLE

The Auditor user role is designed for institutions that have or use someone outside of the lab to audit or check inventory. The Auditor has access to Search, Inventory, Reports, and Audit. The Auditor is responsible for laboratory inventory audits and checks a printed inventory for accuracy. The Auditor cannot view the Settings icon, which prevents the Auditor from adding SDS folder locations, chemical storage locations, and chemical storage groups and owners. See Section [2](#_bookmark4) for setup and detailed information.

#### CA T©

CAT© is a software developed by Sandia National Laboratories to assist in the chemical inventory management system or program at small-to-medium-sized institutions.

#### CHEMICAL ABSTRACT SERVICE REGISTRY NUMBER (CAS RN)

Chemical Abstract Service Registry Number is also referred to as CAS Number or CAS #. This is a unique numeric identifier can contain up to 10 digits assigned to one unique chemical substance and is separated into three groups by hyphens. Starting from the left, the first part of the number has from two to seven digits; the second part has two digits. The final part consists of a single check digit. The check digit, generated by a standard calculation, can be used to verify the CAS validity. All chemical substances registered with CAS are assigned a CAS Number. The CAS Registry—containing more than 71 million organic and inorganic substances and 64 million sequences—is the most authoritative collection of disclosed chemical substance information. For more information on the standard calculation and how to validate the CAS number, and to search CAS Numbers, visit [http://www.cas.org/.](http://www.cas.org/) See Section [4](#_bookmark21) for details.

#### CHEMICAL FACILITY ANTI-TERRORISM STANDARDS (CFATS)

The Chemical Facility Anti-Terrorism Standards (CFATS) program was launched in 2007 by the United States (US) Department of Homeland Security (DHS). The program is designed to identify and regulate high-risk chemical facilities to ensure they have security measures in place to reduce the risks associated with storing these chemicals. For more information on CFATS or DHS, please visit the program website at <https://www.dhs.gov/chemical-facility-anti-terrorism-standards> or perform an internet search for “DHS CFATS.”

#### CH EMICAL WEAPO NS CO NVE NTI O N (CW C)

“The Chemical Weapons Convention (CWC) [implemented by the Organisation for the Prohibition of Chemical Weapons (OPCW)] aims to eliminate an entire category of weapons of mass destruction by prohibiting the development, production, acquisition, stockpiling, retention, transfer, or use of chemical weapons by States Parties. States Parties, in turn, must take the steps necessary to enforce that prohibition in respect of persons (natural or legal) within their jurisdiction. All States Parties have agreed to chemically disarm by destroying any stockpiles of chemical weapons they may hold and any facilities which produced them, as well as any chemical weapons they abandoned on the territory of other States Parties in the past. States Parties have also agreed to create a verification regime for certain toxic chemicals and their precursors (listed in Schedules 1, 2 and 3 in the Annex on Chemicals to the CWC) in order to ensure that such chemicals are only used for purposes not prohibited.” Therefore, any chemical on the CWC List must be managed and controlled by all signatories to the CWC. Even for non-signatories, the chemicals on the list are important to track and secure. To find out more information about the CWC, please visit [http://www.opcw.org/chemical-weapons-convention/.](http://www.opcw.org/chemical-weapons-convention/) If the website link is broken, conduct an internet search for “OPCW CWC.”

For the most up to date list of guidelines for scheduled chemicals please visit [http://www.opcw.org/chemical-weapons-convention/annex-on-chemicals/a-guidelines-for-schedules-](http://www.opcw.org/chemical-weapons-convention/annex-on-chemicals/a-guidelines-for-schedules-of-chemicals/) [of-chemicals/.](http://www.opcw.org/chemical-weapons-convention/annex-on-chemicals/a-guidelines-for-schedules-of-chemicals/) This website address should remain correct. If issues arise, conduct an internet search for “OPCW CWC List.”

