exSILentia®

User Guide

SILstat™

RELEASED 2025.01.30

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Part 1

Introduction

Chapter 1 Introduction

SILstat™ is the life event recording module of the exSILentia® Safety Lifecycle tool. Used during operation and maintenance, SILstat™ provides insight to the performance of your safety systems on site, simplifying the collection of critical data, and contextualizing results for comparison of key metrics to assumptions made during your SIS design.

SILstat leverages your project work from PHA, LOPA, SRS, SIL Verification and Proof Test definition for easy database configuration. This builds a dynamic plant hierarchy that captures the physical location of your safeguard devices as well as the logical relationship between elements of your safety functions.

SILstat gives context to data collected on process demands, proof tests, failures, and repairs. With curated Dashboards, Insights, and Reports, performance metrics are communicated to key personnel throughout a team or organization. The table below provides an example of event data and the output metrics.

Event Data	Output Metric
Hazardous Event	Actual vs. Assumed Initiating Event Frequency
On- Demand Success/Failure of Safeguards (IPLs) and SIFs	Actual vs. Assumed PFD and Failure Rates
Testing Performance for Proof Tests and Routine Maintenance	Actual vs. Assumed Proof Test Intervals, Failed tests contribute to failure rate analysis
Tracking Bypasses, Repairs, and Management of Change	Actual vs. Assumed Mean Repair Time and Mission Time

With the information recorded you can determine if the performance metrics you assumed during the Analysis and Design and Implementation phases of the Safety Lifecycle adequately represent actual performance. In case actual performance is better than predicted you can argue that your SIF is over-designed to protect against a specific hazard. This would allow modification of the design and required risk reduction implementation in future applications and can provide potential cost savings. In case actual performance is worse than expected, the process hazard might represent a higher risk than originally estimated, or the SIF does not perform as well as expected. In this case additional risk reduction measures must be implemented to ensure tolerable risk targets are met.

The user guide is divided into 6 parts:

- *Part 1 Introduction*
- *Part 2 SILstat Settings and Libraries*
- *Part 3 Configuration*
- *Part 4 Collection*
- *Part 5 Analysis*
- *Part 6 Miscellaneous*

Part 1 of this user guide provides this introduction, including an overview of what to expect when launching the SILstat software, the various license platforms and installation of the software on a local PC, as well as a high level overview of each of the software modules within the exSILentia® Software. Part 2 covers all steps needed to getting you started using the SILstat software ranging from initial setup of the SILstat environment to an understanding on how data is stored with SILstat. Part 3 provides detailed guidance on the configuration tasks for SILstat, this includes setting up the various hierarchies and defining devices that data is collected on. Part 4 describes how data is collected using SILstat, ranging from recording hazards / initiating events and device failures to performing proof tests and maintenance activities. Part 5 describes how the data that is collected can be analyzed either through review of teh SILstat dashboard or through pre-defined reports. Part 6 covers Abbreviations, Terms and Definitions, Disclaimer and Assumptions as well as the exSILentia® Software License Agreement and an Index.

If this user guide does not answer your questions you can contact the exSILentia® Support Team via http://support.exida.com.

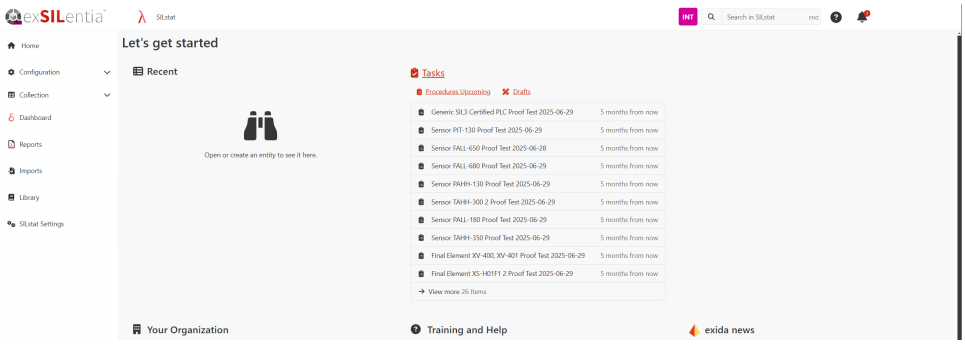
Chapter 2 Home Page

SILstat's Home Page provides quick access to items recently viewed, upcoming tasks, and data insights. The Home Page also provides links to Your Organization, Training and Help, and exida news.

You can navigate to the Configuration, Collection, Analysis , Reports, Imports, Library, and SILstat Settings using the left-side panel. Configuration and Collection can be expanded by pressing the header or downward arrow. Once expanded, grey shading will appear to show the sub sections.

The left-side panel can collapse by pressing the two left arrows at the bottom of the screen, showing an icon for each section.

The availability of the various options / menus will depend on your user role's privileges.



2.1 Landing Page

The following sections display on the SILstat Landing Page.

2.1.1 Recent

The Recent section lists the latest items you have viewed in SILstat, ordered by the last edited. Double click on an item in the list to return to that view.

2.1.2 Tasks

The Tasks section is specific to each user, showing a list of items that need your attention. Tasks can be filtered by Approvals, Procedures Upcoming, and Drafts.

Procedures Upcoming

Scheduled proof tests and procedures with upcoming due dates are listed here. Double click on an item to initiate an event.

Drafts

Items added to the database and left in the 'Draft' state are listed here. The Home Page will show a maximum of 10 draft items. Select 'View More' to view the complete list of drafted items. Items without a Name will be given a name by default.

2.1.3 Your Organization

Your Organization displays company information from the licensing integration system.

2.1.4 Training and Help

Training and Help shows exida's latest information on Training and Software Support.

2.1.5 Latest News

exida News displays the latest company news.

2.2 Search

SILstat's Home Page includes a Search feature you can use to search within the full application. If desired, you can filter and search specifically within Events. Selecting the 'Events' filter will show results from Collection events.

When typing keywords into the search box, you will immediately begin seeing results with the keywords highlighted to match. The search results display breadcrumbs where you can find where the results are located, as well as the full name, description, and associated labels.

2.3 Help

If you are having problems with SILstat, you can use the Help feature. Click on the "?" icon next to the Search Bar and Notification Bell. A new box will open the SILstat User Guide.

2.4 Notifications

You will be able to receive in-app notifications, including:

- Welcome Messages
- Announcements of New Releases and Help documentation
- Notifications about Imports

You will also receive notifications via email. These include:

- Welcome Message

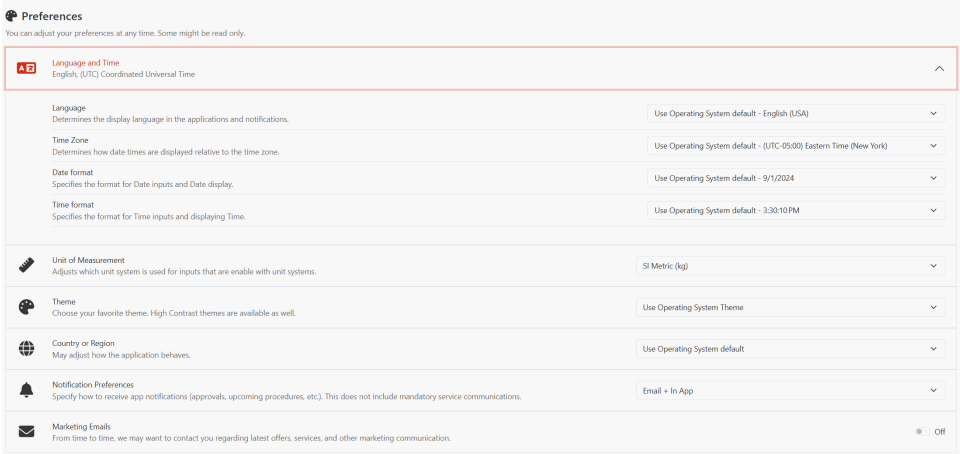
A Notification icon is located at the top of the SILstat Home Page, showing a red dot when a Notification is available. When you hover over the icon, the number of Notifications is displayed. Select the Notification icon to view your notifications. Select 'View' to see more details. Select the Delete icon to dismiss the Notification.

Chapter 3 User Profile

Select your Username or Profile Picture at the top right corner of the app to view your profile. By default, your profile picture will show your initials. Once selected, you will see a menu that lists: Switch Organization, Account, Profile, and Sign Out.

Select 'Profile' to upload a Profile Picture and edit your First, Middle, and Last Name. You can also edit your Organization Details and Contact Information.

Within Preferences, you can adjust your Time Zone and Country / Region. You can also select your preferred Language, Date format, Time format, Unit of Measurements, and Theme.

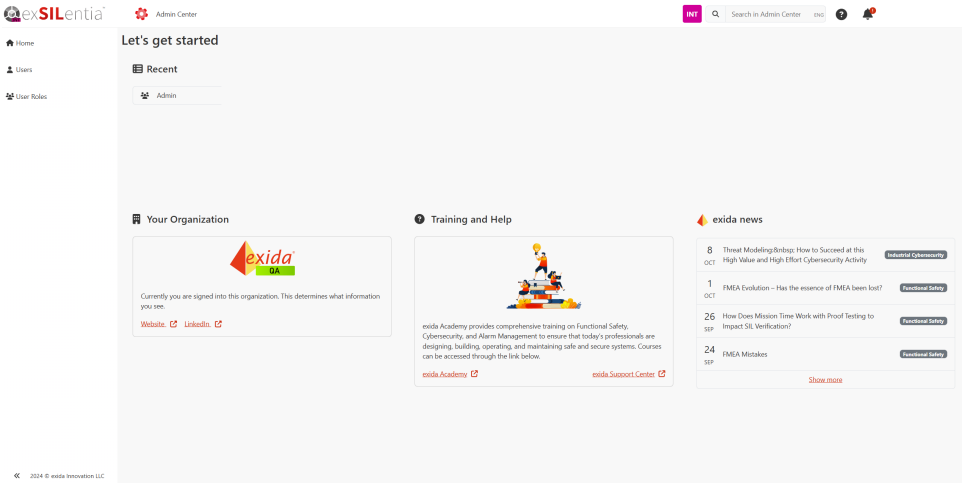


Chapter 4 Admin Center

The Admin Center allows a user with an administrator role to define users and user roles for the SILstat environment.

To navigate to the Admin Center, select the SILstat on the top bar of the Home Page. This will open a drop-down menu that allows you to switch from SILstat to Dashboard, Licensing, Admin Center or Help and Support. Select 'Admin Center' to proceed.

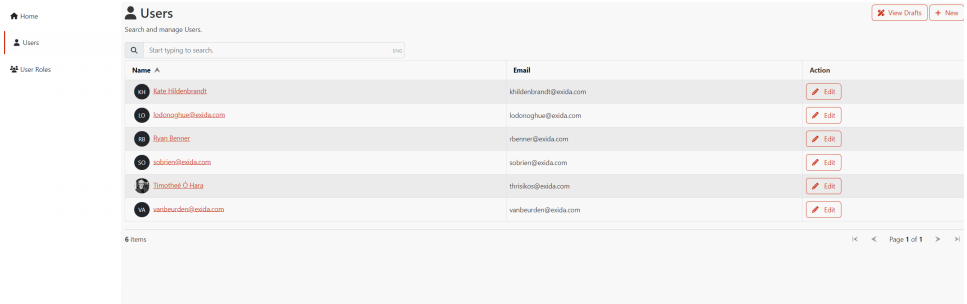
The Admin Center Homepage shows your recent activity within the Admin Center. You can select an item from the 'Recent' list to return to that item's view. You will also see information on your Organization, exida Training and Help, and exida News.



4.1 Users

The Users option allows you to create and manage Users in your SILstat database. To manage Users, select the **Users** button on the left side panel. This will show a grid with all of the Users in the database. The following properties are shown for each User:

- Name
- Email
- Action



The Search bar at the top searches the User grid. Matching results will appear in the menu. At the bottom of the search menu, a plus button is displayed along with **Did you want to create 'result'**. This allows you to create a user with that keyword. In the search results itself, you can search for a specific user.

To create a new User, select the **New** button on the top right-hand corner of the view. This will open the User Account view. To View or Edit a User, select the **Edit** button in the Action column.

You can input the following properties for the User.

Property	Description
Profile Picture	This will default to the User's initials, or you can browse to an image file to choose as the Profile Picture.
First Name	This can be entered as text.
Middle Name	This can be entered as text.
Last Name	This can be entered as text.
Email	Enter Email Address.
Primary Contact Number	Enter Phone Number.
Language	Choose a language from the drop-down menu. This defaults to use the operating system settings.

The only mandatory fields are the user's First Name.

The User Roles section allows you to associate User Roles for the current User. Select **Add** to see a panel appear showing User Roles available in the database. These can be configured in the User Roles section of the Admin Center. From the options available, toggle from **Off** to **On** to associate a User Role to the current User. Multiple User Roles can be selected per User. Close the panel to apply the User Roles.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

Upon creation of a user, the Preferences section appears. This section allows each user to choose settings for the following:

- Language and Time (Defaults to use operating system settings)
    - Time Zone
    - Language
    - Date Format
    - Time Format
- Unit of Measurement
    - SI Metric or USA Standard
- Theme (Defaults to use operating system settings)
    - Light, Dark or High Contrast
- Country or Region (Defaults to use operating system settings)
- Notifications
    - Email, In-App, or Email + In-App
- Marketing Emails
    - Toggle **On** or **Off**

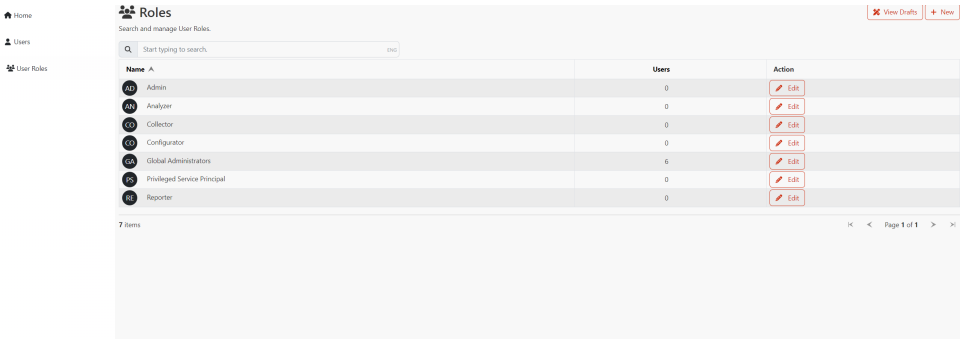
The Insights show you how many User Roles are associate with this User.

To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

4.2 User Roles

The User Roles option allows you to create and manage User Roles in your SILstat database. To manage User Roles, select the **User Roles** button on the left side panel. This will show a grid with all of the User Roles in the database. The following properties are shown for each User Role:

- Name
- Number of Users
- Action



The Search bar at the top searches the User Roles grid. Matching results will appear in the menu. At the bottom of the search menu, a plus button is displayed along with **Did you want to create 'result'**. This allows you to create a User Role with that keyword. In the search results itself, you can search for a specific User Role.

To create a new User Role, select the **New** button on the top right-hand corner of the view. This will open the User Role view. To View or Edit a User Role, select the **Edit** button in the Action column.

You can input the following properties for the User Role.

Property	Description
Name	This can be entered as text.
Description	This can be entered as text.

To create the User Role, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

The Permissions section allows you to specify what access this User Role will have to each application. This includes:

- General Permissions
- SILstat Permissions
- Dashboard Permissions
- API Permissions

The Insights show you how many Users are associated with this User Role.

4.2.1 General Permissions

For General Permissions, under Global Administrator you can indicate if the User Role should have access as a Global Administrator to SILstat, Dashboard, or API. To do this, toggle from **Off** to **On** next to the application name.

For General Permissions, under Users and Roles you can indicate if the User Role should have the ability to manage Users and User Roles shared by the applications. To do this, toggle from **Off** to **On** next to *Users and Roles*.

4.2.2 SILstat Permissions

For the SILstat Application, the following permissions are available to the User Role:

- Configuration Permissions
- Collection Permissions
- Report Permissions

For Configuration Permissions, the following options are available for this User Role:

Property	Description
Read Permissions	Enables read permissions for all Configuration options. This is enabled by default for all User Roles.
Modify Hierarchy	Grants permission to modify Hierarchy configuration.
Modify Library	Grants permission to modify Library entities.
Allow Imports	Grants permission to Import the Hierarchy and Library items from exSILentia.

Property	Description
Modify Site-wide Settings	Grants permission to modify site-wide entities and settings.
Install Events	Grants permission to perform Install Events.

To enable a permission, toggle from **Off** to **On** next to that permission. To enable all Configuration Permissions at once, select the **Enable All** button in that section.

For Collection Permissions, the following options are available for this User Role:

Property	Description
Read Permissions	Enables read permissions for all Collection options. This is enabled by default for all User Roles.
Bypass and Remove Bypass Events	Grants permission to perform Bypass and Remove Bypass Events.
Procedure Events	Grants permission to perform Procedure Events. This does not implicitly grant access to Area of Device Lifecycle Events.
Failure Events	Grants permission to performer Failure Events.
Hazard Events	Grants permission to perform Hazard Events, along with associated Failure Events.
Repair Events	Grants permission to perform Repair Events.
Replace Events	Grants permission to perform Replace Events.
Decommission Events	Grants permission to perform Decommission Events.
Modify Past Events	Grants permission to modify Collection Events completed in the past.
Delete Events	Grants permission to delete Collection Events.

To enable a permission, toggle from **Off** to **On** next to that permission. To enable all Collections Permissions at once, select the **Enable All** button in that section.

For Report Permissions, the following options are available for this User Role:

Property	Description
View Reports	Grants permission to view snapshot Reports.
Create Reports	Grants permission to generate Reports.

To enable a permission, toggle from **Off** to **On** next to that permission. To enable all Report Permissions at once, select the **Enable All** button in that section.

For Area Filters, select specific Areas in the hierarchy the User Role is given access to.

Note: if permissions are changed for a user, the user is required to refresh their session.

4.2.3 Dashboard Permissions

For the Dashboard Application, the following permissions are available to the User Role:

Property	Description
System Dashboards	Grants permission to allow System Dashboards to be viewed.
Dashboard Area Filters	Select the nodes to filter the widgets.

To enable a permission, toggle from **Off** to **On** next to that permission. To enable all Shared Dashboard Permissions at once, select the **Enable All** button in that section.

4.2.4 API Permissions

For the API, the following permissions are available to the User Role:

Property	Description
Read	Allows the reading of data via the API.
Create and Modify	Allows the creation and modification of data via the API.
Delete	Allows the deletion of data via the API.
Manage Personal Access Tokens	Allows Personal Access Tokens for API access to be created, modified, and deleted. These tokens allow for unattended access to the API.

For Manage Access Tokens permission, this allows Access Tokens for API access to be created, modified, and deleted for any user.

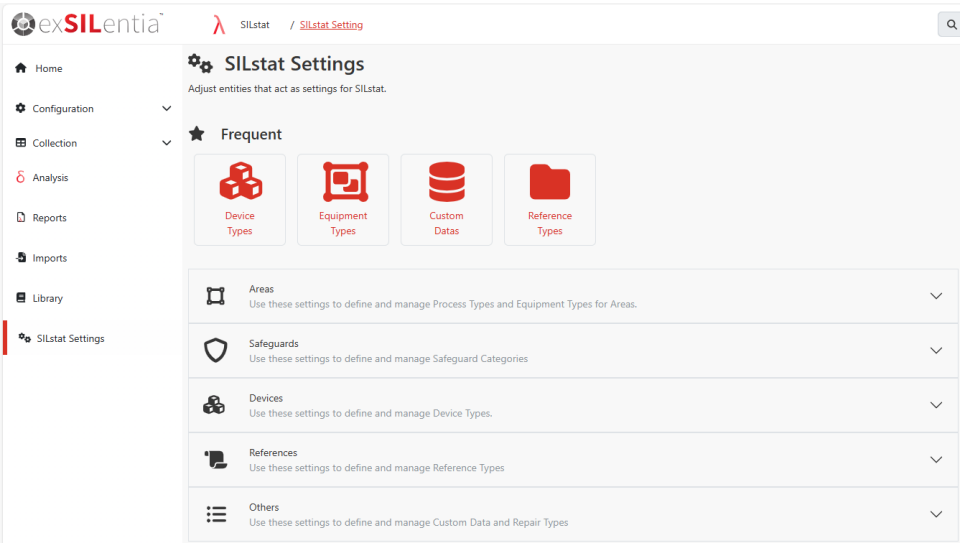
To enable a permission, toggle from **Off** to **On** next to that permission.

Part 2

SILstat Settings and Libraries

Chapter 5 SILstat Settings

The SILstat Settings allow you to configure attributes and custom data to be associated with items in your database.



The following Settings can be defined.

Areas Settings

- Plant Types
- Equipment Types

Safeguards Settings

- Safeguard Categories

Devices Settings

- Device Types & Failure Classifications

References Settings

- Reference Types

Other Settings

- Custom Data
- Repair Types

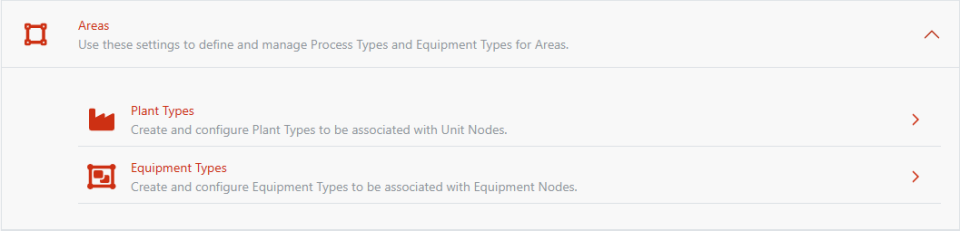
To navigate to these settings, select the 'SILstat Settings' button on the left side panel. At the top, you will see your most frequently accessed settings listed. Under your Frequent settings, you will see all available setting options listed.

5.1 Areas Settings

The Area Settings section contains the following setting options.

- Plant Types
- Equipment Types

Each will be described in detail in the subsequent sections.

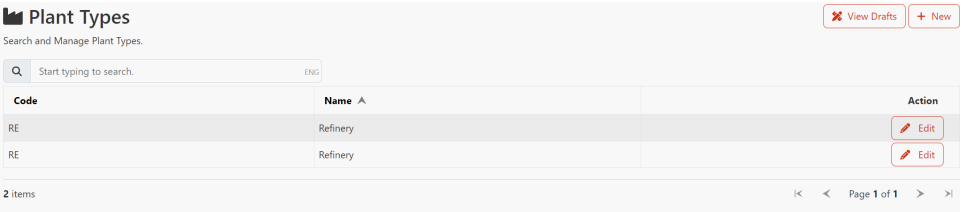


5.1.1 Plant Types

The Plant Types settings allow you to create and configure Plant Types and their Process Types to be associated with Areas in the hierarchy.

Select the Plant Types setting to view all Plant Types in the database. A grid shows the following properties for each:

- Code
- Name
- Action



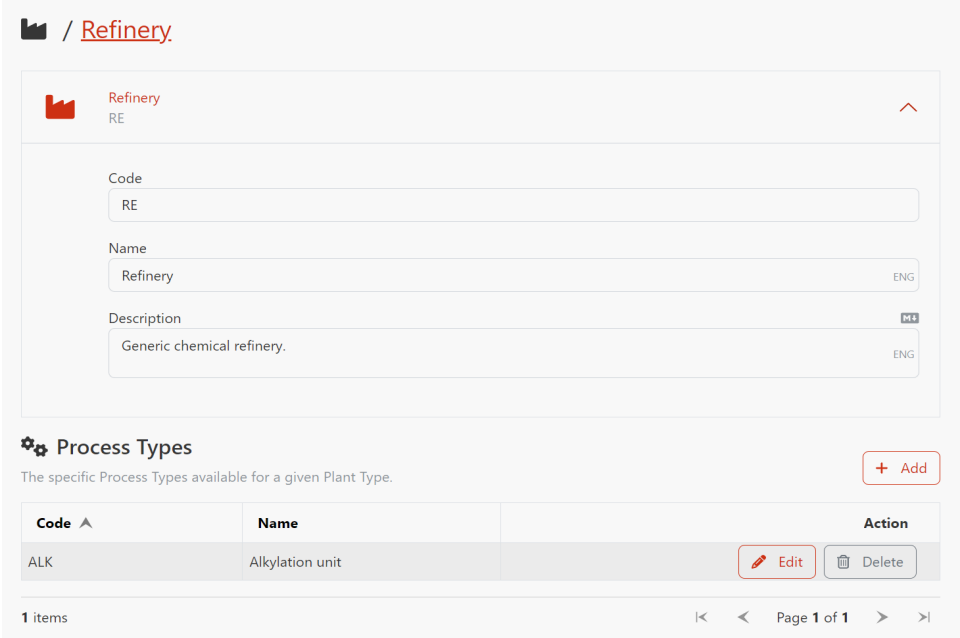
To create a new Plant Type, select the **New** button on the top right-hand corner of the settings view. This will open the Plant Types view. To View or Edit a Plant Type, select the **Edit** button in the Action column.

You can input the following properties for the Plant Type.

Property	Description
Code	This can be entered as text.
Name	This can be entered as text.

Property	Description
Description	This can be entered as text.

The Process Types section allows you to add multiple Process Types as children of the Plant Type. These can be associated with Areas in the hierarchy. To add associated Process Types, select the **Add** button.



You can input the following properties for the Process Type.

Property	Description
Code	This can be entered as text.
Name	This can be entered as text.
Description	This can be entered as text.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

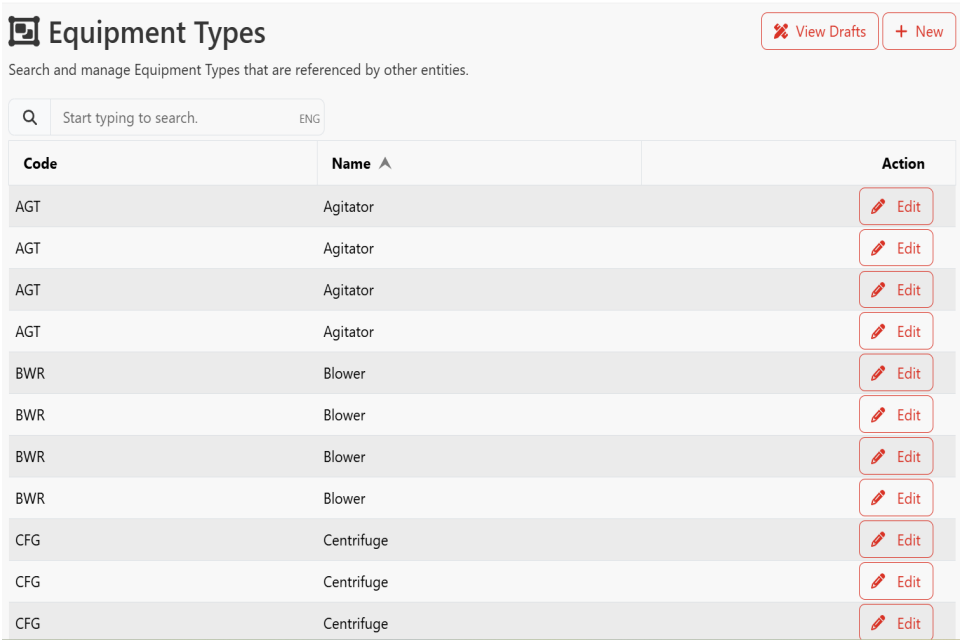
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

5.1.2 Equipment Types

The Equipment Types settings allow you to create and configure Equipment Types to be associated with Equipment Areas.

Select the Equipment Types setting to view all Equipment Types in the database. A grid shows the following properties for each:

- Code
- Name
- Action



To create a new Equipment Type, select the **New** button on the top right-hand corner of the settings view. This will open the Equipment Types view. To View or Edit an Equipment Type, select the **Edit** button in the Action column.

You can input the following properties for the Equipment Type.

Property	Description
Code	This can be entered as text.
Name	This can be entered as text.
Description	This can be entered as text.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

The Insights show you how many Equipment Areas in the hierarchy are using this specific Equipment Type.

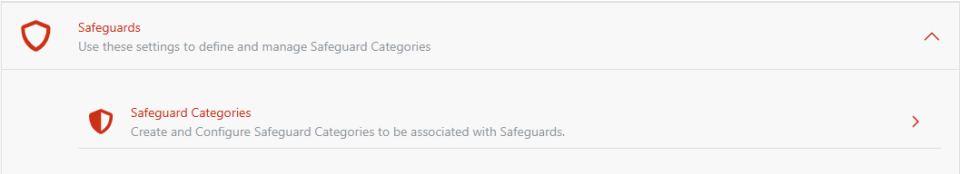
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

5.2 Safeguards Settings

The Safeguard Settings section contains the following setting options.

- Safeguard Categories

Each will be described in detail in the subsequent sections.

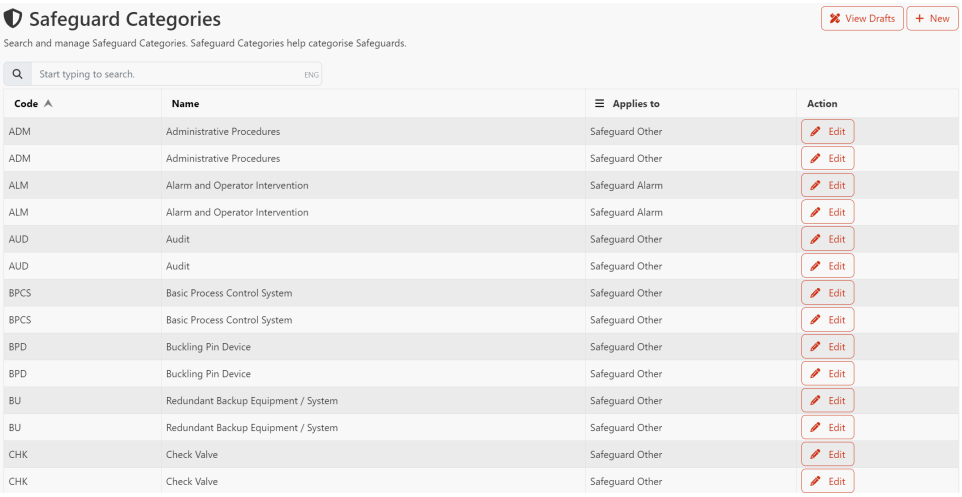


5.2.1 Safeguard Categories

The Safeguard Categories settings allow you to create and configure Safeguard Categories to be associated with Safeguards. This will determine the data fields available for each Safeguard in your database.

Select the Safeguard Categories setting to view all Safeguard Categories in the database. A grid shows the following properties for each:

- Code
- Name
- Applies To
- Action



Code	Name	Applies to	Action
ADM	Administrative Procedures	Safeguard Other	Edit
ADM	Administrative Procedures	Safeguard Other	Edit
ALM	Alarm and Operator Intervention	Safeguard Alarm	Edit
ALM	Alarm and Operator Intervention	Safeguard Alarm	Edit
AUD	Audit	Safeguard Other	Edit
AUD	Audit	Safeguard Other	Edit
BPCS	Basic Process Control System	Safeguard Other	Edit
BPCS	Basic Process Control System	Safeguard Other	Edit
BPD	Buckling Pin Device	Safeguard Other	Edit
BPD	Buckling Pin Device	Safeguard Other	Edit
BU	Redundant Backup Equipment / System	Safeguard Other	Edit
BU	Redundant Backup Equipment / System	Safeguard Other	Edit
CHK	Check Valve	Safeguard Other	Edit
CHK	Check Valve	Safeguard Other	Edit

To create a new Safeguard Category, select the **New** button on the top right-hand corner of the settings view. This will open the Safeguard Category view. To View or Edit a Safeguard Category, select the **Edit** button in the Action column.

You can input the following properties for the Safeguard Category.

Property	Description
Code	This can be entered as text.
Name	This can be entered as text.
Description	This can be entered as text.
Applies To	Using the drop-down menu, choose if this applies to SIF Safeguards, Alarm Safeguards or Other Safeguards.
Custom Data	Using the drop-down menu, specify which Custom Data applies to Safeguards under this Safeguard category.

Note: Changing Custom Data in an entity will change the Custom Data for all existing safeguards with this category.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

The Insights show you how many Safeguards in the hierarchy are using this specific Safeguard Category.

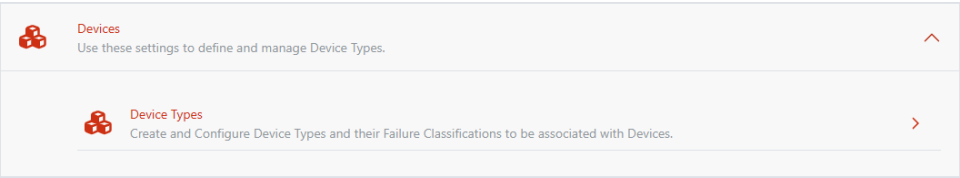
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

5.3 Devices Settings

The Device Settings section contains the following setting options.

- Device Types

Each will be described in detail in the subsequent sections.

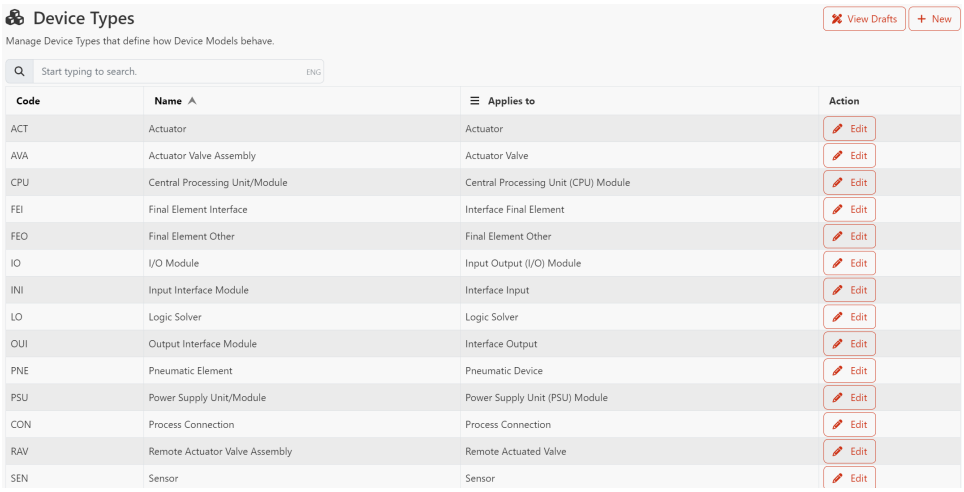


5.3.1 Device Types

The Device Types settings allow you to create and configure Device Types and their Failure Classifications to be associated with Device Models. For Failure Events collected in SILstat, the Failure Classifications shown depend on the Device Type configured here.

Select the Device Types setting to view all Device Types in the database. A grid shows the following properties for each:

- Code
- Name
- Applies To
- Action



Code	Name	Applies to	Action
ACT	Actuator	Actuator	Edit
AVA	Actuator Valve Assembly	Actuator Valve	Edit
CPU	Central Processing Unit/Module	Central Processing Unit (CPU) Module	Edit
FEI	Final Element Interface	Interface Final Element	Edit
FEO	Final Element Other	Final Element Other	Edit
IO	I/O Module	Input Output (I/O) Module	Edit
INI	Input Interface Module	Interface Input	Edit
LO	Logic Solver	Logic Solver	Edit
OUI	Output Interface Module	Interface Output	Edit
PNE	Pneumatic Element	Pneumatic Device	Edit
PSU	Power Supply Unit/Module	Power Supply Unit (PSU) Module	Edit
CON	Process Connection	Process Connection	Edit
RAV	Remote Actuator Valve Assembly	Remote Actuated Valve	Edit
SEN	Sensor	Sensor	Edit

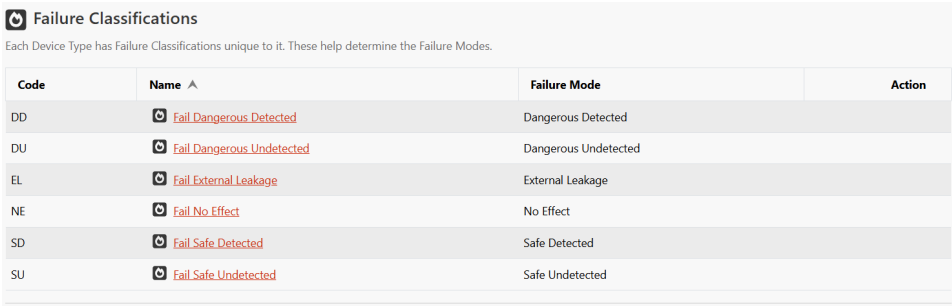
To create a new Device Type, select the **New** button on the top right-hand corner of the settings view. This will open the Device Types view. To View or Edit a Device Type, select the **Edit** button in the Action column.

You can input the following properties for the Device Type.

Property	Description
Device Model Type	Using the drop-down menu, choose the Device Model Type the Device Type will apply to. These options are hard coded to allow failure events to trace back to specific Device Types and Device Model types.
Code	This can be entered as text.
Name	This can be entered as text.
Description	This can be entered as text.

The Failure Classifications section allows you to add multiple Failure Classifications as children of the Device Type. These will help add detail to the Failure Events, allowing you to classify the type of failure that occurred by selecting a Failure Classification. In the Failure Event, the Failure Classifications shown depend on the Device Type configured here.

To add associated Failure Classifications, select the **New** button.



You can input the following properties for the Failure Classifications.

Property	Description
Code	This can be entered as text.
Name	This can be entered as text.
Description	This can be entered as text.
Comment	This can be entered as text.
Failure Mode	Using the drop-down menu, choose the Failure Mode the Failure Classification will apply to. These options are hard coded to allow failure events to trace back to specific Failure Modes.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

The Insights show the number of Device Models using this Device Type, the number of Devices using the Device Model, and the number of Failures that are related to the specific Device Type.

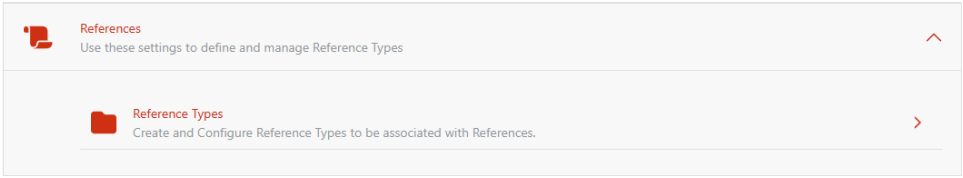
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

5.4 References Settings

The References Settings section contains the following setting options.

- Reference Types

Each will be described in detail in the subsequent sections.

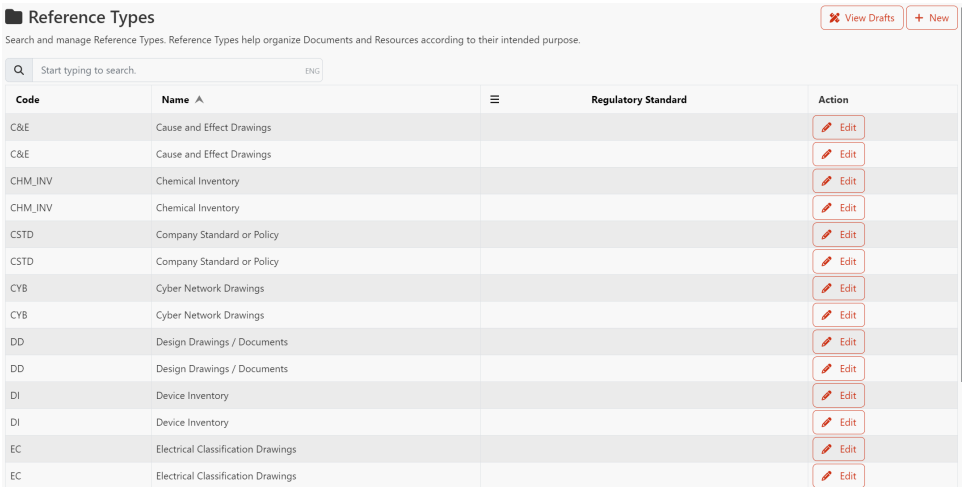


5.4.1 Reference Types

The Reference Types settings allow you to create and configure Reference Types to be associated with References. This will determine the data fields available for each Safeguard in your database.

Select the Reference Types setting to view all Reference Types in the database. A grid shows the following properties for each:

- Code
- Name
- Regulatory Standard
- Action



To create a new Reference Type, select the **New** button on the top right-hand corner of the settings view. This will open the Reference Type view. To View or Edit a Reference Type, select the **Edit** button in the Action column.

You can input the following properties for the Reference Type.

Property	Description
Code	This can be entered as text.
Name	This can be entered as text.
Description	This can be entered as text.
Regulatory Standard	Toggle from ‘Off’ to ‘On’ to indicate if this is a Regulatory Standard.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

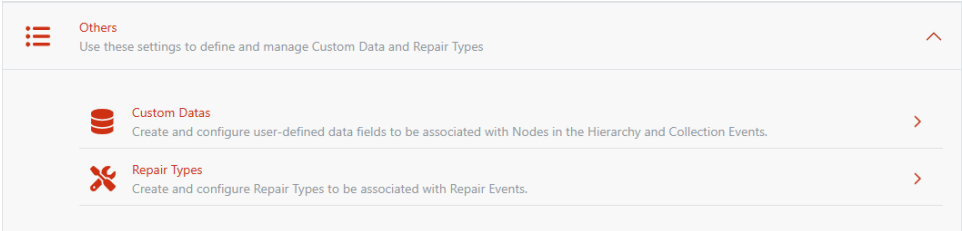
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

5.5 Other Settings

The Other Settings section contains the following setting options.

- Custom Data
- Repair Types

Each will be described in detail in the subsequent sections.

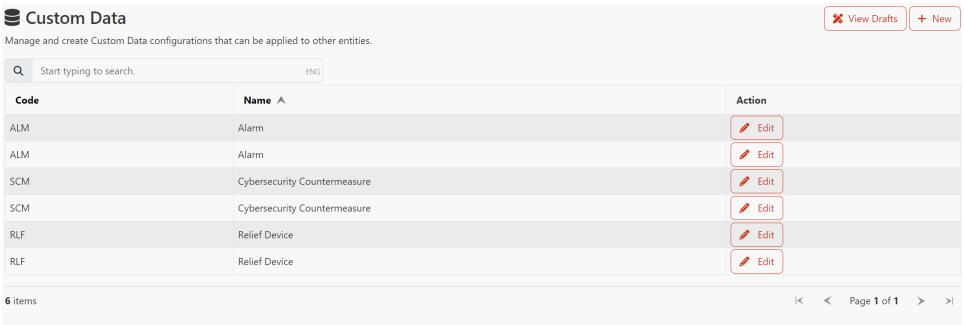


5.5.1 Custom Data

The Custom Data settings allow you to create and configure user-defined data fields to be associated with Safeguards, Tags and Collection Events.

Select the Custom Data setting to view all Custom Data sets in the database. A grid shows the following properties for each:

- Code
- Name
- Action



To create a new Custom Data set, select the **New** button on the top right-hand corner of the settings view. This will open the Custom Data view. To View or Edit a Custom Data set, select the **Edit** button in the Action column.

You can input the following properties for the Custom Data set.

Property	Description
Code	This can be entered as text.
Name	This can be entered as text.
Description	This can be entered as text.
Applies To	Toggle from 'Off' to 'On' for Events and/or Tags to indicate where the Custom Data set should be shown.

The Inputs section allows you to define different types of user-defined fields including:

- Text
- Boolean (True/False)
- Selection (Single)
- Selection (Multiple)
- Numeric

Select the **Add** button and choose the field type from the drop-down menu to add a new field to the Custom Data set.

You can input the following properties for Text fields.

Property	Description
Identifier	This can be entered as text.
Name	This can be entered as text.
Description	This can be entered as text.
Postfix	Unit Field
Placeholder (Default Text)	Indicate what text should be entered by default (optional).
Required	Toggle from 'Off' to 'On' if this field requires an input.

This will provide a preview of how the Text field will appear where the Custom Data set is applied.

You can input the following properties for Boolean fields.

Property	Description
Identifier	This can be entered as text.
Name	This can be entered as text.
Description	This can be entered as text.
Placeholder (Default)	Select if 'True' or 'False' should be shown be default (optional).
Required	Toggle from 'Off' to 'On' if this field requires an input.

This will provide a preview of how the Boolean field will appear where the Custom Data set is applied.

You can input the following properties for Selection (Single) fields.

Property	Description
Identifier	This can be entered as text.
Name	This can be entered as text.
Description	This can be entered as text.
Placeholder (Default)	Indicate if the Selection field should be selected by default (optional).
Required	Toggle from 'Off' to 'On' if this field requires an input.
Items	Add, remove, and configure what items are available to select in this input. Enter a Name for the Selection as text.
Active	Toggle from 'Off' to 'On'

This will provide a preview of how the Selection (Single) field will appear where the Custom Data set is applied.

You can input the following properties for Selection (Multiple) fields.

Property	Description
Identifier	This can be entered as text.
Name	This can be entered as text.
Description	This can be entered as text.
Placeholder (Default)	Indicate which Selection should be selected by default (optional).
Required	Toggle from 'Off' to 'On' if this field requires an input.
Items	Add, remove, and configure what items are available to select in this input. Enter a Name for the Selection as text.

This will provide a preview of how the Selection (Multiple) field will appear where the Custom Data set is applied.

You can input the following properties for Numeric fields.

Property	Description
Identifier	This can be entered as text.
Name	This can be entered as text.
Description	This can be entered as text.
Placeholder (Default)	Indicate what number should be entered by default (optional).
Required	Toggle from 'Off' to 'On' if this field requires an input.