#### CHEMICALS OF INTEREST (COI)

Chemicals of Interest (COI) are defined by the US Department of Homeland Security (DHS) Chemical Facility Anti-Terrorism Standards (CFATS) program as chemicals known to be targeted for theft. These are “chemicals or materials, [that can be] mixed with readily available materials or easily converted into weapons using simple chemistry, equipment or techniques, [and] have the potential to create significant adverse consequences for human life or health.” A complete list is included in the US Federal Regulation Title 6: Domestic Security Part 27. For the most up-to-date list, see “Title 6: Domestic Security Part 27 Appendix A” at <http://www.ecfr.gov/> or [https://www.dhs.gov/xlibrary/assets/chemsec\_appendixa-](https://www.dhs.gov/xlibrary/assets/chemsec_appendixa-chemicalofinterestlist.pdf) [chemicalofinterestlist.pdf.](https://www.dhs.gov/xlibrary/assets/chemsec_appendixa-chemicalofinterestlist.pdf)

#### CHEMICALS OF CONCER N (C OC) COLUM N

The Chemicals of Concern (COC) column is used to indicate any chemical that may be a security concern. This feature includes automatic formatting to indicate if the chemical CAS Number is located on any controlled lists. The CAT© software includes chemical lists from Australia Group (AG), the Chemical Facility Anti-Terrorism Standards (CFATS) program, Chemical Weapons Convention (CWC), EU Council Regulation (EC) No. 428/2009, and International Nonproliferation Export Control Program (INECP). For more information on these lists, refer to their definitions in this section. The COC column also allows users the option to manually check a security concern box for the inventory item.

#### CIM S

A Chemical Inventory Management System (CIMS) is a system or program that is used to track chemicals at a facility or institution. An effective CIMS begins tracking these chemicals from their point of procurement through their use and disposal. The management of chemicals throughout the life cycle (procurement to disposal) is a key concept for the secure management of chemicals at any institution. See Section [1.](#_bookmark1)

#### CORROSION PICTOG RAM

The Corrosion pictogram is a GHS Hazard Symbol for the Skin Corrosion/Burns, Eye Damage, and Corrosive to Metals hazard classes. A corrosive substance is one that will destroy and damage other substances with which it comes into contact, including metals and various organic compounds. For health purposes, we are concerned with chemical effects on living tissue and irreversible damage to the skin, eyes, and mucous membranes. For more information on GHS, see the definition in this section.

#### EDITOR ROLE

The Editor user role is an optional role that can be used by your institution to give editing permission to specific users. This may be useful if your institution has senior laboratory staff who manage a laboratory under the direction of the laboratory manager.

#### E NVIRONM E NT PICTOGRAM

The Environment pictogram is a GHS Hazard Symbol. The basic characteristics of a chemical environment hazard within the harmonized GHS system are acute aquatic toxicity, chronic aquatic toxicity, potential for or actual bioaccumulation, and degradation for organic chemicals. For more information on the GHS Environment pictogram, please review the latest GHS documents using your web search engine or the following link: [https://unece.org/transport/standards/transport/dangerous-goods/ghs-rev9-2021.](https://unece.org/transport/standards/transport/dangerous-goods/ghs-rev9-2021)

#### EU

The EU abbreviation is listed under the COC column that appears on the Inventory page. This abbreviation is used to create an alert for dual-use items that are described in the “Council Regulation (EC) No 428/2009 of 5 May 2009.” This regulation sets up a community regime for the control of exports, transfer, brokering, and transit of dual-use items. For additional information on the regulation, please visit [https://eur-lex.europa.eu/legal-](https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX%3A32021R0821&from=EN&d1e63-25-1) [content/EN/TXT/HTML/?uri=CELEX:32021R0821&from=EN#d1e63-25-1.](https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX%3A32021R0821&from=EN&d1e63-25-1)

Annex I of the regulation is the List of Dual-Use Items Referred to in Article 3. This list implements dual-use controls internationally agreed upon by the Australia Group, Missile Technology Control Regime, Nuclear Suppliers Group, Wassenaar Arrangement, and Chemical Weapons Convention.

For more information on Annex I dual-use items, visit:

[https://eur-lex.europa.eu/legal-](https://eur-lex.europa.eu/legal-ontent/EN/TXT/HTML/?uri=CELEX%3A32021R0821&from=EN&d1e63-25-1) [ontent/EN/TXT/HTML/?uri=CELEX:32021R0821&from=EN#d1e63-25-1.](https://eur-lex.europa.eu/legal-ontent/EN/TXT/HTML/?uri=CELEX%3A32021R0821&from=EN&d1e63-25-1)

#### E XPLODING BOMB PICTOGRAM

The Exploding Bomb pictogram is a GHS Hazard Symbol for the Explosives, Self-Reactive, and/or Organic Peroxides hazard classes. For more information on the GHS Exploding Bomb pictogram, please review the latest GHS documents using your web search engine or the following link: <https://unece.org/transport/standards/transport/dangerous-goods/ghs-rev9-2021>

#### E XCLAMATION MARK PICTOGRAM

The Exclamation Mark pictogram is a GHS Hazard Symbol for the Irritant (skin and eye), Skin Sensitizer, Acute Toxicity, Narcotic Effects, Respiratory Tract Irritant, and Hazardous to Ozone Layer (Non- Mandatory) hazard classes. For more information on the GHS Exclamation Mark pictogram, please review the latest GHS documents using your web search engine or the following link: <https://unece.org/transport/standards/transport/dangerous-goods/ghs-rev9-2021>

#### FLAME OVE R CIRCLE PICTOGRAM

The Flame Over Circle pictogram is a GHS Hazard Symbol for chemicals that, while not necessarily combustible, may (generally by yielding oxygen) cause or contribute to the combustion of other material. For more information on the GHS Flame Over Circle pictogram, please review the latest GHS documents using your web search engine or the following link: <https://unece.org/transport/standards/transport/dangerous-goods/ghs-rev9-2021>

#### FLAM E PICTOGRAM

The Flame pictogram is a GHS Hazard Symbol for the Flammables, Pyrophoric, Self-Heating, and Emits Flammable Gas hazard classes. For more information on the GHS Flame pictogram, please review the latest GHS documents using your web search engine or the following link: <https://unece.org/transport/standards/transport/dangerous-goods/ghs-rev9-2021>

#### GAS CYLIN DER PICTOGRAM

The Gas Cylinder pictogram is a GHS Hazard Symbol for gases that are under pressure—compressed, liquefied, refrigerated liquefied, and dissolved. For more information on the GHS Gas Cylinder pictogram, please review the latest GHS documents using your web search engine or the following link: [https://unece.org/transport/standards/transport/dangerous-goods/ghs-rev9-2021.](https://unece.org/transport/standards/transport/dangerous-goods/ghs-rev9-2021)

#### GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION A ND LABELING OF CHEM ICALS (GHS)

The Globally Harmonized System of Classification and Labeling of Chemicals (GHS) is an internationally agreed-upon system created by the United Nations. It is designed to replace the many classification and labeling systems around the world by using consistent criteria for classification and labeling on a global level. For more information on the GHS, use your web search engine or the following link: <https://unece.org/about-ghs>

#### HAZARD COLUMN

The Hazard inventory column shows the GHS Hazard Symbols or pictograms, either manually selected or automatically checked, for the GHS chemical hazard classes. The column is designed to draw attention to chemicals that require special considerations. See Section [4.4.3](#_bookmark45) for more information.

#### H AZA RD I NFORMA TION

The Hazard Information section includes hazard codes for chemicals listed in the 14th Adaptation to Technical Progress (ATP) of the Annex VI of the CLP Regulation (EU REGULATION [EC] No 1272/2008) published on 28 October 2019. This is important in the COC column and the “Hazard Information” section of the Action column of the Inventory page. For more information, use your web search engine or the following link: [https://op.europa.eu/en/publication-detail/-](https://op.europa.eu/en/publication-detail/-/publication/8e14cee0-1a31-11eb-b57e-01aa75ed71a1/language-en/format-PDF/source-170000220)

[/publication/8e14cee0-1a31-11eb-b57e-01aa75ed71a1/language-en/format-PDF/source-](https://op.europa.eu/en/publication-detail/-/publication/8e14cee0-1a31-11eb-b57e-01aa75ed71a1/language-en/format-PDF/source-170000220) [170000220.](https://op.europa.eu/en/publication-detail/-/publication/8e14cee0-1a31-11eb-b57e-01aa75ed71a1/language-en/format-PDF/source-170000220)