Property	Description
Unit of Measurement	Select Unit of Measurement that applies. Units of Measurement can be defined in the library.
Lower Bound/Upper Bound	Define Lower Bound or Numeric Range for this input.

This will provide a preview of how the Numeric field will appear where the Custom Data set is applied.

To create the Custom Data set, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

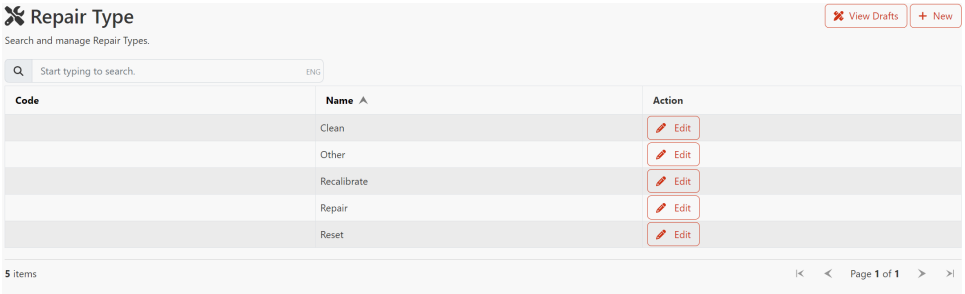
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

5.5.2 Repair Types

The Repair Types settings allow you to create and configure Repair Types to be associated with Repair Events.

Select the Repair Types setting to view all Repair Types in the database. A grid shows the following properties for each:

- Code
- Name
- Action



To create a new Repair Type, select the **New** button on the top right-hand corner of the settings view. This will open the Repair Types view. To View or Edit a Repair Type, select the **Edit** button in the Action column.

You can input the following properties for the Repair Type.

Property	Description
Code	This can be entered as text.
Name	This can be entered as text.
Description	This can be entered as text.

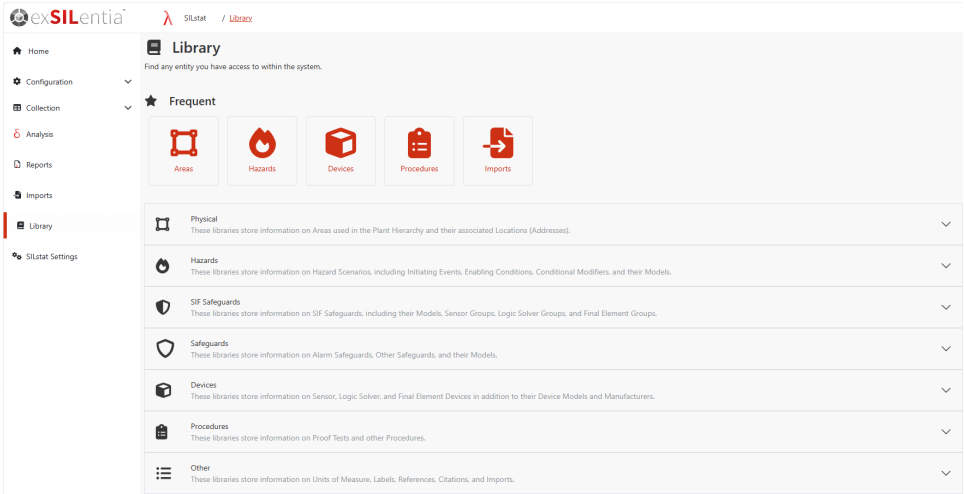
To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

The Insight tiles show the number of Repair Events and the number of Devices that were repaired with this Repair Type.

To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

Chapter 6 SILstat Library

The SILstat Library provides a centralized location for the data in your SILstat database. A library item is a unique entity that can be referenced/linked in multiple locations. Items that have been added to the plant hierarchy can be found here, as well as items that are in draft. A change to the library item will automatically be applied to all locations the library item is referenced/linked. Using libraries will dramatically increase the efficiency and consistency of the various work activities to be performed. To navigate to the Library, select the ***Library*** button on the left side panel. At the top you will see your most frequently accessed libraries listed. Under your Frequent libraries, you will see all available libraries listed.



The following libraries are defined within SILstat.

Physical Library

- Areas
- Locations
- Tags

Hazards Library

- Initiating Event Models
- Initiating Events
- Hazards
- Enabling Condition Models
- Enabling Conditions
- Conditional Modifier Models
- Conditional Modifiers

SIF Safeguards Library

- SIF Safeguard Models
- SIF Safeguards
- Sensor Groups
- Logic Solver Groups
- Final Element Groups

Safeguards Library

- Alarm Safeguard Models
- Alarm Safeguards
- Other Safeguard Models
- Other Safeguards

Devices Library

- Manufacturers
- Device Models
- Devices
- Sensors
- Logic Solvers
- Final Elements

Procedures Library

- Procedures

Other Library

- Units of Measurements
- Labels
- References
- Resources
- Citations
- Imports

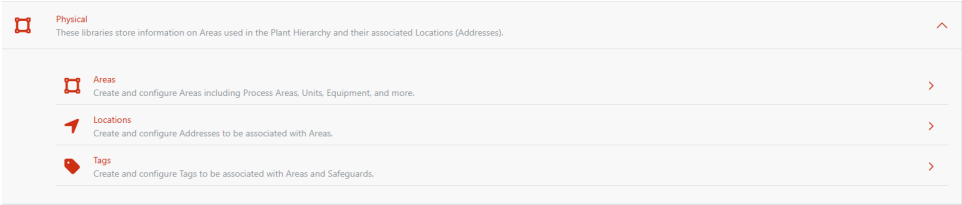
These libraries will be discussed in more detail in the subsequent sections.

Chapter 7 Physical Library

The Physical Library section contains the following libraries.

- Areas
- Locations
- Tags

Each will be described in detail in the subsequent sections.

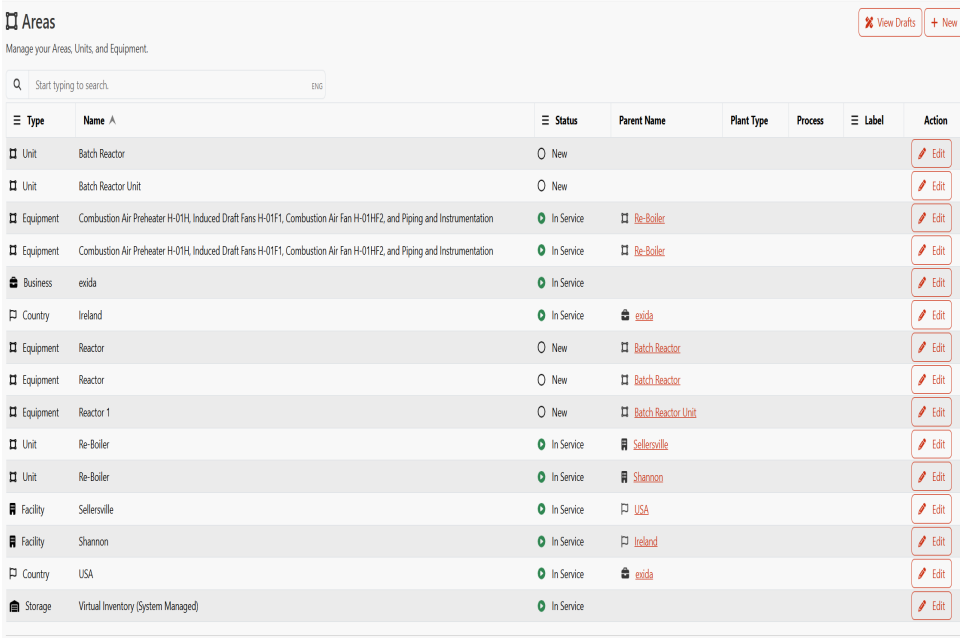


7.1 Areas

The Areas library allows for creation and configuration of Areas including Process Areas, Units, Equipment, and more. These Areas can be used to create your Plant Hierarchy.

Select the ***Areas*** library to view all Areas in the database. A grid shows the following properties for each.

- Type
- Name
- Status
- Parent Name
- Plant Type
- Process Type
- Labels
- Action



Type	Name	Status	Parent Name	Plant Type	Process	Label	Action
Unit	Batch Reactor	New					Edit
Unit	Batch Reactor Unit	New					Edit
Equipment	Combustion Air Preheater H-01H, Induced Draft Fans H-01F1, Combustion Air Fan H-01HF2, and Piping and Instrumentation	In Service	Re-Boiler				Edit
Equipment	Combustion Air Preheater H-01H, Induced Draft Fans H-01F1, Combustion Air Fan H-01HF2, and Piping and Instrumentation	In Service	Re-Boiler				Edit
Business	exida	In Service					Edit
Country	Ireland	In Service	exida				Edit
Equipment	Reactor	New	Batch Reactor				Edit
Equipment	Reactor	New	Batch Reactor				Edit
Equipment	Reactor 1	New	Batch Reactor Unit				Edit
Unit	Re-Boiler	In Service	Sellersville				Edit
Unit	Re-Boiler	In Service	Shannon				Edit
Facility	Sellersville	In Service	USA				Edit
Facility	Shannon	In Service	Ireland				Edit
Country	USA	In Service	exida				Edit
Storage	Virtual Inventory (System Managed)	In Service					Edit

To create a new Area, select the **New** button on the top right-hand corner of the library view. This will open the Area view. To View or Edit an Area, select the **Edit** button in the Action column. You can input the following properties for the Area.

Property	Description
Area Types	Types include Business, Country, Region, Site, Facility, Plant, Storage, Unit, Process Area, Equipment. Some selections will add properties to your Area. These have dedicated sections below.
Name	This can be entered as text.
Description	This can be entered as text.
Comments	This can be entered as text.
Location	Locations can be added to the Location library and associated with an Area.
Assigned Procedures	Procedures can be added to the Procedures Library and associated with an Area.

The Lifecycle Section shows all events associated with the Area.

The Hierarchy section shows all Parents and Children associated with the Area. These could be other Areas, Hazards or Tags.

The Common Properties section shows all Resources, References and Labels associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

The following Area Types have additional properties as detailed below.

Unit

Property	Description
Type	Automatically selected as Unit.
Name	This can be entered as text.
Description	This can be entered as text.
Comments	This can be entered as text.
Location	Locations can be added to the Location library and associated with an Area.

The Operations section shows Plant Type, Process Type, Process Mode, and Process Description.

The Lifecycle section shows all events associated with the Area. To view more information on what each state means, select the Legend button.

The Hierarchy section shows all the Parents and Children associated with the Unit. Children can be Areas and Tags.

The Common Properties section shows all Resources, References and Labels associated with the item.

Equipment

Property	Description
Type	Automatically selected as Unit.
Name	This can be entered as text.
Description	This can be entered as text.
Comments	This can be entered as text.
Intention	This can be entered as text.
Location	Locations can be added to the Location library and associated with an Area.

Specify which Equipment Type applies to the current area through the drop-down menu or by creating New.

The Assigned Procedures section shows the Procedures that have been directly assigned to this node. To add a new Procedure, select the New button. For more information on how to create a Procedure, see section *12.1* . To associate with an existing Procedure, select the Associate button.

The Lifecycle section shows all events associated with the Area. To view more information on what each state means, select the Legend button.

The Hierarchy section shows all the Parents and Children associated with the Equipment. Parents include Units, and Children include Hazards and Tags.

The Common Properties section shows all the Resources, References, and Labels associated with the item.

To delete the item, select the Delete button in the top right-hand corner. An item will not be able to be deleted if it is in service.

After deleting the item, it becomes a soft delete. A soft delete means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

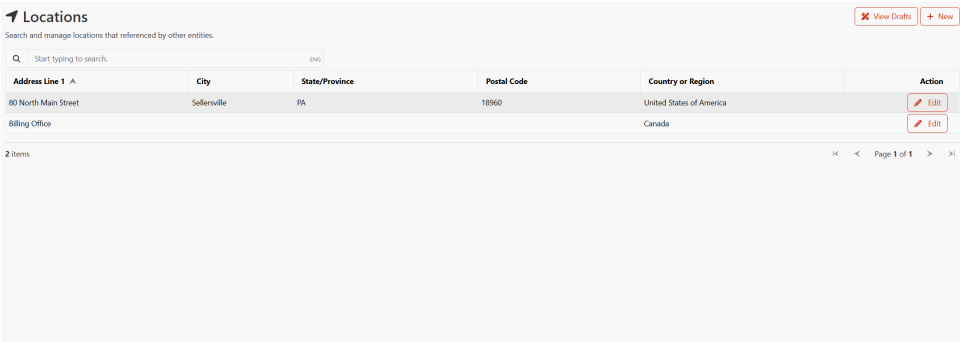
To record an event against the Equipment node, select the Record button to record an Install, Decommission, or Bypass event.

7.2 Locations

The Locations library allows for creation and configuration of Addresses to be associated with Areas.

Select the ***Locations*** library to view all items in the database. A grid shows the following properties for each.

- Address Line 1
- Address Line 2
- State/Province
- Postal Code
- Country or Region
- Action



To create a new Location, select the **New** button on the top right-hand corner of the library view. This will open the Location view. To View or Edit a Location, select the **Edit** button in the Action column. You can input the following properties for the Location.

Property	Description
Address Line 1	This can be entered as text.
Address Line 2	This can be entered as text.
City	This can be entered as text.

Property	Description
State/Province	This can be entered as text.
Postal Code	This can be entered as text.
Country/Region	This can be selected from the drop down. Options for country are pre-set.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

The Insights on the Locations view show the Number of Areas with this Location associated.

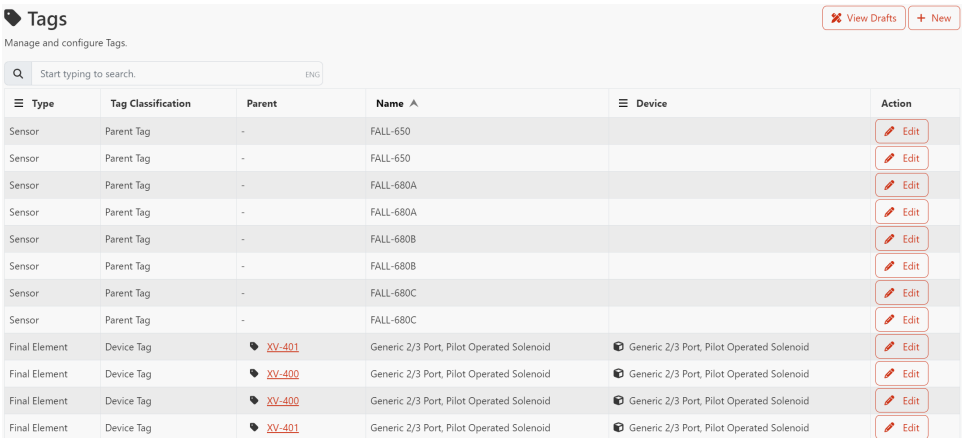
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

7.3 Tags

The Tags Library allows for creation and configuration of Tags and Subtags including Sensor Tags, Logic Solver Tags, Final Element Tags, Alarm Tags and Other Tags. These can be associated with Areas and Safeguards.

Select the ***Tags*** library to view all Tags in the database. A grid shows the following properties for each.

- Type
- Name
- Device
- Action



To create a new Tag, select the **New** button on the top right-hand corner of the library view. This will open the Tag view. To View or Edit a Tag, select the **Edit** button in the Action column. You can input the following properties for the Tag.

Property	Description
Tag Types	Select from drop down. Types include Other, Sensor, Logic Solver, Final Element, Alarm.
Name	This can be entered as text.
Description	This can be entered as text.
Unit of Measurement	Use field to search for available Units to choose from, or create new Unit.
Device	Select a Device from the Device Library. These will be filtered based on the Tag Type selected.

The Hierarchy section shows all Parents and Children associated with the Tag. These could be other Tags, Groups, Safeguards or Areas.

The Analysis Section includes additional fields based on the Tag Type, these are defined in the sections below.

The Custom Data section allows you to fill out user-defined fields. These can be configured in the SILstat Settings.

The Procedures section shows all Procedures associated with the Tag. Procedures can be created in the Procedures Library.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

7.3.1 Sensor Tags

You can input the following properties for the Sensor Tag Configuration.

Property	Description
Input Type	Select from Process or Discreet from drop down.
Process Value	Select Analog or Digital from drop down.
Range Low	Enter value in Units of Measure selected.
Range High	Enter value in Units of Measure selected.
Tolerance	Enter value in Units of Measure selected.

Select **Add** in the Profile section to add a new profile. You can input the following properties for the Sensor Tag Profile.

Property	Description
Trip Direction	Select from High or Low from drop down.
Limit	Enter value in Units of Measure selected.
Basis	This can be entered as text.

7.3.2 Logic Solver Tags

You can input the following properties for the Logic Solver Tag Configuration.

Property	Description
Input Type	Select from Process or Discreet from drop down.
Process Value	Select Analog or Digital from drop down.
Range Low	Enter value in Units of Measure selected.
Range High	Enter value in Units of Measure selected.
Tolerance	Enter value in Units of Measure selected.

Select **Add** in the Profile section to add a new profile. You can input the following properties for the Logic Solver Tag Profile.

Property	Description
Trip Direction	Select from High or Low from drop down.
Limit	Enter value in Units of Measure selected.
Basis	This can be entered as text.

7.3.3 Final Element Tags

You can input the following properties for the Final Element Tag Configuration.

Property	Description
Remote Actuated Valve	Toggle On/Off based on your Final Element device.

Select **Add** in the Profile section to add a new profile. You can input the following properties for the Remote Actuated Valve Final Element Tag Profile.

Property	Description
Action	Select Open or Closed from drop down.
Fail Position	Select Open, Closed or Stuck from drop down.
Tight Shutoff Required	Select True or False.
Feedback Tag	This can be entered as text.

Select **Add** in the Profile section to add a new profile. You can input the following properties for the Non-Remote Actuated Valve Final Element Tag Profile.

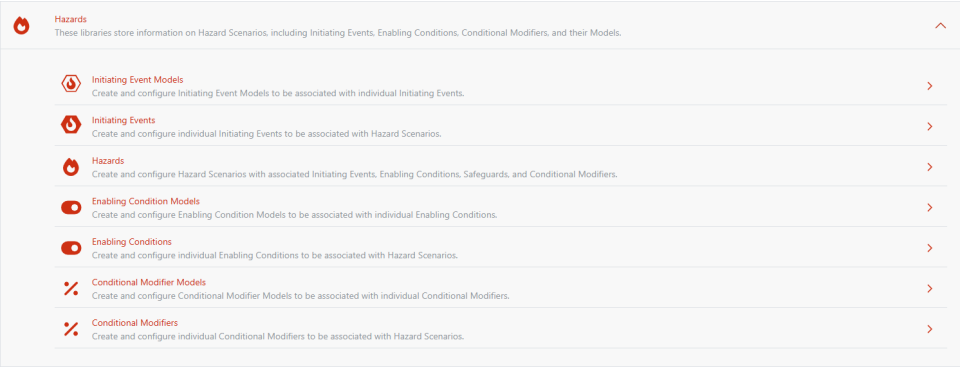
Property	Description
Trip Action	Select On or Off from drop down.
Fail Position	Select On or Off from drop down.

Chapter 8 Hazards Library

The Hazards Library section contains the following libraries.

- Initiating Event Models
- Initiating Events
- Hazards
- Enabling Condition Models
- Enabling Conditions
- Conditional Modifier Models
- Conditional Modifiers

Each will be described in detail in the subsequent sections.

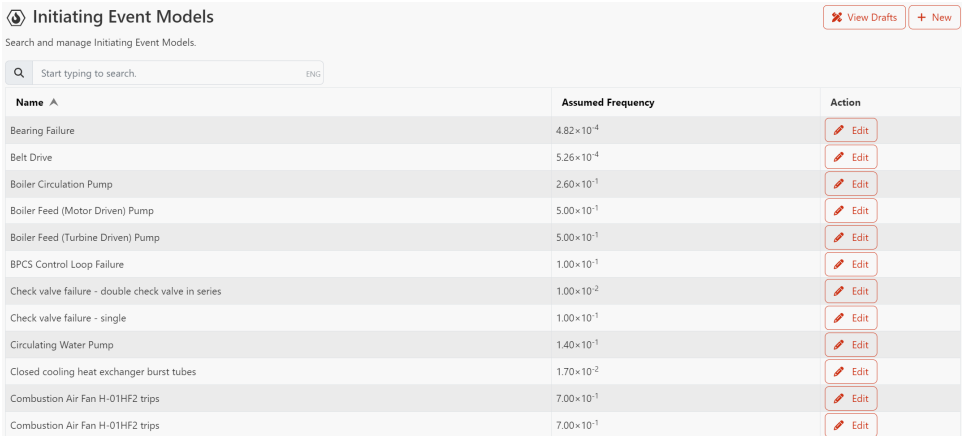


8.1 Initiating Event Models

The Initiating Event Models library allows for creation and configuration of Initiating Event Models to be associated with individual Initiating Events.

Select the ***Initiating Event Models*** library to view all items in the database. A grid shows the following properties for each.

- Name
- Assumed Frequency
- Action



To create a new Initiating Event Model, select the **New** button on the top right-hand corner of the library view. This will open the Initiating Event Model view. To View or Edit an Initiating Event Model, select the **Edit** button in the Action column. You can input the following properties for the Initiating Event Model.

Property	Description
Name	This can be entered as text.
Description	This can be entered as text.

You can input the following properties for the Initiating Event Model in the Assumptions section.

Property	Description
Assumed Frequency	Enter the value in frequency per year.
Assumption	This can be entered as text.
Comment	This can be entered as text.
Sources	This can be entered as text.
Citation	Citations can be added to the Citations Library and associated with an Initiating Event Model.

The Common Properties section shows all Resources and References associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

The Insights on the Initiating Event Models view shows Initiating Events (count that are using the models) and Hazards.

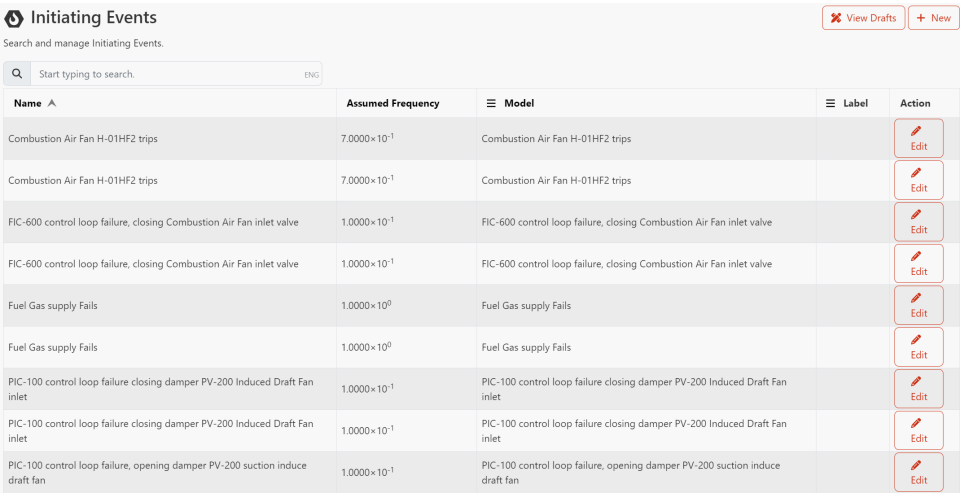
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

8.2 Initiating Events

The Initiating Events library allows for creation and configuration of individual Initiating Events that can be associated with Hazard Scenarios.

Select the ***Initiating Events*** library to view all items in the database. A grid shows the following properties for each.

- Name
- Assumed Frequency
- Model
- Labels
- Action



To create a new Initiating Event, select the **New** button on the top right-hand corner of the library view. This will open the Initiating Event view. To View or Edit an Initiating Event, select the **Edit** button in the Action column. You can input the following properties for the Initiating Event.

Property	Description
Initiating Event Model	Initiating Event Models can be added to the Initiating Event Models Library and associated with an Initiating Event.
Name	This can be entered as text.
Description	This can be entered as text.

You can input the following properties for the Initiating Event in the Assumptions section. These may be based on the Initiating Event Model selected.

Property	Description
Assumed Frequency	Enter the value in frequency per year.
Assumption	This can be entered as text.
Comment	This can be entered as text.
Sources	This can be entered as text.

The Hierarchy section shows all Parents and Children associated with the Initiating Event. The Parents section will show associated Hazard Scenarios. The Children section will show associated Safeguards and Modifiers.

The Common Properties section shows all Resources, References and Labels associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

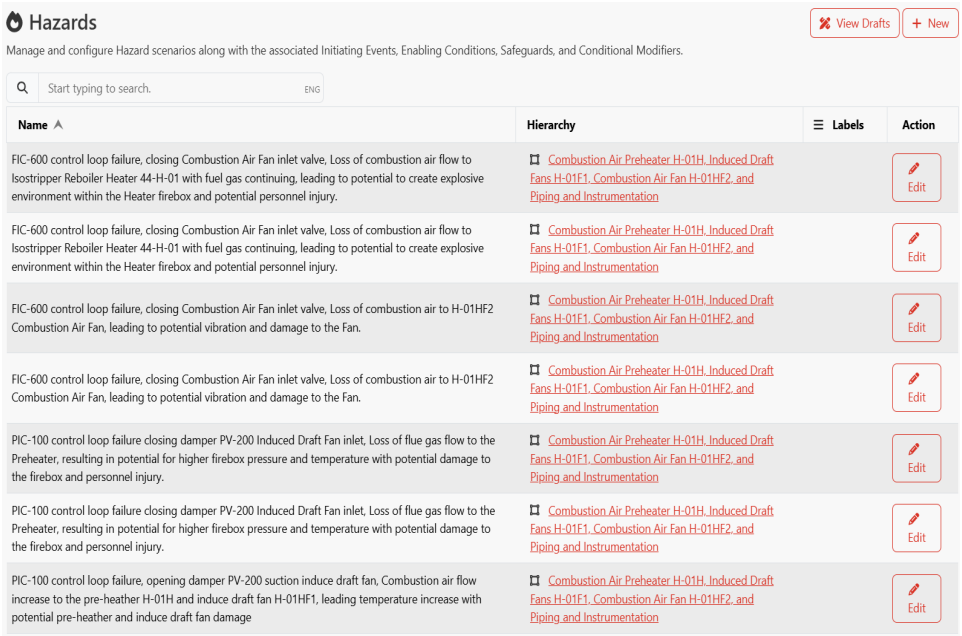
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

8.3 Hazards

The Hazards library allows for creation and configuration of Hazard Scenarios, with associated Initiating Events, Enabling Conditions, Safeguards, and Conditional Modifiers.

Select the ***Hazards*** library to view all Hazards in the database. A grid shows the following properties for each.

- Name
- Hierarchy
- Label
- Action



To create a new Hazard, select the **New** button on the top right-hand corner of the library view. This will open the Hazard view. To View or Edit a Hazard, select the **Edit** button in the Action column. You can input the following properties for the Hazard.

Property	Description
Name	This can be entered as text.
Description	This can be entered as text.

For Hazard Scenarios imported from exSILentia, the Assumed Frequency and Assumed Risk Reduction Factor per Severity Category are shown from the LOPA.

Once the Hazard is defined a Hazard Scenario Diagram will appear. This allows you to associate existing items from the library or create new items. Items that can be associated with a Hazard include:

- Initiating Events
- Enabling Conditions
- Safeguards
- Conditional Modifiers

You can create new items via the diagram, or by selecting the **New** button and choosing the item type from the drop down. This will show a new view for the item to be defined. After specifying the new item, select **Create**. Upon creation the item will be associated with the Hazard.

To add existing items to the Hazard Scenario, select the **Associate** button and choose the item type from the drop down. A panel will appear on the right-hand side showing existing items in the database. For each item the Name, Type, and Action are shown. To add this to the Hazard, select the toggle button under the Action column. This will toggle from *Off* to *On*. Once all items to be associated are switched to *On*, close the right-hand panel.

The Hazard Scenario Diagram can be viewed in Fullscreen. Selecting items in the Diagram will show associated data.

- Assumed Frequency is shown for Initiating Events
- Assumed Probability is shown for Enabling Conditions and Conditional Modifiers
- Assumed PFD is shown for Safeguards

To re-order items, select the item in the diagram and move it left or right using the arrow buttons.

The Hierarchy section shows all Parents and Children associated with the Hazard. Parents will include Areas the Hazard is associated with. Children will show the Initiating Events, Safeguards, and Modifiers associated with the Hazard. Through the hierarchy, you can directly edit, create new, and associate any existing children.

The Common Properties section shows all Resources, References and Labels associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.]

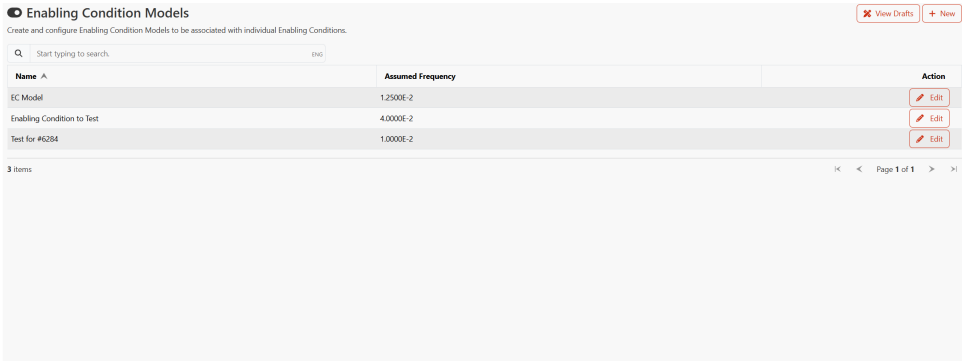
Hazards become Read-Only when any Area above the Hazard goes into Service and when it is out of the Draft status.

8.4 Enabling Condition Models

The Enabling Condition Models library allows for creation and configuration of Enabling Condition Models to be associated with individual Enabling Conditions.

Select the ***Enabling Condition Models*** library to view all items in the database. A grid shows the following properties for each.

- Name
- Assumed Probability
- Action



To create a new Enabling Condition Model, select the **New** button on the top right-hand corner of the library view. This will open the Enabling Condition Model view. To View or Edit an Enabling Condition Model, select the **Edit** button in the Action column. You can input the following properties for the Enabling Condition Model.

Property	Description
Type	This should default to Enabling Condition. If you prefer a different type, select from drop down.
Name	This can be entered as text.

You can input the following properties for the Enabling Condition Model in the Assumptions section.

Property	Description
Assumed Probability	Enter this value as a decimal.
Assumption	This can be entered as text.
Comment	This can be entered as text.
Sources	This can be entered as text.
Citation	Citations can be added to the Citations Library and associated with an Enabling Condition Model.

The Common Properties section shows all Resources and References associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

The Insights on the Enabling Conditions Model view shows Enabling Conditions (count that are using the models).

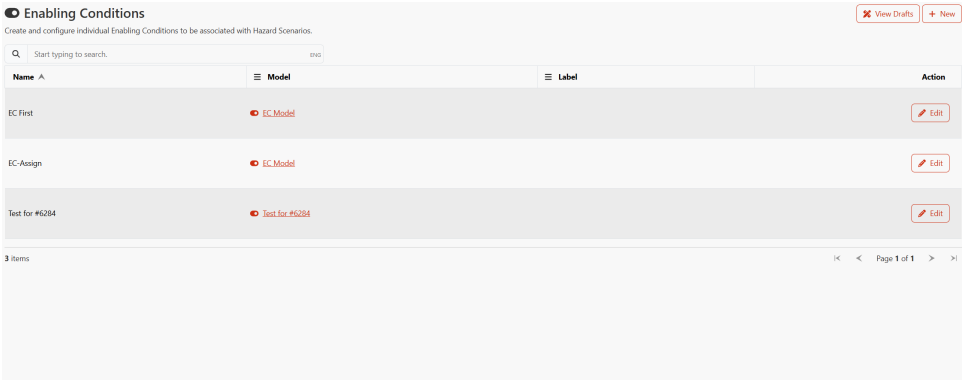
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

8.5 Enabling Conditions

The Enabling Conditions library allows for creation and configuration of individual Enabling Conditions to be associated with Hazard Scenarios.

Select the ***Enabling Conditions*** library to view all items in the database. A grid shows the following properties for each.

- Name
- Assumed Probability
- Model
- Labels
- Action



To create a new Enabling Condition, select the **New** button on the top right-hand corner of the library view. This will open the Enabling Condition view. To View or Edit an Enabling Condition, select the **Edit** button in the Action column. You can input the following properties for the Enabling Condition.

Property	Description
Enabling Condition Model	Enabling Condition Models can be added to the Enabling Condition Models Library and associated with an Enabling Condition.
Name	This can be entered as text.
Description	This can be entered as text.

You can input the following properties for the Enabling Condition in the Assumptions section. These may be based on the Enabling Condition Model selected.

Property	Description
Assumed Probability	Enter this value as a decimal.
Assumption	This can be entered as text.
Comment	This can be entered as text.
Sources	This can be entered as text.
Citation	Citations can be added to the Citations Library and associated with an Enabling Condition.

The Hierarchy section shows all Parents and Children associated with the Enabling Condition. The Parents section will show associated Hazard Scenarios and Enabling Condition Models.

The Common Properties section shows all Resources, References and Labels associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

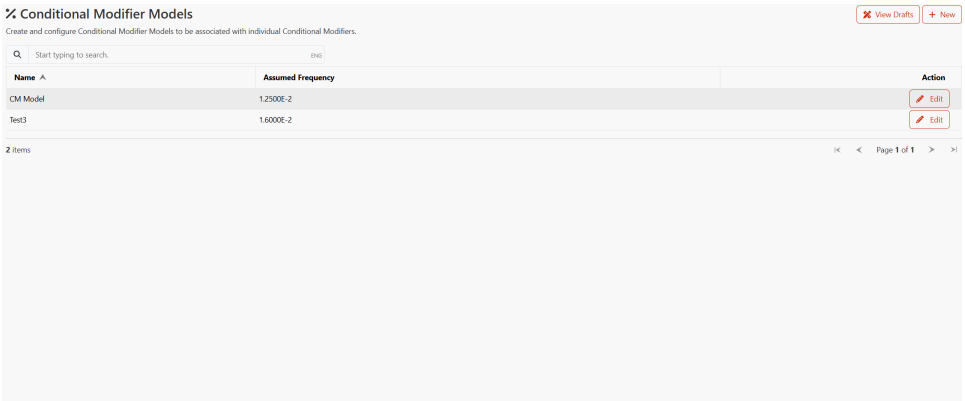
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

8.6 Conditional Modifier Models

The Conditional Modifier Models library allows for creation and configuration of Conditional Modifier Models to be associated with individual Conditional Modifiers.

Select the ***Conditional Modifier Models*** library to view all items in the database. A grid shows the following properties for each.

- Name
- Assumed Probability
- Action



To create a new Conditional Modifier Model, select the **New** button on the top right-hand corner of the library view. This will open the Conditional Modifier Model view. To View or Edit a Conditional Modifier Model, select the **Edit** button in the Action column. You can input the following properties for the Conditional Modifier Model.

Property	Description
Type	This should default to Conditional Modifier. If you prefer a different type, select from drop down.
Name	This can be entered as text.

You can input the following properties for the Conditional Modifier Model in the Assumptions section.

Property	Description
Assumed Probability	Enter this value as a decimal.
Assumption	This can be entered as text.
Comment	This can be entered as text.
Sources	This can be entered as text.

Property	Description
Citation	Citations can be added to the Citations Library and associated with a Conditional Modifier Model.

The Common Properties section shows all Resources and References associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

The Insights on the Conditional Modifier Model view shows Conditional Modifiers (count that are using the models).

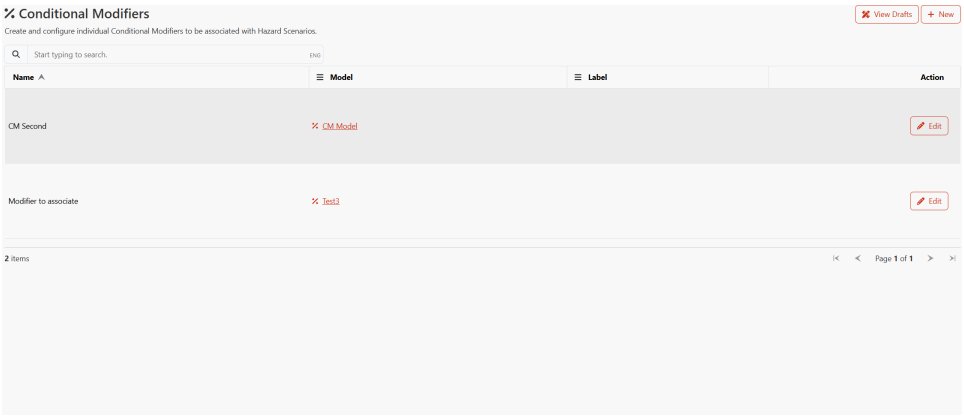
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

8.7 Conditional Modifiers

The Conditional Modifiers library allows for creation and configuration of individual Conditional Modifiers that can be associated with Hazard Scenarios.

Select the ***Conditional Modifiers*** library to view all items in the database. A grid shows the following properties for each.

- Name
- Assumed Probability
- Model
- Labels
- Action



To create a new Conditional Modifier, select the **New** button on the top right-hand corner of the library view. This will open the Conditional Modifier view. To View or Edit a Conditional Modifier, select the **Edit** button in the Action column. You can input the following properties for the Conditional Modifier.

Property	Description
Conditional Modifier Model	Conditional Modifier Models can be added to the Conditional Modifier Models Library and associated with a Conditional Modifier.
Name	This can be entered as text.
Description	This can be entered as text.

You can input the following properties for the Conditional Modifier in the Assumptions section. These may be based on the Conditional Modifier Model selected.

Property	Description
Assumed Probability	Enter this value as a decimal.
Assumption	This can be entered as text.
Comment	This can be entered as text.
Sources	This can be entered as text.
Citation	Citations can be added to the Citations Library and associated with a Conditional Modifier.

The Hierarchy section shows all Parents and Children associated with the Conditional Modifier. The Parents section will show associated Hazard Scenarios and Conditional Modifier Models.

The Common Properties section shows all Resources, References and Labels associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

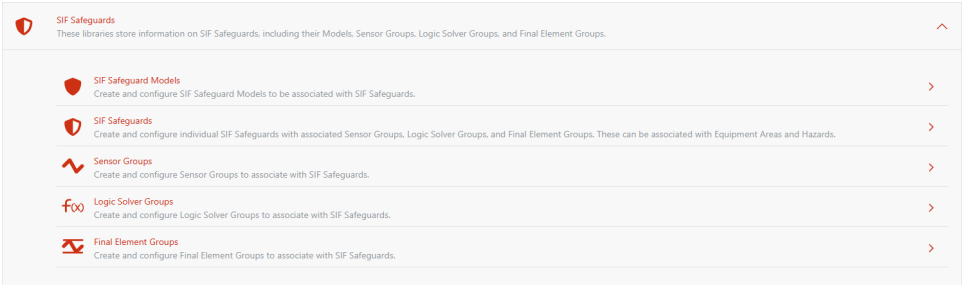
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

Chapter 9 SIF Safeguards Library

The SIF Safeguards Library section contains the following libraries.

- SIF Safeguard Models
- SIF Safeguards
- Sensor Groups
- Logic Solver Groups
- Final Element Groups

Each will be described in detail in the subsequent sections.

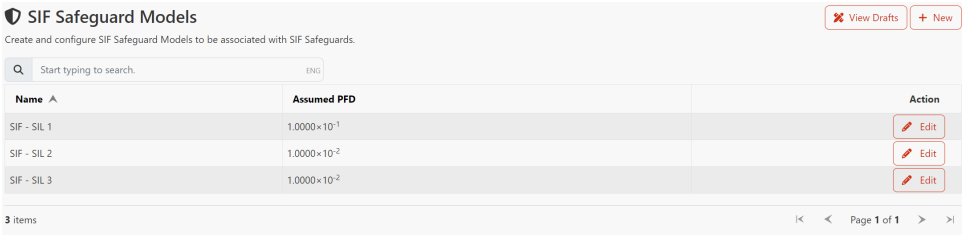


9.1 SIF Safeguard Models

The SIF Safeguard Models library allows for creation and configuration of SIF Safeguard Models to be associated with individual SIF Safeguards.

Select the ***SIF Safeguard Models*** library to view all items in the database. A grid shows the following properties for each.

- Name
- Assumed PFD
- Action



To create a new SIF Safeguard Model, select the **New** button on the top right-hand corner of the library view. This will open the SIF Safeguard Model view. To View or Edit a SIF Safeguard Model, select the **Edit** button in the Action column. You can input the following properties for the SIF Safeguard Model.

Property	Description
Type	This should default to SIF Safeguard. If you prefer a different type, select from drop down.
Name	This can be entered as text.
Description	This can be entered as text.

You can input the following properties for the SIF Safeguard Model in the Assumptions section.

Property	Description
Assumed PFD	Enter this value as a decimal.
Assumed RRF	Enter this value as a whole number.
Assumption	This can be entered as text.
Comment	This can be entered as text.
Sources	This can be entered as text.
Citation	Citations can be added to the Citations Library and associated with a SIF Safeguard Model.

The Common Properties section shows all Resources and References associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

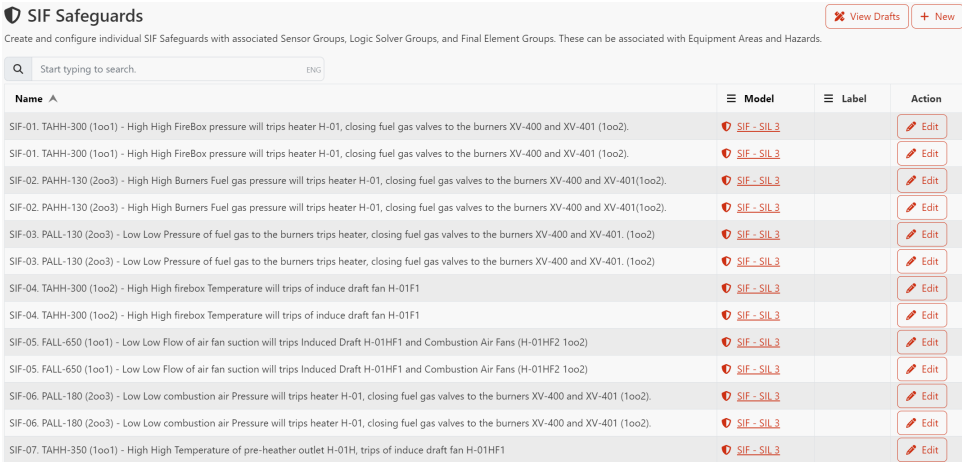
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

9.2 SIF Safeguards

The SIF Safeguards library allows for creation and configuration of individual SIF Safeguards that can be associated with Sensor Groups, Logic Solvers, Final Element Groups, Tags, and Devices.

Select the ***SIF Safeguards*** library to view all items in the database. A grid shows the following properties for each.

- Name
- Model
- Labels
- Action



To create a new SIF Safeguard, select the **New** button on the top right-hand corner of the library view. This will open the SIF Safeguard view. To View or Edit a SIF Safeguard, select the **Edit** button in the Action column. You can input the following properties for the SIF Safeguard.

Property	Description
Model	This will default to 'SIF – SIL 1'. Model can be changed by selecting the model to open the Models view on the right-side panel. Select the new Model and close the view.
Name	This can be entered as text.
Description	This can be entered as text.
Tag	This can be entered as text.
Comment	This can be entered as text.
Safeguard Category	Safeguard Categories can be configured in SILstat Settings and associated with an SIF Safeguard.
Immediate Consequence	This can be entered as text.
Potential Ultimate Consequence	This can be entered as text.

You can input the following properties for the SIF Safeguard in the LOPA Data section.

Property	Description
Assumed PFD	Enter this value as a decimal.
Assumed RRF	Enter this value as a whole number.
Assumed Demand Rate	Enter the value in frequency per year.
Assumption	This can be entered as text.
Comment	This can be entered as text.
Sources	This can be entered as text.

Property	Description
Citation	Citations can be added to the Citations Library and associated with an Initiating Event Model.

You can input the following properties for the SIF Safeguard in the SIL Verification Data section.

Property	Description
Sensor Site Safety Index	Select SSI Level from drop down.
Logic Solver Site Safety Index	Select SSI Level from drop down.
Final Element Site Safety Index	Select SSI Level from drop down.
Include SSI in Failure Rate Selection	Check or uncheck the box.
Assumed SIL	Select SIL Level from drop down.
Assumed PFDavg	Enter this value as a whole number.
Achieved RRF	Enter this value as a whole number.
SIF Mission Time	Enter the value in years.
Start-up Time	Enter the value in hours.