#### HEA LTH HA ZARD PICTOGRAM

The Health Hazard pictogram is a GHS Hazard Symbol for the Carcinogen, Mutagenicity, Reproductive Toxicity, Respiratory Sensitizer, Target Organ Toxicity, and Aspiration Toxicity hazard classes. For more information on the GHS Health Hazard pictogram, please review the latest GHS documents using your web search engine or the following link: [https://unece.org/transport/standards/transport/dangerous-](https://unece.org/transport/standards/transport/dangerous-goods/ghs-rev9-2021) [goods/ghs-rev9-2021](https://unece.org/transport/standards/transport/dangerous-goods/ghs-rev9-2021)

#### I NVE N TO RY ICON

The Inventory icon lists all the inventory entered into the CAT© software. It is viewable to all Users but editable only by the Administrator, Auditor, and Manager. See Section [2](#_bookmark4) for setup and detailed information.

#### MA NAGER R OLE

The Manager user role is ideally for the person responsible for managing daily inventory usage. The Manager has access privileges and responsibilities similar to the Administrator, except that the Manager is not capable of adding new users via the Settings icon or importing databases from an Excel® file. An account for the Manager must be created by the Administrator. See Section [2](#_bookmark4) for setup and detailed information.

#### NOTE FIEL D

The Note field is available for adding customized notes and additional alerts to an inventory item. Examples of notes may include information on compatibility and reactivity, the expiration date or analysis date. See Section [3.](#_bookmark11)

#### ORGA NISATIO N F OR THE PROHIBITION OF CHEMICAL WEAPONS (OPCW)

The Organisation for the Prohibition of Chemical Weapons (OPCW) is the implementing body of the Chemical Weapons Convention (CWC), which entered into force in 1997. As of today, OPCW has 193 Member States, who are working together to achieve a world free of chemical weapons. For more information on the OPCW, please visit [https://www.opcw.org/.](https://www.opcw.org/)

#### R EPO RTS ICO N

The Reports icon generates three optional reports—Inventory Reports, Inventory Audit Reports, and Log Entries Reports—using the CAT© software. See Section [6](#_bookmark51) for more information regarding reports and instructions for generating reports within the CAT© software.

#### R O OT US ER

The Root user role has the highest level of permission. This level of permission should be limited to server managers and software programmers. See Section [2](#_bookmark4) for detailed software setup information.

#### SAFETY DATA SHE ET (S DS)

A Safety Data Sheet (SDS), typically supplied by the chemical manufacturer, offers instructions for the safe use of and potential hazards associated with a particular material or product. Specific product information covers physical data (melting point, boiling point, flash point, etc.), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill-handling procedures. For accurate information on a chemical, look for the most up-to-date SDS from the supplier or manufacturer.

#### S EARCH ICO N

The Search icon allows Users to scan or type in a barcode number and obtain basic information on the chemical, including alerts, location, and SDS. See Section [5](#_bookmark47) for more information.

#### S KULL A N D C ROSSBO NE S PICTOGRAM

The Skull and Crossbones pictogram is a GHS Hazard Symbol for five GHS hazard categories assigned on the basis of LD50 (oral, dermal) or LC50 (inhalation). Category 1 requires the least

exposure and Category 5 requires the most exposure to be lethal. For more information on the GHS Skull and Crossbones pictogram, please review the latest GHS documents using your web search engine or the following link: <https://unece.org/transport/standards/transport/dangerous-goods/ghs-rev9-2021>

#### S TAT E

The State field is used to indicate the physical state of matter (solid, liquid, gas) of the substance.

#### S TORAG E GROUP

The Storage Group field designates the storage classification of compatible chemicals that will not react violently if mixed together. This system may classify storage groups independent of main hazard classes, in order to keep the number of Storage Groups as low as possible. The Storage Group column in the Inventory helps chemical users identify chemicals that can be safely stored together. A drop-down list can be generated on the Settings icon under Storage Group. The storage group classification published by Stanford University (developed for laboratory scale storage and not to be routinely applied in non- laboratory storage situations) is recommended. See also the note on page 14. More chemical storage classification guidance from Stanford University’s ChemTracker Storage System can be found using the following link: <https://www.stanford.edu/dept/EHS/prod/researchlab/chem/Chemicals_by_Storage_Group.pdf>

#### VIEWER ROLE

The Viewer user role is that of a general user, such as a technician or laboratory student, who has access to view and search the inventory, but is not responsible for adding/removing inventory items. The Viewer has access to the Search, Inventory, and Reports icons. The Viewer is the only user who can be generically assigned access by multiple people. See Section [2](#_bookmark4) for setup and detailed information.