Once the SIF Safeguard is defined a SIF Diagram will appear. This allows you to associate existing items from the library or create new items. Items that can be associated with a SIF Safeguard include:

- Sensor Groups
- Logic Solver
- Final Element Groups

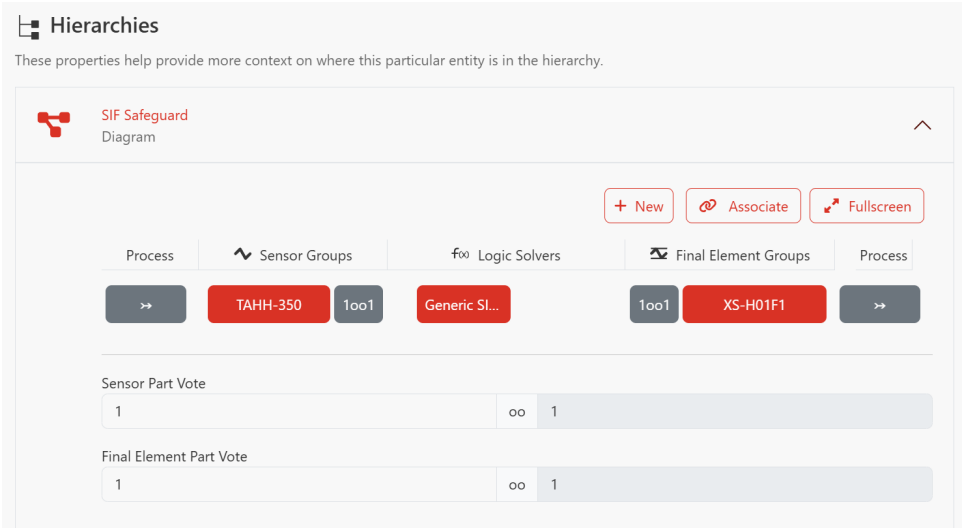
By default, the SIF Safeguard will have 1 Sensor Group, 1 Logic Solver, and 1 Final Element Group. Below the SIF Diagram you can specify:

- Vote between Sensor Groups
- Vote between Final Element Groups

You can create new items via the diagram, or by selecting the **New** button and choosing the item type from the drop down. This will show a new view for the item to be defined. After specifying the new item, select **Create**. Upon creation the item will be associated with the SIF Safeguard.

To add existing items to the SIF Safeguard, select the **Associate** button and choose the item type from the drop down. A panel will appear on the right-hand side showing existing items in the database. For each item the Name, Type, and Action are shown. To add this to the SIF Safeguard, select the toggle button under the Action column. This will toggle from *Off* to *On*. Once all items to be associated are switched to *On*, close the right-hand panel. Please Note: once the safeguard is in operation, you will not be able to disassociate items.

The SIF Diagram can be viewed in Fullscreen. Selecting items in the Diagram will show associated data.



The Hierarchy section shows all Parents and Children associated with the SIF Safeguard. Parents will include Areas, Hazards, and Initiating Events the SIF Safeguard is associated with. Children will show the Sensor, Logic Solver, and Final Element Groups. Through the hierarchy you can directly edit, create new, and associate any existing children.

The Procedures section shows any procedures that have been assigned or inherited. Procedures can be added to the Procedures Library and associated with the SIF Safeguard. The Procedures section shows the following properties:

- Name
- Interval
- Duration
- Initial Run

The Inherited Procedures section shows procedures assigned to a Parent associated with the SIF Safeguard. These are read-only on the child level. To edit these procedures, you must navigate to the Parent.

The Common Properties section shows all Resources, References and Labels associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

9.3 Sensor Groups

The Sensor Groups library allows for creation and configuration of individual Sensor Groups to be associated with SIF Safeguards.

Select the ***Sensor Groups*** library to view all items in the database. A grid shows the following properties for each.

- Name
- Action

To create a new Sensor Group, select the **New** button on the top right-hand corner of the library view. This will open the Sensor Group view. To View or Edit a Sensor Group, select the **Edit** button in the Action column. You can input the following properties for the Sensor Group.

Property	Description
Type	Types include Sensor, Logic Solver and Final Element. This field will default to 'Sensor' if added to the Sensor Group Library.
Name	This can be entered as text.
Description	This can be entered as text.

The Hierarchy section shows all Parents and Children associated with the Sensor Group. Parents include Hazards, Initiating Events, and SIF Safeguards. Since Sensor Groups can belong to multiple Parents, it will be listed in grid format. Within the grid, select the Parents links to view the Parent. Children will show associated Sensor Tags. You can add New, Associate, and Disassociate the Tags.

You can input the following properties for the Sensor Group in the SIL Verification Data, Group Options section.

Property	Description
Vote between Tags	Enter vote between the Tags or Legs of the Sensor Group in MooN format.
Mean Repair Time	Enter the value in hours.
Group Mission Time	Enter the value in years.

You can input the following properties for the Sensor Group in the SILver Data, Analysis Proof Test Configurations section.

Property	Description
Interval	Enter the value in years.

The Procedures section shows any procedures that have been assigned or inherited. Procedures can be added to the Procedures Library and associated with the Sensor Group. The Procedures section shows the following properties:

- Name
- Interval
- Duration
- Initial Run

The Inherited Procedures section shows procedures assigned to a Parent associated with the Sensor Group. These are read-only on the child level. To edit these procedures, you must navigate to the Parent.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

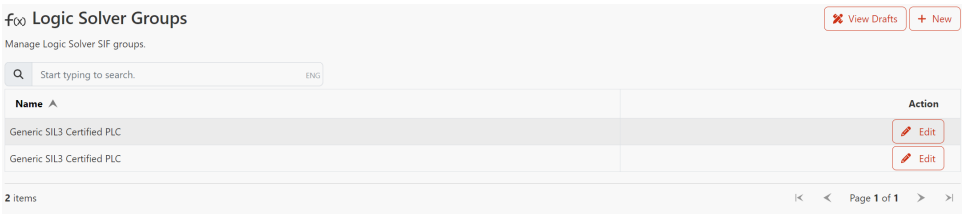
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

9.4 Logic Solver Groups

The Logic Solver Groups library allows for creation and configuration of individual Logic Solver Groups to be associated with SIF Safeguards.

Select the ***Logic Solver Groups*** library to view all items in the database. A grid shows the following properties for each.

- Name
- Action



To create a new Logic Solver Group, select the **New** button on the top right-hand corner of the library view. This will open the Logic Solver Group view. To View or Edit a Logic Solver Group, select the **Edit** button in the Action column. You can input the following properties for the Logic Solver Group.

Property	Description
Type	Types include Sensor, Logic Solver and Final Element. This field will default to 'Logic Solver' if added to the Logic Solver Group Library.

Property	Description
Name	This can be entered as text.
Description	This can be entered as text.

The Hierarchy section shows all Parents and Children associated with the Logic Solver Group. Parents include Hazards, Initiating Events, and SIF Safeguards. Since Logic Solver Groups can belong to multiple Parents, it will be listed in grid format. Within the grid, select the Parents links to view the Parent. Children will show the Logic Solver Tag. You can add New, Associate, and Disassociate the Tag.

You can input the following properties for the Logic Solver Group in the SILver Data, Group Options section.

Property	Description
Mean Repair Time	Enter the value in hours.
Group Mission Time	Enter the value in years.

You can input the following properties for the Logic Solver Group in the SILver Data, Analysis Proof Test Configurations section.

Property	Description
Interval	Enter the value in years.

The Procedures section shows any procedures that have been assigned or inherited. Procedures can be added to the Procedures Library and associated with the Logic Solver Group. The Procedures section shows the following properties:

- Name
- Interval
- Duration
- Initial Run

The Inherited Procedures section shows procedures assigned to a Parent associated with the Logic Solver Group. These are read-only on the child level. To edit these procedures, you must navigate to the Parent.

The Common Properties section shows all Resources, References and Labels associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

The Insights on the Logic Solver Group view shows SIF Safeguards, Tags, Procedures, Operating Hours, Demands, and Failures.

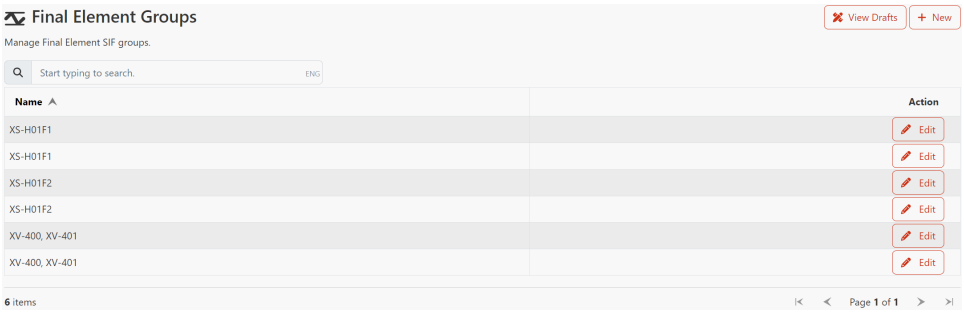
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

9.5 Final Element Groups

The Final Element Groups library allows for creation and configuration of individual Final Element Groups to be associated with SIF Safeguards.

Select the ***Final Element Groups*** library to view all items in the database. A grid shows the following properties for each.

- Name
- Action



To create a new Final Element Group, select the **New** button on the top right-hand corner of the library view. This will open the Final Element Group view. To View or Edit a Final Element Group, select the **Edit** button in the Action column. You can input the following properties for the Final Element Group.

Property	Description
Type	Types include Sensor, Logic Solver and Final Element. This field will default to 'Final Element' if added to the Final Element Group Library.
Name	This can be entered as text.
Description	This can be entered as text.

The Hierarchy section shows all Parents and Children associated with the Final Element Group. Parents include Hazards, Initiating Events, and SIF Safeguards. Since Final Element Groups can belong to multiple Parents, it will be listed in grid format. Within the grid, select the Parents links to view the Parent. Children will show associated Final Element Tags. You can add New, Associate, and Disassociate the Tags.

You can input the following properties for the Final Element Group in the SILver Data, Group Options section.

Property	Description
Vote between Tags	Enter vote between the Tags or Legs of the Final Element Group in MooN format.

Property	Description
Mean Repair Time	Enter the value in hours.
Group Mission Time	Enter the value in years.

You can input the following properties for the Final Element Group in the SILver Data, Analysis Proof Test Configuration section.

Property	Description
Interval	Enter the value in years.

You can input the following properties for the Final Element Group in the SILver Data, Partial Valve Stroke Test section.

Property	Description
On/Off	Toggle from Off to On to enter information on Partial Valve Stroke Test.
Interval	Enter the value in years.

The Procedures section shows any procedures that have been assigned or inherited. Procedures can be added to the Procedures Library and associated with the Final Element Group. The Procedures section shows the following properties:

- Name
- Interval
- Duration
- Initial Run

The Inherited Procedures section shows procedures assigned to a Parent associated with the Final Element Group. These are read-only on the child level. To edit these procedures, you must navigate to the Parent.

The Common Properties section shows all Resources, References and Labels associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

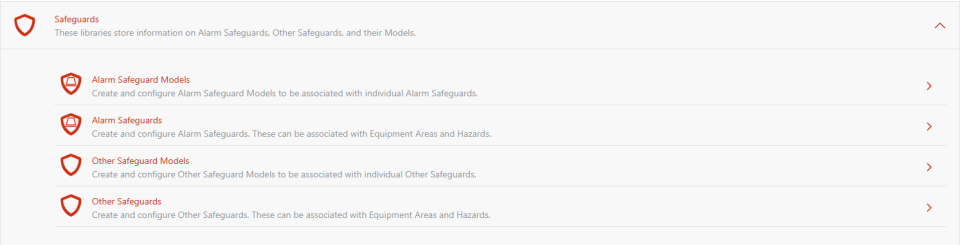
Chapter 10 Safeguards Library

The Safeguards Library section contains the following libraries.

Safeguards Library

- Alarm Safeguard Models
- Alarm Safeguards
- Other Safeguard Models
- Other Safeguards

Each will be described in detail in the subsequent sections.

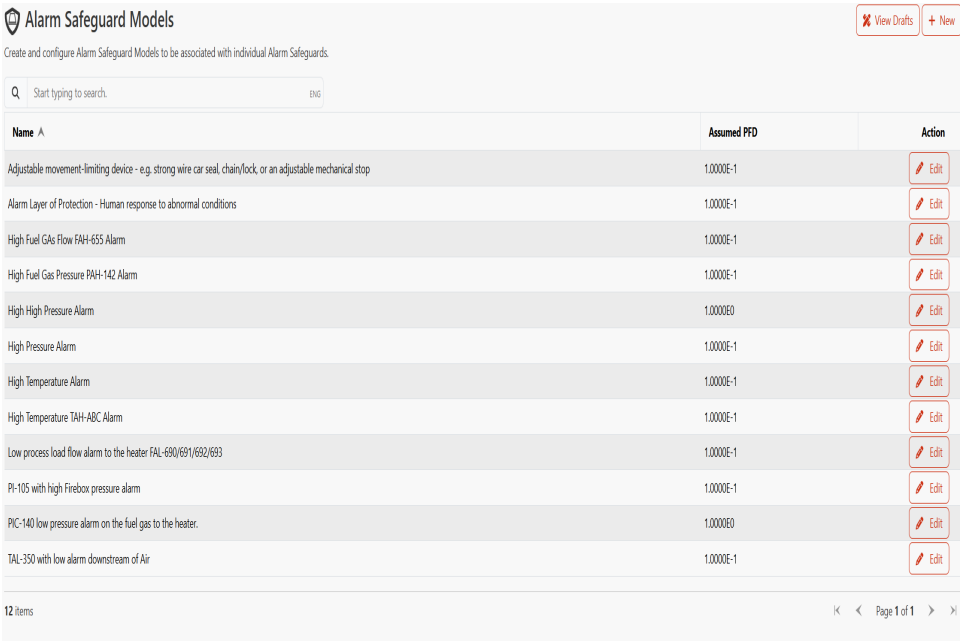


10.1 Alarm Safeguard Models

The Alarm Safeguard Models library allows for creation and configuration of Alarm Safeguard Models to be associated with individual Alarm Safeguards.

Select the ***Alarm Safeguard Models*** library to view all items in the database. A grid shows the following properties for each.

- Name
- Assumed PFD
- Action



To create a new Alarm Safeguard Model, select the **New** button on the top right-hand corner of the library view. This will open the Alarm Safeguard Model view. To View or Edit an Alarm Safeguard Model, select the **Edit** button in the Action column. You can input the following properties for the Alarm Safeguard Model.

Property	Description
Type	This should default to Alarm Safeguard. If you prefer a different type, select from drop down.
Name	This can be entered as text.
Description	This can be entered as text.

You can input the following properties for the Alarm Safeguard Model in the Assumptions section.

Property	Description
Assumed PFD	Enter this value as a decimal.
Assumed RRF	Enter this value as a whole number.
Assumption	This can be entered as text.
Comment	This can be entered as text.
Sources	This can be entered as text.
Citation	Citations can be added to the Citations Library and associated with an Alarm Safeguard Model.

The Common Properties section shows all Resources and References associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

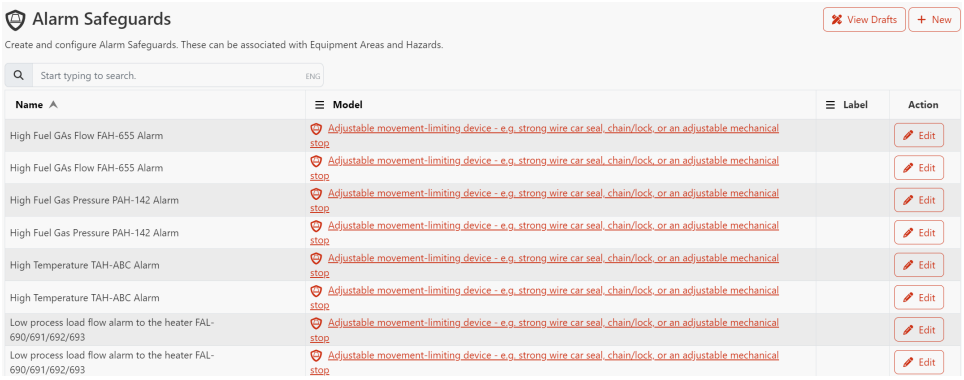
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

10.2 Alarm Safeguards

The Alarm Safeguards library allows for creation and configuration of individual Alarm Safeguards that can be associated with Hazard Scenarios and Initiating Events.

Select the ***Alarm Safeguards*** library to view all items in the database. A grid shows the following properties for each.

- Name
- Model
- Labels
- Action



To create a new Alarm Safeguard, select the **New** button on the top right-hand corner of the library view. This will open the Alarm Safeguard view. To View or Edit an Alarm Safeguard, select the **Edit** button in the Action column. You can input the following properties for the Alarm Safeguard.

Property	Description
Model	This will default to 'Alarm Layer of Protection – Human Response to abnormal conditions'. The Model can be changed by selecting the model through the drop-down menu.
Name	This can be entered as text.
Description	This can be entered as text.
Tag	Tags can be created in the Tag library and associated with the Alarm Safeguard using the drop-down menu.

Property	Description
Comment	This can be entered as text.
Safeguard Category	Safeguard Categories can be configured in SILstat Settings and associated with an Alarm Safeguard.

The Hierarchy section shows all Parents and Children associated with the Alarm Safeguard. Parents will include Areas, Hazards, and Initiating Events the Alarm Safeguard is associated with. Children include associated Tags.

You can input the following properties for the Alarm Safeguard in the Consequences section.

Property	Description
Immediate Consequence	This can be entered as text.
Potential Ultimate Consequence	This can be entered as text.

You can input the following properties for the Alarm Safeguard in the LOPA Data section.

Property	Description
Assumed PFD	Enter this value as a decimal.
Assumed RRF	Enter this value as a whole number.
Assumption	This can be entered as text.
Comments	This can be entered as text.
Sources	This can be entered as text.

The Custom Data section shows fields defined by the user and associated with Alarm Safeguards.

The Procedures section shows any procedures that have been assigned or inherited. Procedures can be added to the Procedures Library and associated with the Alarm Safeguard. The Procedures section shows the following properties:

- Name
- Interval
- Duration
- Initial Run

The Inherited Procedures section shows procedures assigned to a Parent associated with the Alarm Safeguard. These are read-only on the child level. To edit these procedures, you must navigate to the Parent.

The Common Properties section shows all Resources, References and Labels associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

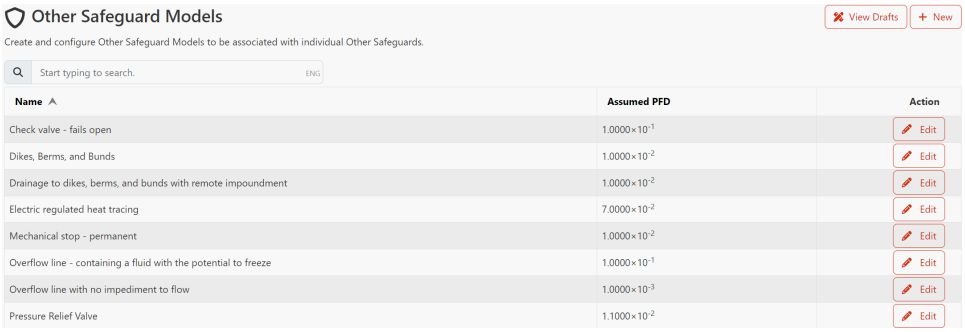
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

10.3 Other Safeguard Models

The Other Safeguard Models library allows for creation and configuration of Other Safeguard Models to be associated with individual Other Safeguards.

Select the ***Other Safeguard Models*** library to view all items in the database. A grid shows the following properties for each.

- Name
- Assumed PFD
- Action



To create a new Other Safeguard Model, select the **New** button on the top right-hand corner of the library view. This will open the Other Safeguard Model view. To View or Edit an Other Safeguard Model, select the **Edit** button in the Action column. You can input the following properties for the Other Safeguard Model.

Property	Description
Type	This should default to Other Safeguard. If you prefer a different type, select from drop down.
Name	This can be entered as text.
Description	This can be entered as text.

You can input the following properties for the Other Safeguard Model in the Assumptions section.

Property	Description
Assumed PFD	Enter this value as a decimal.
Assumed RRF	Enter this value as a whole number.

Property	Description
Assumption	This can be entered as text.
Comment	This can be entered as text.
Sources	This can be entered as text.
Citation	Citations can be added to the Citations Library and associated with an Other Safeguard Model.

The Common Properties section shows all Resources and References associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

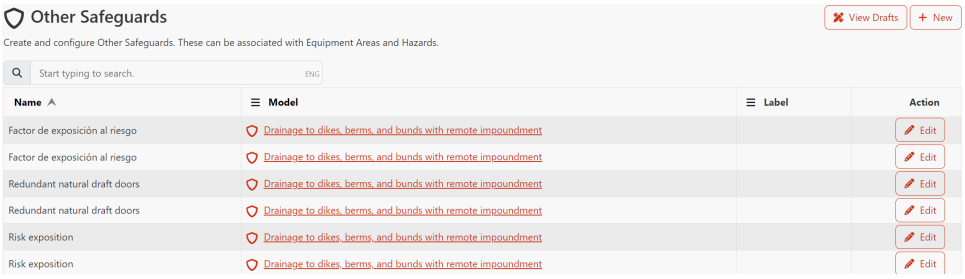
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

10.4 Other Safeguards

The Other Safeguards library allows for creation and configuration of individual Other Safeguards that can be associated with Hazard Scenarios and Initiating Events.

Select the ***Other Safeguards*** library to view all items in the database. A grid shows the following properties for each.

- Name
- Model
- Labels
- Action



To create a new Other Safeguard, select the **New** button on the top right-hand corner of the library view. This will open the Other Safeguard view. To View or Edit an Other Safeguard, select the **Edit** button in the Action column. You can input the following properties for the Other Safeguard.

Property	Description
Model	The Model can be changed by selecting the model to open the Models view on the right-side panel. Select the new Model and close the view.

Property	Description
Name	This can be entered as text.
Description	This can be entered as text.
Tag	Tags can be created in the Tag library and associated with the Safeguard using the drop-down menu.
Comment	This can be entered as text.
Safeguard Category	Safeguard Categories can be configured in SILstat Settings and associated with a Safeguard.
Immediate Consequence	This can be entered as text.
Potential Ultimate Consequence	This can be entered as text.

The Hierarchy section shows all Parents and Children associated with the Other Safeguard. Parents will include Areas, Hazards, and Initiating Events the Other Safeguard is associated with. Children include associated Tags.

You can input the following properties for the Other Safeguard in the LOPA Data section.

Property	Description
Assumed PFD	Enter this value as a decimal.
Assumed RRF	Enter this value as a whole number.
Assumed Demand Rate	Enter the value in frequency per year.
Assumption	This can be entered as text.
Comments	This can be entered as text.
Sources	This can be entered as text.

The Custom Data section shows fields defined by the user and associated with Other Safeguards.

The Procedures section shows any procedures that have been assigned or inherited. Procedures can be added to the Procedures Library and associated with the Other Safeguard. The Procedures section shows the following properties:

- Name
- Interval
- Duration
- Initial Run

The Inherited Procedures section shows procedures assigned to a Parent associated with the Other Safeguard. These are read-only on the child level. To edit these procedures, you must navigate to the Parent.

The Common Properties section shows all Resources, References and Labels associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

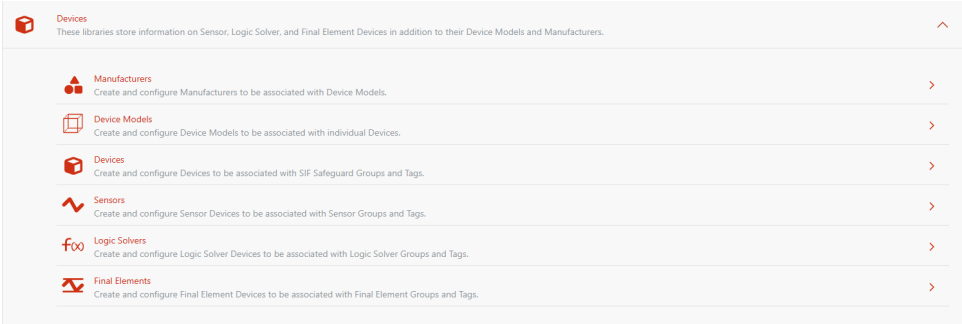
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

Chapter 11 Devices Library

The Devices Library section contains the following libraries.

- Manufacturers
- Device Models
- Devices
- Sensors
- Logic Solvers
- Final Elements

Each will be described in detail in the subsequent sections.

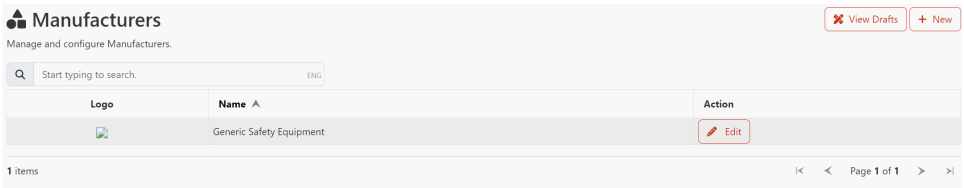


11.1 Manufacturers

The Manufacturers library allows for creation and configuration of Manufacturers to be associated with Device Models.

Select the ***Manufacturers*** library to view all Manufacturers in the database. A grid shows the following properties for each.

- Logo
- Name
- Action



To create a new Manufacturer, select the **New** button on the top right-hand corner of the library view. This will open the Manufacturer view. To View or Edit a Manufacturer, select the **Edit** button in the Action column. You can input the following properties for the Manufacturer.

Property	Description
Name	This can be entered as text.
Description	This can be entered as text.
Logo	Logos can be added to the Resources Library and associated with a Manufacturer.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

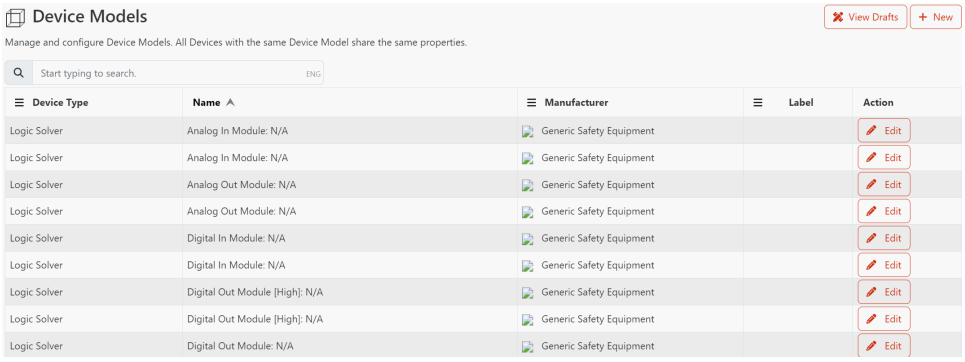
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

11.2 Device Models

The Device Models library allows for creation and configuration of Device Models to be associated with individual Devices.

Select the ***Device Models*** library to view all Device Models in the database. A grid shows the following properties for each.

- Device Type
- Name
- Manufacturer
- Labels
- Action



To create a new Device Model, select the **New** button on the top right-hand corner of the library view. This will open the Device Model view. To View or Edit a Device Model, select the **Edit** button in the Action column. You can input the following properties for the Device Model.

Property	Description
Name	This can be entered as text.
Description	This can be entered as text.
Model	This can be entered as text.
Comments	This can be entered as text.
Device Type	Device Types can be configured in SILstat Settings and associated with Device Models by selecting from the drop-down list.
Measurement Type	If the Device Type selected is a Sensor, you must choose a Measurement Type from the drop-down. Options include: None, Pressure, FireGas, Proximity, Flow, Temperature, Level, Other.
Manufacturer	Manufacturers can be added to the Manufacturers library and associated with Device Models by selecting from the drop-down list.
Citations	Citations can be added to the Citations Library and associated with a Device Model.

You can input the following properties for the Device Model in the Operations section. This information is optional.

Property	Description
Useful Life	Enter in years or adjust units before entering.
Useful Cycles	Enter number of cycles.

In the channels section, the input and output interfaces for the Device Model can be set. The following list shows all options.

- Any
- Analog In
- Analog Out
- Digital In
- Digital Out
- Hydraulic In
- Hydraulic Out
- Pneumatic In
- Pneumatic Out
- Thermocouple
- RTD 3 Wire
- RTD 4 Wire
- Process
- Mechanical
- Fiber Optic
- Pass Through

You can input the following properties for the Device Model in the Failure Rate section.

Property	Description
Fail Low Failure Rate	Enter failure rate in failures per hour.
Fail High Failure Rate	Enter failure rate in failures per hour.
Fail Detected Failure Rate	Enter failure rate in failures per hour.
Dangerous Detected Failure Rate	Enter failure rate in failures per hour.
Dangerous Undetected Failure Rate	Enter failure rate in failures per hour.
Safe Detected Failure Rate	Enter failure rate in failures per hour.
Safe Undetected Failure Rate	Enter failure rate in failures per hour.
Annunciation Detected Failure Rate	Enter failure rate in failures per hour.
Annunciation Undetected Failure Rate	Enter failure rate in failures per hour.
No Effect Failure Rate	Enter failure rate in failures per hour.
External Leakage Failure Rate	Enter failure rate in failures per hour.
Site Safety Index	Choose SSI Level from the drop-down menu. Options includes SSI 0: None, SSI 1: Medium, SSI 2: Good, SSI 3: Almost Perfect, SSI 4: Perfect. The default selection is SSI 2.

Failure Rates can also be entered for the Device Model channels. This is optional.

The Site Safety Index is a qualitative metric meant to capture how well each site performs maintenance tasks. To effectively compare Assumed vs. Actual Failure Rates, the SSI selection should match that used for the SIL Verification calculation in SILver. A more detailed description of each level is listed below.

SSI	Description
SSI 4 - Perfect	Repairs are always completed correctly. Testing is always performed correctly and on schedule; equipment is always replaced before the end of useful life; equipment is always selected according to the specified environmental limits and process-compatible materials; electrical power supplies are clean of transients; isolated, pneumatic supplies and hydraulic fluids are always kept clean.
SSI 3 - Excellent	Repairs are completed correctly. Testing is performed correctly and on schedule. Equipment normally is selected based on the specified environmental limits, and a good analysis of the process chemistry and compatible materials. Electrical power supplies are normally clean of transients and isolated; pneumatic supplies and hydraulic fluids are mostly kept clean.
SSI 2 - Good	Repairs are usually completed correctly. Testing is performed correctly and mostly on schedule. Most equipment is replaced before the end of useful life.

SSI	Description
SSI 1 - Medium	Many repairs are completed correctly. Testing is performed, and mostly on schedule, some equipment replaced before end of useful life.
SSI 0 - None	Repairs are not always done. Testing is not performed; equipment is not replaced until failure.

The Common Properties section shows all Resources, References and Labels associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

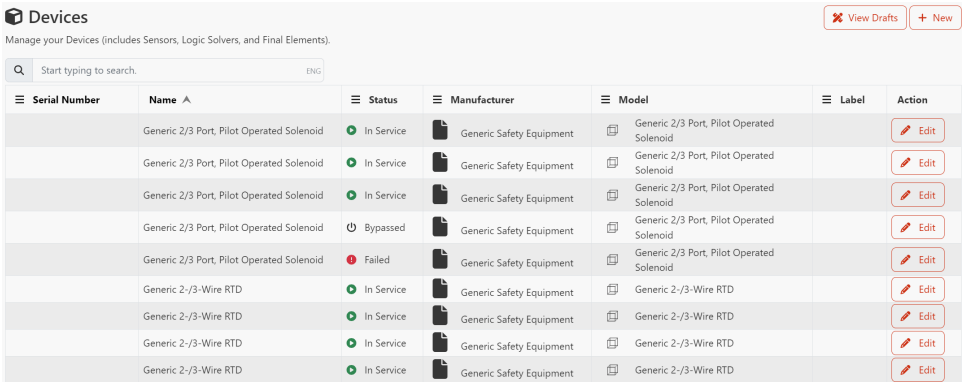
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

11.3 Devices

The Devices library allows for creation and configuration of Devices to be associated with SIF Safeguards, Sensors, Logic Solvers, and Final Elements.

Select the ***Devices*** library to view all Devices in the database. A grid shows the following properties for each.

- Serial Number
- Name
- Status
- Manufacturer
- Model
- Labels
- Action



To create a new Device, select the **New** button on the top right-hand corner of the library view. This will open the Device view. To View or Edit a Device, select the **Edit** button in the Action column. You can input the following properties for the Device.

Property	Description
Device Model	Device Models can be added to the Device Model library and associated with Devices by selecting from the drop-down list.
Name	This can be entered as text.
Description	This can be entered as text.
Manufacturer	Manufacturers can be associated with Device Models. Once the Device's Model is set, the Manufacturer will show here.

You can input the following properties for the Device in the Operations section.

Property	Description
Serial Number	This can be entered as text.
Utilization	This can be entered as a percent.
Proven In Use	Proven In Use justifications documented in exSILentia can be imported into SILstat and shown here for each Device.

The Lifecycle Section shows all events associated with the Device.

The Hierarchy section shows all Parents and Children associated with the Device. Parents include Areas and Tags associated with SIF Safeguards.

The Selected Failures section shows the failure rates that are applicable to the specific application of the Device.

The Common Properties section shows all Resources, References and Labels associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

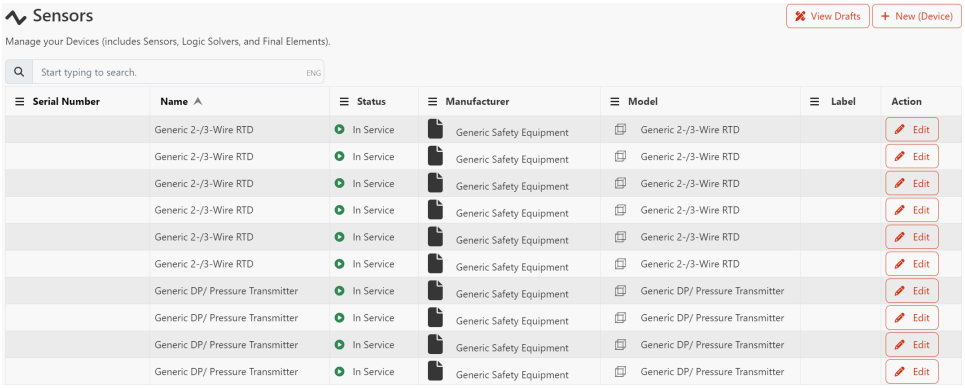
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

11.4 Sensors

The Sensors library allows for creation and configuration of Sensor Devices to be associated with Sensor Groups in SIF Safeguards.

Select the ***Sensors*** library to view all Sensor Devices in the database. A grid shows the following properties for each.

- Serial Number
- Name
- Status
- Manufacturer
- Model
- Labels
- Action



To create a new Sensor Device, select the **New** button on the top right-hand corner of the library view. This will open the Device view. To View or Edit a Sensor Device, select the **Edit** button in the Action column. You can input the following properties for the Device.

Property	Description
Manufacturer	Manufacturers can be associated with Device Models. Once the Device's Model is set, the Manufacturer will show here.
Device Model	Device Models can be added to the Device Model library and associated with Devices by selecting from the drop-down list.
Serial Number	This can be entered as text.
Name	This can be entered as text.
Description	This can be entered as text.
Utilization	This can be entered as a percent.
Proven In Use	Proven In Use justifications documented in exSILentia can be imported into SILstat and shown here for each Device.

The Lifecycle Section shows all events associated with the Device.

The Hierarchy section shows all Parents and Children associated with the Device. Parents include Tags associated with SIF Safeguards. The Hierarchy section also includes the Device Failure Rates that are applicable to the specific application of the Device.

The Common Properties section shows all Resources, References and Labels associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

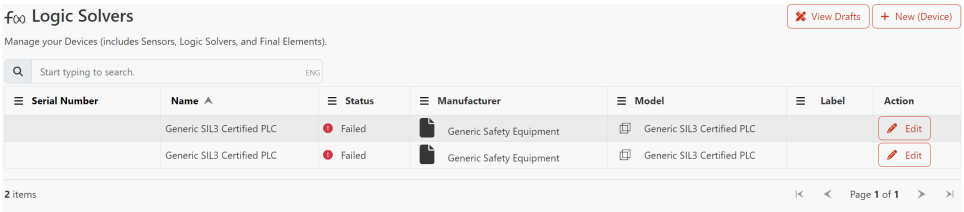
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

11.5 Logic Solvers

The Logic Solvers library allows for creation and configuration of Logic Solver Devices to be associated with SIF Safeguards.

Select the ***Logic Solvers*** library to view all Logic Solver Devices in the database. A grid shows the following properties for each.

- Serial Number
- Name
- Status
- Manufacturer
- Model
- Labels
- Action



To create a new Logic Solver Device, select the **New** button on the top right-hand corner of the library view. This will open the Device view. To View or Edit a Logic Solver Device, select the **Edit** button in the Action column. You can input the following properties for the Device.

Property	Description
Manufacturer	Manufacturers can be associated with Device Models. Once the Device's Model is set, the Manufacturer will show here.
Device Model	Device Models can be added to the Device Model library and associated with Devices by selecting from the drop-down list.
Serial Number	This can be entered as text.
Name	This can be entered as text.
Description	This can be entered as text.
Utilization	This can be entered as a percent.
Proven In Use	Proven In Use justifications documented in exSILentia can be imported into SILstat and shown here for each Device.

The Lifecycle Section shows all events associated with the Device.

The Hierarchy section shows all Parents and Children associated with the Device. Parents include Tags associated with SIF Safeguards. The Hierarchy section also includes the Device Failure Rates that are applicable to the specific application of the Device.

The Common Properties section shows all Resources, References and Labels associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

The Insights on the Sensor Device view shows Demands, Failures, Actual PFD, Actual Risk Reduction Factor, Operating Hours, and Children.

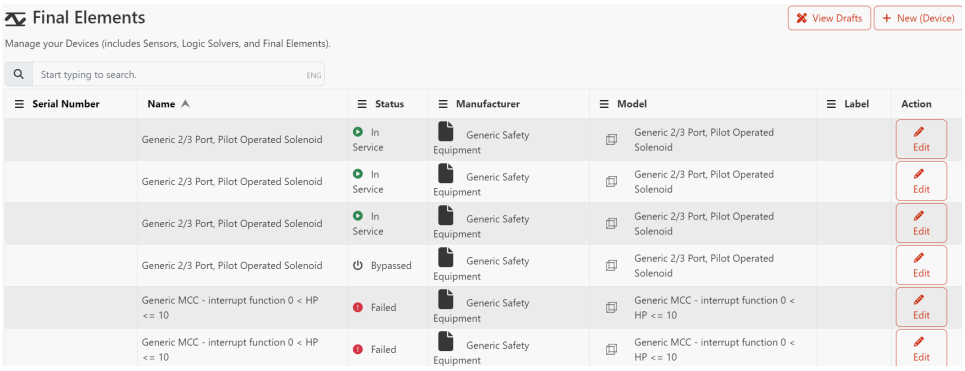
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

11.6 Final Elements

The Final Elements library allows for creation and configuration of Final Element Devices to be associated with Final Element Groups in SIF Safeguards.

Select the ***Final Elements*** library to view all Final Element Devices in the database. A grid shows the following properties for each.

- Serial Number
- Name
- Status
- Manufacturer
- Model
- Labels
- Action



To create a new Final Element Device, select the **New** button on the top right-hand corner of the library view. This will open the Device view. To View or Edit a Final Element Device, select the **Edit** button in the Action column. You can input the following properties for the Device.

Property	Description
Manufacturer	Manufacturers can be associated with Device Models. Once the Device's Model is set, the Manufacturer will show here.
Device Model	Device Models can be added to the Device Model library and associated with Devices by selecting from the drop-down list.
Serial Number	This can be entered as text.

Property	Description
Name	This can be entered as text.
Description	This can be entered as text.
Utilization	This can be entered as a percent.
Proven In Use	Proven In Use justifications documented in exSILentia can be imported into SILstat and shown here for each Device.

The Lifecycle Section shows all events associated with the Device.

The Hierarchy section shows all Parents and Children associated with the Device. Parents include Tags associated with SIF Safeguards. The Hierarchy section also includes the Device Failure Rates that are applicable to the specific application of the Device.

The Common Properties section shows all Resources, References and Labels associated with the item.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

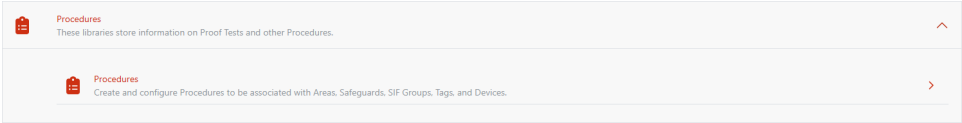
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

Chapter 12 Procedures Library

The Procedures Library section contains the following libraries.

- Procedures

Each will be described in detail in the subsequent sections.

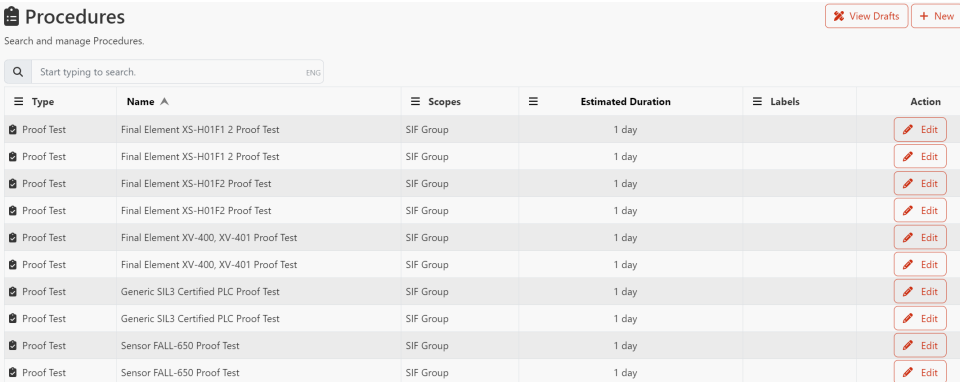


12.1 Procedures

The Procedures library allows for creation and configuration of Proof Tests and other Procedures to be associated with SIFs, Safeguards, SIF Groups, Tags, and Areas.

Select the ***Procedures*** library to view all Procedures in the database. A grid shows the following properties for each.

- Type
- Name
- Scopes
- Estimated Duration
- Labels
- Action



To create a new Procedure, select the **New** button on the top right-hand corner of the library view. This will open the Procedure view. To View or Edit a Procedure, select the **Edit** button in the Action column. You can input the following properties for the Procedure.

Property	Description
Type	Select the Procedure type from the drop-down. Options include Proof Test or Procedure.
Name	This can be entered as text.
Description	This can be entered as text.
Default Interval	Enter time interval between proof tests.
Scopes	Select from the drop- down where the Procedure applies. Options include: Any, Equipment, SIF Safeguard, Alarm Safeguard, Other Safeguard, SIF Group, Tag / SIF Leg.

The Steps section allows for definition of detailed Procedure Steps. Select the **Add** button to add a step. This will open the Step Editor in the right-side panel.

You can input the following properties for each Step:

Property	Description
Name	This can be entered as text.
Description	This can be entered as text.
Duration (Estimated)	Enter the estimated time it will take to complete this step.

In the Data Collection section, you can specify fields for data entry during this step of the procedure. In some cases, pass/fail criteria can be specified based on the data collected. To enable this function, select the toggle button in the Data Collection section header from 'Off' to 'On'. Then select the 'Input Type' from the drop-down menu. Options for Input Type include Numeric (Range), Boolean (True/False), or Text. This will determine the type of input field associated with the Step.

You can input the following properties for the Data Collection if the Input Type is Numeric (Range).

Property	Description
Name	This can be entered as text.
Expected Value	Enter the value expected when performing the procedure step for the procedure to pass.
Tolerance	Enter the tolerance allowed for the procedure to pass.
Unit of Measure	Enter a pre-defined Unit of Measure from the library or create a new Unit of Measure.

You can input the following properties for the Data Collection if the Input Type is Boolean (True/False).

Property	Description
Name	This can be entered as text.
Expected Value	Use the toggle button to indicate if the expected answer is 'True' or 'False' when performing the procedure step for the procedure to pass.

You can input the following properties for the Data Collection if the Input Type is Text.

Property	Description
Name	This can be entered as text.
Expected Value	This can be entered as text.

To create the Procedure, select the 'Create' button in the top right-hand corner. Items that are not created will be saved as a draft.

The Hierarchy section shows all the places where the procedure is assigned within the hierarchy.

The Common Properties section shows all Resources, References and Labels associated with the Procedure.

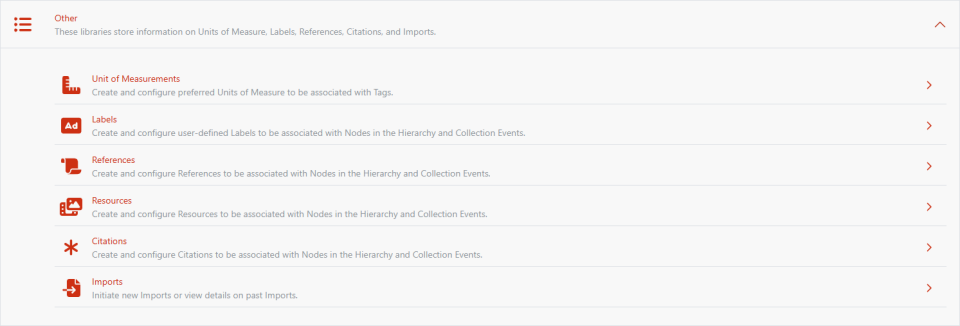
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

Chapter 13 Other Library

The Other Library section contains the following libraries.

- Unit of Measurements
- Labels
- References
- Resources
- Citations
- Imports

Each will be described in detail in the subsequent sections.

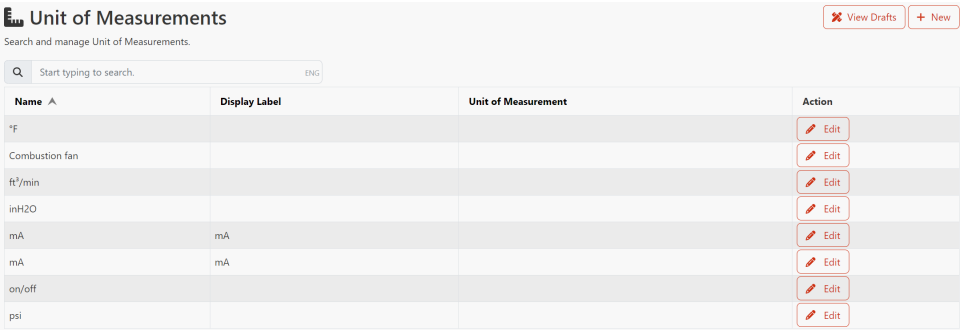


13.1 Unit of Measurements

The Unit of Measurements library allows for creation and configuration of Unit of Measurements to be associated with Tags and Procedure data collection steps.