#### WE APON S OF M AS S D ESTRUCTION (WMD)

The Weapons of Mass Destruction (WMD) check box in the COC column is used to indicate any CAS Number that has appeared on a controlled substance list as a WMD agent or precursor. This is a general category on international lists of multilateral export control regimes (Australia Group, Nuclear Suppliers Group, Missile Technology Control Regime, and Wassenaar Arrangement), the Chemical Weapons Convention, the United Nations Office on Drugs and Crime (UNODC), the U.S. Occupational Safety and Health Administration list of TICs, and the CFATS list of explosives precursors. For more information about the specific security concern, search an international database for the CAS Number of the chemical.

## Acronyms

**AG-** Australia Group

**CAT©-** Chemical Asset Tracker

**CAS -** Chemical Abstract Services

**CIMS -** Chemical Inventory Management System

**CMS©-** Chemical Management System

**CFATS -** Chemical Facility Anti-Terrorism Standards

**CLP-** Classification, Labeling and Packaging

**COI -** Chemical of Interest **COC -** Chemical of Concern **CSV-** Comma-Separated Values

**CWC -** Chemical Weapons Convention **DHS -** Department of Homeland Security **ECHA**- European Chemicals Agency

**EU-** European Union

**GHS –** Global Harmonized System of Classification and Labeling of Chemicals

**INECP**- International Nonproliferation Export Control Program

**LD50-** Median Lethal Dose

**OPCW -** Organisation for the Prohibition of Chemical Weapons

**OSHA -** Occupational Safety & Health Administration

**SDS -** Safety Data Sheet

**SNL-** Sandia National Laboratories **SOP -** Standard Operating Procedure **TSCA -** Toxic Substances Control Act **WMD -** Weapons of Mass Destruction

### Troubleshooting

Provided below is a small list of common problems encountered when using the CIMS software. If your issue is not listed in this section, please contact [chemsecurity@sandia.gov](mailto:chemsecurity@sandia.gov) for additional guidance.

|  |  |  |  |
| --- | --- | --- | --- |
| **Problem** | **Cause** | **Solution** | **Reference Section** |
| Software application not responding | There are a number of possible causes. | 1. Close the browser tab for CAT© 2. Check the internet connection 3. Open a new browser tab and navigate to the CAT© URL. 4. If the problem persists check with the server administrator. | N/A |
| Barcode number is not readable | 1. Improper Barcode label position 2. Incompatible barcode symbology 3. Barcode is scratched or destroyed | 1. Check that the barcode scanner is properly connected to the computer 2. Reposition the barcode 3. Replace with new, compatible,   barcode label | See Section [9.1](#_bookmark74), Barcode Label and Scanner Requirements  See Section [9.2](#_bookmark79) for Labelling Containers |
| Some icons are missing | The user you are logged in as does not possess the rights and privileges to view all  the icons available | Seek approval from the Administrator | See Section [8.1.3](#_bookmark65)User roles and permissions |
| Searching for a specific chemical by barcode or name does not return any results | 1. Barcode label is damaged 2. Name of the chemical has not been added to the inventory | 1. Check the previous solutions for barcode problem 2. If you possess the privilege of editing the inventory, add the name of the chemical, otherwise notify the manager or the   administrator | See Section [4.3](#_bookmark34), Add New Chemical |

|  |  |  |  |
| --- | --- | --- | --- |
| **Problem** | **Cause** | **Solution** | **Reference Section** |
| Deleting a chemical from the inventory by mistake | A user could be trying to add, duplicate, or view SDS and hit Delete instead | If the inventory has been backed up recently, then you can simply Restore your lost information. It is important to back up your inventory  regularly to avoid loss of data | See Section [4.4.1.3](#_bookmark42) |

|  |  |  |
| --- | --- | --- |
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