Select the ***Unit of Measurements*** library to view all items in the database. A grid shows the following properties for each.

- Name
- Display Label
- Unit of Measurement
- Action



To create a new Unit of Measurement, select the **New** button on the top right-hand corner of the library view. This will open the Unit of Measurement view. To View or Edit a Unit of Measurement, select the **Edit** button in the Action column. You can input the following properties for the Unit of Measurement.

Property	Description
Name	This can be entered as text.
Description	This can be entered as text.
Comment	This can be entered as text.
Display the Input in Scientific Notation	Toggle from Off to On if you'd like values input to be displayed in scientific notation.
Simple Display Label	Toggle from Off to On to allow the unit of measurement to be set to a specific display label that does not change. Enter label as text.
Advanced Unit of Measurement	Toggle from Off to Onto use a well-defined unit of measurement with built in localization support to automatically adapt to user system of measurement preferences. Select Unit of Measurement from the drop-down menu.
SI Metric Order of Magnitude	Select option from the drop-down menu as applicable.
US Customary Order of Magnitude	Select option from the drop-down menu as applicable.

Note: If you choose the Advanced option, those Units will be configured depending on your User Settings (i.e., if Temperature is selected, the Unit will be Fahrenheit or Celsius).

The preview section shows how the Unit of Measurement will be displayed for SI Metric Units and USA Customary Units.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

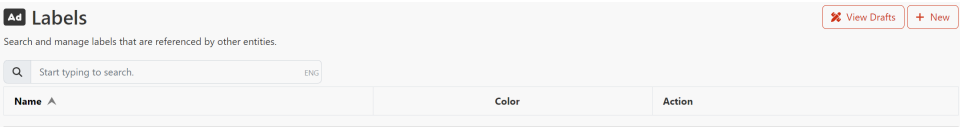
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

13.2 Labels

The Labels library allows for creation and configuration of Labels to be associated with any item in the database.

Select the ***Labels*** library to view all items in the database. A grid shows the following properties for each.

- Name
- Color
- Action



To create a new Label, select the **New** button on the top right-hand corner of the library view. This will open the Label view. To View or Edit a Label, select the **Edit** button in the Action column. You can input the following properties for the Label.

Property	Description
Name	This can be entered as text.
Description	This can be entered as text.
Fill Pattern	Choose a Pattern Option from the drop-down menu.
Color	Select the Color Tile to open the color picker. Select the color or enter the R, G, B values. If you change a fill pattern that requires more than one color, a secondary color option is available for you to choose. If the colors chosen have a poor contrast ratio, a tip will appear that explains that the colors chosen may be hard to see.
Preview	Shows a preview of the label created.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

The Insights display the number of entities that are using the Label.

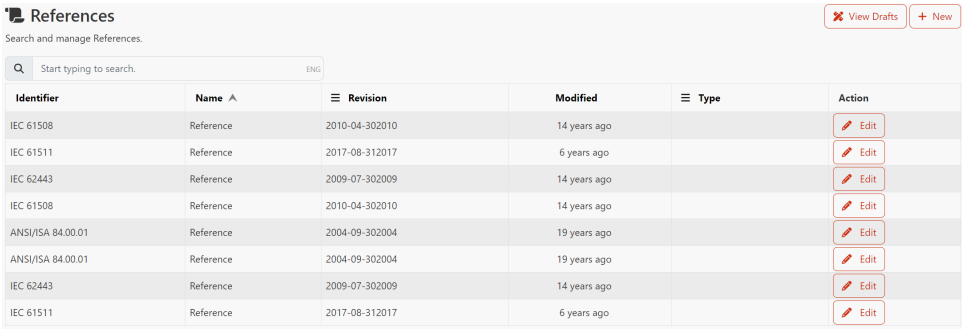
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

13.3 References

The References library allows for creation and configuration of References to be associated with any item in the database.

Select the ***References*** library to view all items in the database. A grid shows the following properties for each.

- Identifier
- Name
- Revision
- Revision Date
- Date Modified
- Type
- Action



To create a new Reference, select the **New** button on the top right-hand corner of the library view. This will open the Reference view. To View or Edit a Reference, select the **Edit** button in the Action column. You can input the following properties for the Reference.

Property	Description
Document Number	This can be entered as text.
Name	This can be entered as text.
Description	This can be entered as text.
Comment	This can be entered as text.
Type	Select the Reference Type from the drop-down menu. Reference Types can be configured in the SILstat Settings.
Revision	If Tracking revisions manually, enter Reference Revision here.
Revision Date	Enter date of Reference Revision.
Resources	Resources can be added to the Resources library and associated with the Reference.
Citation	Citations can be added to the Citation library and associated with the Reference.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

The Insights display the number of entities that are using the Reference.

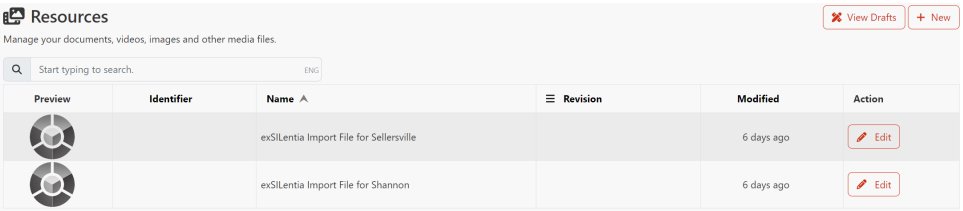
To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

13.4 Resources

The Resources library allows for creation and configuration of Resources to be associated with any item in the database. These are documents, videos, images, and other media files.

Select the ***Resources*** library to view all items in the database. A grid shows the following properties for each.

- Preview
- Identifier
- Name
- Revision
- Modified
- Action



To create a new Resource, select the **New** button on the top right-hand corner of the library view. This will open the Resource view. To View or Edit a Resource, select the **Edit** button in the Action column. You can input the following properties for the Resource.

Property	Description
Identifier	This can be entered as text.
Name	This can be entered as text.
Description	This can be entered as text.
Revision	If Tracking revisions manually, enter Reference Revision here.
Revision Date	Enter date of Reference Revision.
Resources	Select 'Choose File' to browse for a file and upload as the Resource. This Section also includes options to 'View Resource' and 'Download Resource'.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

The Insights display the number of entities that are using the Resource.

To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

If you need to upload a new version of a Resource that has already been uploaded, you are able to import the revised Resource so the data within SILstat is updated.

To do so, navigate to the Resources library. Find the Resource you wish to revise and select the 'Edit' button.

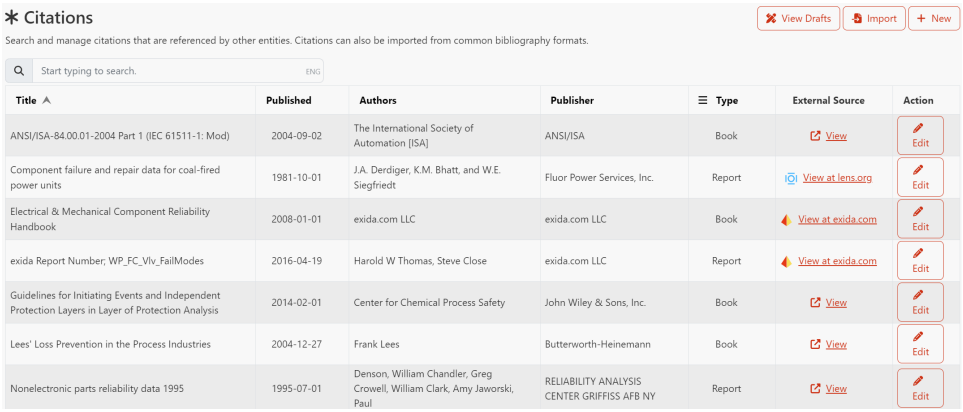
Under the 'Resource' accordion, you can choose the file to be uploaded as the new revision.

13.5 Citations

The Citations library allows for creation and configuration of Citations to be associated with any item in the database.

Select the ***Citations*** library to view all items in the database. A grid shows the following properties for each.

- Title
- Published
- Authors
- Publisher
- Type
- External Source
- Action



To create a new Citation, select the **New** button on the top right-hand corner of the library view. This will open the Citation view. To View or Edit a Citation, select the **Edit** button in the Action column. You can input the following properties for the Citation.

Property	Description
Type	Select the Type from the drop-down.
Title	This can be entered as text.

Property	Description
Published	Enter date of publication. Select 'Year only' option to enter year of publication only.
Authors	Select **New** to add an Author to the Authors grid. Enter the Author's Last, Middle and First Name.
Publisher	This can be entered as text.
City	This can be entered as text.
Country or Region	This can be entered as text.
DOI	Enter the DOI for the Citation.
URL	Enter the URL for the Citation.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

The Insights display the number of entities that are using the Citation.

To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

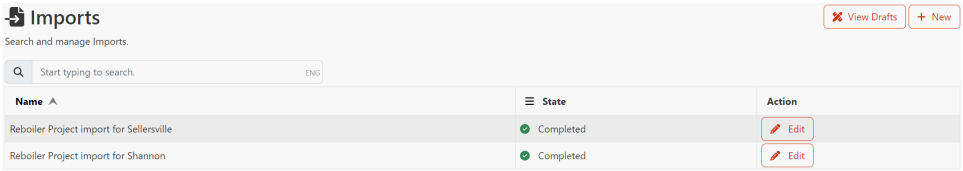
13.6 Imports

The Imports library shows a record of Imports into the database.

Importing your data into SILstat is the quickest way to start the data recording process. For manual creation of your project database, see Sections on Configuration.

Select the ***Imports*** library to view all Imports in the database. A grid shows the following properties for each.

- Name
- State
- Action



To create a new Import, select the **New** button on the top right-hand corner of the library view. This will open the Import view. To View an Import, select the **Edit** button in the Action column. You can input the following properties for the Import.

Property	Description
Name	This can be entered as text.
Description	This can be entered as text.
Import	Select the 'Choose File' button to browse for the file to be imported, or select a Resource from the Resource library to import. In both cases only exSILentia files (.exp) can be selected.
Import Setting – Auto generate Placeholder Hierarchy	Toggle this option from 'Off' to 'On' to automatically create key hierarchy nodes that are not present in the import.
Import Setting – Remove Empty Procedure Steps	Toggle this option from 'Off' to 'On' to automatically remove empty Procedure steps.
Confirm	Review Name, Description, Import File, and settings selected before Import. Select 'Import' to proceed.
Results	Once Import is complete the Results section show a list of Entities imported, their Count, and their Status. This will indicate if any errors occurred.

To create a new item, select the **Create** button in the top right-hand corner. Items that are not created will be saved as a draft.

The Insights display the Total Duration, State, Created, and Same (number of existing items re-imported).

To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

If there are errors after the import of your file is completed, ensure your file has the following criteria:

- All entities have Names
- Devices must have valid data
- No errors present in the file
- File must be compatible with the latest version of exSILentia

Part 3

Configuration

Chapter 14 Configuration

Your site hierarchy can be configured in SILstat's Configuration section. The hierarchy can be created upon import of your exSILentia project files or built directly within SILstat. Here, the hierarchy between Areas, Process Areas, Units, Equipment, Hazard Scenarios, Safeguards, Tags, and Procedures can be defined. This hierarchy has four different views :

1. Physical
2. Hazards
3. Safeguards
4. Procedures

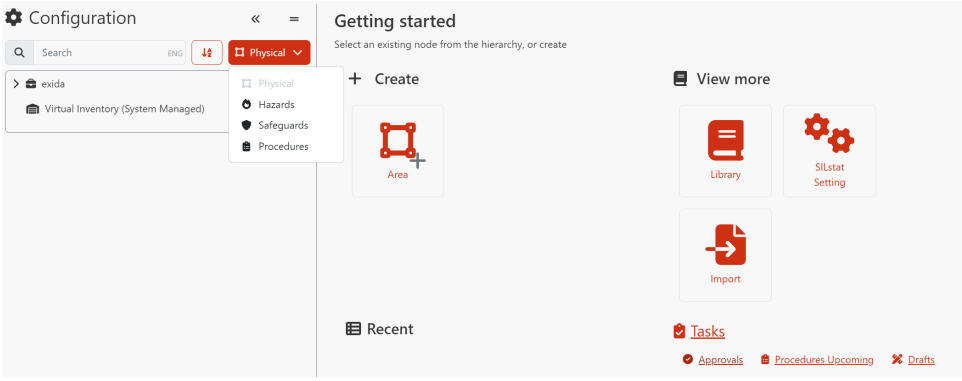
Hierarchies can be completed in any order, though the order listed above gives you the most complete information as you move through the workflows.

After clicking into Configuration, if you have not previously chosen an initial Hierarchy, SILstat will prompt you to choose between the Hierarchy views.

To control the hierarchy view, select the << button to expand and collapse the hierarchy panel. Select the two horizontal bars to expand the panel vertically or horizontally.

Above the hierarchy is a dedicated Search function, which searches items in the Configurations. The Sort function allows you to sort items in the hierarchy alphabetically.

The next button shows which hierarchy view is selected and allows you to switch between views. When you switch views, your place in the previous view is saved for a time. If you select a new view, you will start at the top of the hierarchy.



14.1 Hierarchies

14.1.1 Physical

The Physical hierarchy view represents the location of each Area, Process Area, Unit, Equipment, Tag and Device onsite.

14.1.2 Hazards

The Hazards hierarchy view groups items associated with a Hazard Scenario together, showing Initiating Events, Modifiers, and all Safeguards as children of a Hazard Scenario. If an Initiating Event, Modifier, or Safeguard is re-used across multiple Hazard Scenarios, it will be listed for each Hazard in the Hazards hierarchy view. The link symbol next to the name signifies that it has been reused/linked/associated in multiple areas.

14.1.3 Safeguards

The Safeguard hierarchy view groups items within a Safeguard together, showing the logical relationship between Tags. You will see the Area, Process Area, Unit, Equipment, and all Safeguards including SIFs, Alarms, Relief Devices, etc. Expanding the SIF Safeguards shows the Sensor, Logic Solver, and Final Element parts. If a Tag or Device is re-used across multiple SIFs, it will be listed for each SIF Safeguard in the Safeguard hierarchy view. The link symbol next to the name signifies that it has been reused/linked/associated in multiple areas.

14.1.4 Procedures

The Procedures hierarchy view shows proof tests and procedures assigned throughout your site hierarchy. Depending on their scope, Procedures can be assigned to Units , Equipment, Safeguards, and Tags. If a Procedures is assigned to multiple Areas, it will be listed for each one. Selecting a Procedure will show you the instance of the Procedure applied to that specific part of the hierarchy.

Please Note: When building your hierarchies, you should remember that everything will be defaulted to a draft until you press ***Create***.

14.2 Building a Physical Hierarchy

This section describes how a Physical Hierarchy can be built within SILstat. As you create new entities, i.e. an area, a tag, etc. you should remember that every new item will be defaulted to a draft until you press "Create".

14.2.1 Creating an Area

To create an Area:

- Go to Library, select ‘Area’, then ‘New’.
- Select an Area Type from the drop-down list.
- Add an Area Name and Description. The Name is mandatory for a draft to be saved.
- Select the ‘Create’ button to create the Area.

Another way to create an Area is to go to Configuration and Create a New Area. Create your high-level hierarchy with options for user-defined Areas, Process Areas, Units, and Equipment.

14.2.2 Creating a Unit Node

To create a Unit Node:

- Select the Physical hierarchy view on the left-side panel.
- Navigate to an 'Area' node in the hierarchy. Right click to see 'New' and 'Associate' buttons appear.
- Select 'New' or use the drop-down menu and select 'Unit'. This will open a 'Unit' view on the right-hand side of the app.
- Enter a Unit Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Unit node.

An alternate option is to create a Unit Node from the Area:

- Select the Area.
- Navigate to the 'Hierarchy' section and select the 'Children' accordion.
- Select 'New' to create a new Unit node. You will be automatically loaded into the Unit creation page.
- Enter a Unit Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Unit.

14.2.3 Creating an Equipment Node

To create an Equipment Node:

- Select the Physical hierarchy view on the left-side panel.
- Navigate to an 'Area' node in the hierarchy. Right click to see 'New' and 'Associate' buttons appear.
- Select 'New' or use the drop-down menu and select 'Equipment'. This will open an 'Equipment' view on the right-hand side of the app.
- Enter an Equipment Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Equipment.

An alternate option is to create an Equipment Node from the Area:

- Select the Area.
- Navigate to the 'Hierarchy' section and select the 'Children' accordion.
- Select 'New' to create a new Equipment node. You will be automatically loaded into the Equipment creation page.
- Enter a Equipment Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Equipment.

A second alternate option is to create an Equipment Node from the Unit Node:

- Select the Physical hierarchy view on the left-side panel.
- Navigate to a 'Unit' node in the hierarchy. Right click to see 'Equipment and 'Associate' buttons appear.
- Select 'Equipment'. This will open an 'Equipment' view on the right-hand side of the app.
- Enter an Equipment Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Equipment.

14.2.4 Creating Tags

To create Tags from an Area Node:

- Navigate to an ‘Area’ node in the hierarchy.
- Navigate to the ‘Hierarchy’ section and select the ‘Children’ accordion.
- Under ‘Tags’, select ‘New’.
- Enter a Tag Name and Description.
- Select the ‘Create’ button to create the Tag.

An alternate option is to create a Tag from a Unit Node.

- Navigate to a ‘Unit’ node in the hierarchy.
- Navigate to the ‘Hierarchy’ section and select the ‘Children’ accordion.
- Under ‘Tags’, select ‘New’.
- Enter a Tag Name and Description.
- Select the ‘Create’ button to create the Tag.

A second alternate option is to create a Tag from an Equipment Node.

- Navigate to an ‘Equipment’ node in the hierarchy.
- Navigate to the ‘Hierarchy’ section and select the ‘Children’ accordion.
- Under ‘Tags’, select ‘New’.
- Enter a Tag Name and Description.
- Select the ‘Create’ button to create the Tag.

Currently, there is no limit on how many tags you can create.

To assigning a Device with a Tag:

- Navigate to a Tag.
- Underneath the Name and Description, a Search bar allows you to find a device to associate.

Note: Tags without a Parent cannot be associated with Devices.

14.3 Building a Hazards Hierarchy

This section describes how a Hazard Hierarchy can be built within SILstat. As you create new entities, i.e. an area, a hazard, etc. you should remember that every new item will be defaulted to a draft until you press "Create".

14.3.1 Creating an Area

To create an Area:

- Go to Library, select ‘Area’, then ‘New’.
- Select an Area Type from the drop-down list.
- Add an Area Name and Description. The Name is mandatory for a draft to be saved.
- Select the ‘Create’ button to create the Area.

Another way to create an Area is to go to Configuration and Create a New Area. Create your high-level hierarchy with options for user-defined Areas, Process Areas, Units, and Equipment. Before a Hazard can be created, an Equipment node must first be created.

14.3.2 Creating a Unit Node

To create a Unit Node:

- Select the Hazards hierarchy view on the left-side panel.
- Navigate to an 'Area' node in the hierarchy. Right click to see 'New' and 'Associate' buttons appear.
- Select 'New' or use the drop-down menu and select 'Unit'. This will open a 'Unit' view on the right-hand side of the app.
- Enter a Unit Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Unit node.

An alternate option is to create a Unit Node from the Area:

- Select the Area.
- Navigate to the 'Hierarchy' section and select the 'Children' accordion.
- Select 'New' to create a new Unit node. You will be automatically loaded into the Unit creation page.
- Enter a Unit Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Unit.

14.3.3 Creating an Equipment Node

To create an Equipment Node:

- Select the Hazards hierarchy view on the left-side panel.
- Navigate to an 'Area' node in the hierarchy. Right click to see 'New' and 'Associate' buttons appear.
- Select 'New' or use the drop-down menu and select 'Equipment'. This will open an 'Equipment' view on the right-hand side of the app.
- Enter an Equipment Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Equipment.

An alternate option is to create an Equipment Node from the Area:

- Select the Area.
- Navigate to the 'Hierarchy' section and select the 'Children' accordion.
- Select 'New' to create a new Equipment node. You will be automatically loaded into the Equipment creation page.
- Enter an Equipment Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Equipment.

A second alternate option is to create an Equipment Node from the Unit Node:

- Select the Physical hierarchy view on the left-side panel.
- Navigate to a 'Unit' node in the hierarchy. Right click to see 'Equipment and 'Associate' buttons appear.
- Select 'Equipment'. This will open an 'Equipment' view on the right-hand side of the app.
- Enter an Equipment Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Equipment.

14.3.4 Creating a Hazard

To create a Hazard:

- Select the Hazard hierarchy view on the left-side panel.
- Navigate to an 'Equipment' node in the hierarchy. Right click to see 'New' and 'Associate' buttons appear.
- Select 'New' or use the drop-down menu and select 'Hazard'. This will open a 'Hazard' view on the right-hand side of the app.
- Enter a Hazard Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Hazard.

An alternate option is to create a Hazard directly in the 'Equipment' view:

- Select the Equipment node. This will open an 'Equipment' view on the right-hand side of the app.
- Navigate to the 'Hierarchy' section and select the 'Children' accordion.
- Select 'New' to create a new Hazard. This will open a 'Hazard' view on the right-hand side of the app.
- Enter a Hazard Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Hazard.

To associate a Hazard (from the library) in the 'Equipment' view:

- Select the Equipment node. This will open an 'Equipment' view on the right-hand side of the app.
- Navigate to the 'Hierarchy' section and select the 'Children' accordion.
- Select 'Associate' to choose a Hazard that has been previously created through the Library. This will open the 'Hazard' list via a pop-over.
- Use the Toggle Switch on a Hazard to associate it with the Equipment.

14.3.5 Creating an Initiating Event

To create an Initiating Event:

- Navigate to the 'Hazard' node in the hierarchy. Right click to see 'Initiating Event' and 'Associate' buttons appear.
- Select 'Initiating Event' to create a new Initiating Event. This will open an 'Initiating Event' view on the right-hand side of the app.
- Add the Initiating Event Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Initiating Event.

An alternate option is to create an Initiating Event through the diagram:

- Select the Hazard node. This will open a 'Hazard' view on the right-hand side of the app.
- Navigate to the Diagram and select the 'New' button and select 'Initiating Event' from the drop-down list. This will open an 'Initiating Event' view on the right-hand side of the app.
- Add the Initiating Event Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Initiating Event.

To associate an Initiating Event (from the library) in the diagram view:

- Select the Hazard node. This will open a 'Hazard' view on the right-hand side of the app.
- Navigate to the Diagram section and select the 'Associate' button. Select 'Initiating Event' from the drop-down list. This will open an 'Initiating Event' view on the right-hand side of the app.
- Select 'Associate' to choose an Initiating Event that has been previously created through the Library. This will open the Initiating Event list via a pop-over.
- Use the Toggle Switch on an IE to associate it with the Hazard.

To create an Initiating Event through the hierarchy:

- Select the Hazard node. This will open a 'Hazard' view on the right-hand side of the app.
- Navigate to the 'Hierarchy' section and select the 'Children' accordion.
- Select 'New' to create a new Initiating Event. This will open an 'Initiating Event' view on the right-hand side of the app.
- Add the Initiating Event Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Initiating Event.

To associate an Initiating Event (from the library) through the hierarchy:

- Select the Hazard node. This will open a 'Hazard' view on the right-hand side of the app.
- Navigate to the 'Hierarchy' section and select the 'Children' accordion.
- Select 'Associate' to choose an Initiating Event that has been previously created through the Library. This will open the Initiating Event list via a pop-over.
- Use the Toggle Switch on an IE to associate it with the Hazard.

14.3.6 Creating Safeguards, Enabling Conditions, or Conditional Modifiers

To create new Safeguards, ECs, or CMs:

- Navigate to the 'Initiating Event' node in the hierarchy. Right click to see 'New' and 'Associate' buttons appear.
- Select 'New' or the drop-down menu to see options for adding a SIF Safeguard, Alarm Safeguard, Other Safeguard, Enabling Condition, and Conditional Modifier. When users click "New", a SIF Safeguard is the default.
- Selecting a Safeguard or Modifier will open the associated view on the right-hand side of the app.
- Add the Name and Description of the Safeguard or Modifier. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Safeguard or Modifier.

An alternate option is to create Safeguards, ECs, or CMs through the diagram:

- Select the Hazard node. This will open a 'Hazard' view on the right-hand side of the app.
- Navigate to the Diagram and select the 'New' button to see a drop-down menu to see options for adding a SIF Safeguard, Alarm Safeguard, Other Safeguard, Enabling Condition, and Conditional Modifier.
- This will open a pop-over that requires you to associate an Initiating Event with the Safeguard of Modifier.
- Once associated, you can add the Name and Description of the Safeguard or Modifier. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Safeguard or Modifier.

To associate Safeguards, ECs, or CMs (from the library) in the diagram view:

- Select the Hazard node. This will open a 'Hazard' view on the right-hand side of the app.
- Navigate to the Diagram section. Select the 'Associate' button to see a drop-down menu of options to associate Safeguards or Modifiers.
- After you make your selection, a pop-over appears where you can use the Toggle Switch on your selection to associate it with the Hazard.

To create Safeguards, ECs, or CMs through the hierarchy:

- Select the Hazard node. This will open a ‘Hazard’ view on the right-hand side of the app.
- Navigate to the ‘Hierarchy’ section and select the ‘Children’ accordion.
- Select the ‘New’ button to see a drop-down menu to see options for adding a SIF Safeguard, Alarm Safeguard, Other Safeguard, Enabling Condition, and Conditional Modifier.
- This will open a pop-over that requires you to associate an Initiating Event.
- Once associated, you can add the Name and Description of the Safeguard or Modifier. The Name is mandatory for a draft to be saved.
- Select the ‘Create’ button to create the Safeguard or Modifier.

To associate Safeguards, ECs, or CMs (from the library) in the hierarchy:

- Select the Hazard node. This will open a ‘Hazard’ view on the right-hand side of the app.
- Navigate to the ‘Hierarchy’ section and select the ‘Children’ accordion.
- Select ‘Associate’ to choose a Safeguard or Modifier that has been previously created through the Library. This will open the Safeguard or Modifier list via a pop-over.
- Use the Toggle Switch to associate it with the Hazard.

14.3.7 Creating a SIF

To create a new SIF:

Navigate to the ‘Initiating Event’ node in the hierarchy. Right click to see ‘New’ and ‘Associate’ buttons appear.

- Select ‘New’ or the drop-down menu to see options for adding a SIF Safeguard, Alarm Safeguard, Other Safeguard, Enabling Condition, and Conditional Modifier. When users click "New", a SIF Safeguard is the default.
- Selecting a SIF Safeguard will open a ‘Safeguard’ view on the right-hand side of the app.
- Add a Safeguard Name and Description. The Name is mandatory for a draft to be saved.
- Select the ‘Create’ button to create the SIF Safeguard.

Once a SIF is created, the groups (Sensor, Logic Solver, and Final Element) are automatically created, linked, and appear in the tree view. The groups remain in drafts until created.

An alternate option is to create a new SIF Safeguard through the Hazard diagram view:

- Select the Hazard node. This will open a ‘Hazard’ view on the right-hand side of the app.
- Navigate to the Diagram and select the ‘New’ button and select ‘SIF Safeguard’ from the drop-down list. If a SIF Safeguard is chosen, an Initiating Event must also be associated with your SIF.
- Once selected, this will open an ‘SIF Safeguard’ view on the right-hand side of the app.
- Add a Safeguard Name and Description. The Name is mandatory for a draft to be saved.
- Select the ‘Create’ button to create the SIF Safeguard.

To create a SIF through the hierarchy view:

- Select the Hazard node. This will open a ‘Hazard’ view on the right-hand side of the app.
- Navigate to the ‘Hierarchy’ section and select the ‘Children’ accordion.
- Select the ‘New’ button and select ‘SIF Safeguard’ from the drop-down list. If a SIF Safeguard is chosen, an Initiating Event must also be associated with your SIF.
- Once selected, this will open an ‘SIF Safeguard’ view on the right-hand side of the app.
- Add a Safeguard Name and Description. The Name is mandatory for a draft to be saved.
- Select the ‘Create’ button to create the SIF Safeguard.

14.3.8 Adding SIF Groups

Although the SIF groups (Sensor, Logic Solver, and Final Element) are automatically created when a SIF is made, users can manually create/add groups.

To add SIF Groups:

- Navigate to an 'SIF Safeguard' node in the hierarchy. Right click to see 'New' button appear.
- Select the 'New' button and select 'Sensor Group' or 'Final Element Group' from the drop-down list.
- Add a Group Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Group.

An alternate option is to create SIF Groups through the SIF Diagram:

- Select the SIF Safeguard node. This will open a 'Safeguard' view on the right-hand side of the app.
- Navigate to the Diagram and select the 'New' button and select 'Sensor Group' or 'Final Element Group' from the drop-down list.
- While on your SIF, under Diagram, click 'New'. This gives you an option to create a new Sensor or Final Element Group.

After choosing, the group is automatically created. SILstat does not prompt you to change the name and description; users change the name through choosing the group on the left-hand side tree view.

To create SIF Groups through the Hierarchy Children:

- Select the SIF Safeguard node. This will open a 'Safeguard' view on the right-hand side of the app.
- Navigate to the 'Hierarchy' section and select the 'Children' accordion.
- Select the 'New' button and select 'Sensor Group' or 'Final Element Group' from the drop-down list.
- Add a Group Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Group.

14.3.9 Creating Tags

To create Tags from an Area Node:

- Navigate to an 'Area' node in the hierarchy.
- Navigate to the 'Hierarchy' section and select the 'Children' accordion.
- Under 'Tags', select 'New'.
- Enter a Tag Name and Description.
- Select the 'Create' button to create the Tag.

An alternate option is to create a Tag from a Unit Node.

- Navigate to a 'Unit' node in the hierarchy.
- Navigate to the 'Hierarchy' section and select the 'Children' accordion.
- Under 'Tags', select 'New'.
- Enter a Tag Name and Description.
- Select the 'Create' button to create the Tag.

A second alternate option is to create a Tag from an Equipment Node.

- Navigate to an ‘Equipment’ node in the hierarchy.
- Navigate to the ‘Hierarchy’ section and select the ‘Children’ accordion.
- Under ‘Tags’, select ‘New’.
- Enter a Tag Name and Description.
- Select the ‘Create’ button to create the Tag.

Currently, there is no limit on how many tags you can create.

14.4 Building a Safeguards Hierarchy

This section describes how a Safeguards Hierarchy can be built within SILstat. As you create new entities, i.e. an area, a hazard, etc. you should remember that every new item will be defaulted to a draft until you press "Create".

Within the Safeguards hierarchy, it is assumed that you have previously created your SIFs via the Hazards hierarchy, see section *14.3* .

14.4.1 Creating an Area

To create an Area:

- Go to Library, select ‘Area’, then ‘New’.
- Select an Area Type from the drop-down list.
- Add an Area Name and Description. The Name is mandatory for a draft to be saved.
- Select the ‘Create’ button to create the Area.

Another way to create an Area is to go to Configuration and Create a New Area. Create your high-level hierarchy with options for user-defined Areas, Process Areas, Units, and Equipment.

14.4.2 Creating a Unit Node

To create a Unit Node:

- Select the Safeguards hierarchy view on the left-side panel.
- Navigate to an ‘Area’ node in the hierarchy. Right click to see ‘New’ and ‘Associate’ buttons appear.
- Select ‘New’ or use the drop-down menu and select ‘Unit’. This will open a ‘Unit’ view on the right-hand side of the app.
- Enter a Unit Name and Description. The Name is mandatory for a draft to be saved.
- Select the ‘Create’ button to create the Unit node.

An alternate option is to create a Unit Node from the Area:

- Select the Area.
- Navigate to the ‘Hierarchy’ section and select the ‘Children’ accordion.
- Select ‘New’ to create a new Unit node. You will be automatically loaded into the Unit creation page.
- Enter a Unit Name and Description. The Name is mandatory for a draft to be saved.
- Select the ‘Create’ button to create the Unit.

14.4.3 Creating an Equipment Node

To create an Equipment Node:

- Select the Safeguards hierarchy view on the left-side panel.
- Navigate to an ‘Area’ node in the hierarchy. Right click to see ‘New’ and ‘Associate’ buttons appear.
- Select ‘New’ or use the drop-down menu and select ‘Equipment’. This will open an ‘Equipment’ view on the right-hand side of the app.
- Enter an Equipment Name and Description. The Name is mandatory for a draft to be saved.
- Select the ‘Create’ button to create the Equipment.

An alternate option is to create an Equipment Node from the Area:

- Select the Area.
- Navigate to the ‘Hierarchy’ section and select the ‘Children’ accordion.
- Select ‘New’ to create a new Equipment node. You will be automatically loaded into the Equipment creation page.
- Enter an Equipment Name and Description. The Name is mandatory for a draft to be saved.
- Select the ‘Create’ button to create the Equipment.

A second alternate option is to create an Equipment Node from the Unit Node:

- Select the Hazards hierarchy view on the left-side panel.
- Navigate to a ‘Unit’ node in the hierarchy. Right click to see ‘Equipment and ‘Associate’ buttons appear.
- Select ‘Equipment’. This will open an ‘Equipment’ view on the right-hand side of the app.
- Enter an Equipment Name and Description. The Name is mandatory for a draft to be saved.
- Select the ‘Create’ button to create the Equipment.

14.4.4 Creating a SIF

To create a new SIF:

Navigate to the ‘Initiating Event’ node in the hierarchy. Right click to see ‘New’ and ‘Associate’ buttons appear.

- Select ‘New’ or the drop-down menu to see options for adding a SIF Safeguard, Alarm Safeguard, Other Safeguard, Enabling Condition, and Conditional Modifier. When users click "New", a SIF Safeguard is the default.
- Selecting a SIF Safeguard will open a ‘Safeguard’ view on the right-hand side of the app.
- Add a Safeguard Name and Description. The Name is mandatory for a draft to be saved.
- Select the ‘Create’ button to create the SIF Safeguard.

Once a SIF is created, the groups (Sensor, Logic Solver, and Final Element) are automatically created, linked, and appear in the tree view. The groups remain in drafts until created.

An alternate option is to create a new SIF Safeguard through the Hazard diagram view:

- Select the Hazard node. This will open a ‘Hazard’ view on the right-hand side of the app.
- Navigate to the Diagram and select the ‘New’ button and select ‘SIF Safeguard’ from the drop-down list. If a SIF Safeguard is chosen, an Initiating Event must also be associated with your SIF.
- Once selected, this will open an ‘SIF Safeguard’ view on the right-hand side of the app.
- Add a Safeguard Name and Description. The Name is mandatory for a draft to be saved.
- Select the ‘Create’ button to create the SIF Safeguard.

To create a SIF through the hierarchy view:

- Select the Hazard node. This will open a 'Hazard' view on the right-hand side of the app.
- Navigate to the 'Hierarchy' section and select the 'Children' accordion.
- Select the 'New' button and select 'SIF Safeguard' from the drop-down list. If a SIF Safeguard is chosen, an Initiating Event must also be associated with your SIF.
- Once selected, this will open an 'SIF Safeguard' view on the right-hand side of the app.
- Add a Safeguard Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the SIF Safeguard.

14.4.5 Adding SIF Groups

To add SIF Groups:

Although the SIF groups (Sensor, Logic Solver, and Final Element) are automatically created when a SIF is made, users can manually create/add groups.

- Navigate to an 'SIF Safeguard' node in the hierarchy. Right click to see 'New' button appear.
- Select the 'New' button and select 'Sensor Group' or 'Final Element Group' from the drop-down list.
- Add a Group Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Group.

An alternate option is to create SIF Groups through the SIF Diagram:

- Select the SIF Safeguard node. This will open a 'Safeguard' view on the right-hand side of the app.
- Navigate to the Diagram and select the 'New' button and select 'Sensor Group' or 'Final Element Group' from the drop-down list.
- While on your SIF, under Diagram, click 'New'. This gives you an option to create a new Sensor or Final Element Group.

After choosing, the group is automatically created. SILstat does not prompt you to change the name and description; users change the name through choosing the group on the left-hand side tree view.

To create SIF Groups through the Hierarchy Children:

- Select the SIF Safeguard node. This will open a 'Safeguard' view on the right-hand side of the app.
- Navigate to the 'Hierarchy' section and select the 'Children' accordion.
- Select the 'New' button and select 'Sensor Group' or 'Final Element Group' from the drop-down list.
- Add a Group Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Group.

14.4.6 Creating Tags

To create Tags from an Area Node:

- Navigate to an 'Area' node in the hierarchy.
- Navigate to the 'Hierarchy' section and select the 'Children' accordion.
- Under 'Tags', select 'New'.
- Enter a Tag Name and Description.
- Select the 'Create' button to create the Tag.

An alternate option is to create a Tag from a Unit Node.

- Navigate to a ‘Unit’ node in the hierarchy.
- Navigate to the ‘Hierarchy’ section and select the ‘Children’ accordion.
- Under ‘Tags’, select ‘New’.
- Enter a Tag Name and Description.
- Select the ‘Create’ button to create the Tag.

A second alternate option is to create a Tag from an Equipment Node.

- Navigate to an ‘Equipment’ node in the hierarchy.
- Navigate to the ‘Hierarchy’ section and select the ‘Children’ accordion.
- Under ‘Tags’, select ‘New’.
- Enter a Tag Name and Description.
- Select the ‘Create’ button to create the Tag.

Currently, there is no limit on how many tags you can create.

14.5 Building a Procedures Hierarchy

This section describes how a Procedures Hierarchy can be built within SILstat. As you create new entities, i.e. an area, a procedure, etc. you should remember that every new item will be defaulted to a draft until you press "Create".

Within the Procedures hierarchy, it is assumed that you have previously created your SIFs via the Hazards hierarchy, see section *14.3* .

14.5.1 Creating an Area

To create an Area:

- Go to Library, select ‘Area’, then ‘New’.
- Select an Area Type from the drop-down list.
- Add an Area Name and Description. The Name is mandatory for a draft to be saved.
- Select the ‘Create’ button to create the Area.

Another way to create an Area is to go to Configuration and Create a New Area. Create your high-level hierarchy with options for user-defined Areas, Process Areas, Units, and Equipment.

14.5.2 Creating a Unit Node

To create a Unit Node:

- Select the Procedures hierarchy view on the left-side panel.
- Navigate to an ‘Area’ node in the hierarchy. Right click to see ‘New’ and ‘Associate’ buttons appear.
- Select ‘New’ or use the drop-down menu and select ‘Unit’. This will open a ‘Unit’ view on the right-hand side of the app.
- Enter a Unit Name and Description. The Name is mandatory for a draft to be saved.
- Select the ‘Create’ button to create the Unit node.

An alternate option is to create a Unit Node from the Area:

- Select the Area.
- Navigate to the 'Hierarchy' section and select the 'Children' accordion.
- Select 'New' to create a new Unit node. You will be automatically loaded into the Unit creation page.
- Enter a Unit Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Unit.

14.5.3 Creating an Equipment Node

To create an Equipment Node:

- Select the Procedures hierarchy view on the left-side panel.
- Navigate to an 'Area' node in the hierarchy. Right click to see 'New' and 'Associate' buttons appear.
- Select 'New' or use the drop-down menu and select 'Equipment'. This will open an 'Equipment' view on the right-hand side of the app.
- Enter an Equipment Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Equipment.

An alternate option is to create an Equipment Node from the Area:

- Select the Area.
- Navigate to the 'Hierarchy' section and select the 'Children' accordion.
- Select 'New' to create a new Equipment node. You will be automatically loaded into the Equipment creation page.
- Enter an Equipment Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Equipment.

A second alternate option is to create an Equipment Node from the Unit Node:

- Select the Hazards hierarchy view on the left-side panel.
- Navigate to a 'Unit' node in the hierarchy. Right click to see 'Equipment and 'Associate' buttons appear.
- Select 'Equipment'. This will open an 'Equipment' view on the right-hand side of the app.
- Enter an Equipment Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Equipment.

To assigning Procedures in the Equipment Node:

- Open the Assigned Procedures node.
- Press 'Add'.
- Once the pop-over screen opens, use the toggle switch with the procedure you wish to add.
- This will add the selected procedure into a grid within the accordion.

More procedures can be added by pressing 'Edit'. Procedures can also be removed by pressing 'Disassociate'.

14.5.4 Creating a SIF

To create a new SIF:

Navigate to the 'Initiating Event' node in the hierarchy. Right click to see 'New' and 'Associate' buttons appear.

- Select ‘New’ or the drop-down menu to see options for adding a SIF Safeguard, Alarm Safeguard, Other Safeguard, Enabling Condition, and Conditional Modifier. When users click "New", a SIF Safeguard is the default.
- Selecting a SIF Safeguard will open a ‘Safeguard’ view on the right-hand side of the app.
- Add a Safeguard Name and Description. The Name is mandatory for a draft to be saved.
- Select the ‘Create’ button to create the SIF Safeguard.

Once a SIF is created, the groups (Sensor, Logic Solver, and Final Element) are automatically created, linked, and appear in the tree view. The groups remain in drafts until created.

An alternate option is to create a new SIF Safeguard through the Hazard diagram view:

- Select the Hazard node. This will open a ‘Hazard’ view on the right-hand side of the app.
- Navigate to the Diagram and select the ‘New’ button and select ‘SIF Safeguard’ from the drop-down list. If a SIF Safeguard is chosen, an Initiating Event must also be associated with your SIF.
- Once selected, this will open an ‘SIF Safeguard’ view on the right-hand side of the app.
- Add a Safeguard Name and Description. The Name is mandatory for a draft to be saved.
- Select the ‘Create’ button to create the SIF Safeguard.

To create a SIF through the hierarchy view:

- Select the Hazard node. This will open a ‘Hazard’ view on the right-hand side of the app.
- Navigate to the ‘Hierarchy’ section and select the ‘Children’ accordion.
- Select the ‘New’ button and select ‘SIF Safeguard’ from the drop-down list. If a SIF Safeguard is chosen, an Initiating Event must also be associated with your SIF.
- Once selected, this will open an ‘SIF Safeguard’ view on the right-hand side of the app.
- Add a Safeguard Name and Description. The Name is mandatory for a draft to be saved.
- Select the ‘Create’ button to create the SIF Safeguard.

Within the SIF node, you can add Assigned Procedures. Procedures are created in the Library, see section *12.1 Procedures*. To assign a Procedure in the SIF Node:

- Navigate to the Procedures area
- Open the Assigned Procedures node.
- Press ‘Add’.
- Once the pop-over screen opens, use the toggle switch with the procedure you wish to add.
- This will add the selected procedure into a grid within the accordion.

More procedures can be added by pressing ‘Edit’. Procedures can also be removed by pressing ‘Disassociate’. The Inherited Procedures, procedures assigned to parent nodes, will also be shown.

14.5.5 Adding SIF Groups

Although the SIF groups (Sensor, Logic Solver, and Final Element) are automatically created when a SIF is made, users can manually create/add groups.

To add SIF Groups:

- Navigate to an ‘SIF Safeguard’ node in the hierarchy. Right click to see ‘New’ button appear.
- Select the ‘New’ button and select ‘Sensor Group’ or ‘Final Element Group’ from the drop-down list.
- Add a Group Name and Description. The Name is mandatory for a draft to be saved.
- Select the ‘Create’ button to create the Group.

An alternate option is to create SIF Groups through the SIF Diagram:

- Select the SIF Safeguard node. This will open a 'Safeguard' view on the right-hand side of the app.
- Navigate to the Diagram and select the 'New' button and select 'Sensor Group' or 'Final Element Group' from the drop-down list.
- While on your SIF, under Diagram, click 'New'. This gives you an option to create a new Sensor or Final Element Group.

After choosing, the group is automatically created. SILstat does not prompt you to change the name and description; users change the name through choosing the group on the left-hand side tree view.

To create SIF Groups through the Hierarchy Children:

- Select the SIF Safeguard node. This will open a 'Safeguard' view on the right-hand side of the app.
- Navigate to the 'Hierarchy' section and select the 'Children' accordion.
- Select the 'New' button and select 'Sensor Group' or 'Final Element Group' from the drop-down list.
- Add a Group Name and Description. The Name is mandatory for a draft to be saved.
- Select the 'Create' button to create the Group.

Within the SIF groups, you can add Assigned Procedures. To assign a Procedure in the SIF groups:

- Navigate to the Procedures area.
- Open the Assigned Procedures node.
- Press 'Add'.
- Once the pop-over screen opens, use the toggle switch with the procedure you wish to add.
- This will add the selected procedure into a grid within the accordion.

More procedures can be added by pressing 'Edit'. Procedures can also be removed by pressing 'Disassociate'. The Inherited Procedures, procedures assigned to parent nodes, will also be shown.

14.5.6 Creating Tags

To create Tags from an Area Node:

- Navigate to an 'Area' node in the hierarchy.
- Navigate to the 'Hierarchy' section and select the 'Children' accordion.
- Under 'Tags', select 'New'.
- Enter a Tag Name and Description.
- Select the 'Create' button to create the Tag.

An alternate option is to create a Tag from a Unit Node.

- Navigate to a 'Unit' node in the hierarchy.
- Navigate to the 'Hierarchy' section and select the 'Children' accordion.
- Under 'Tags', select 'New'.
- Enter a Tag Name and Description.
- Select the 'Create' button to create the Tag.

A second alternate option is to create a Tag from an Equipment Node.

- Navigate to an ‘Equipment’ node in the hierarchy.
- Navigate to the ‘Hierarchy’ section and select the ‘Children’ accordion.
- Under ‘Tags’, select ‘New’.
- Enter a Tag Name and Description.
- Select the ‘Create’ button to create the Tag.

Currently, there is no limit on how many tags you can create.

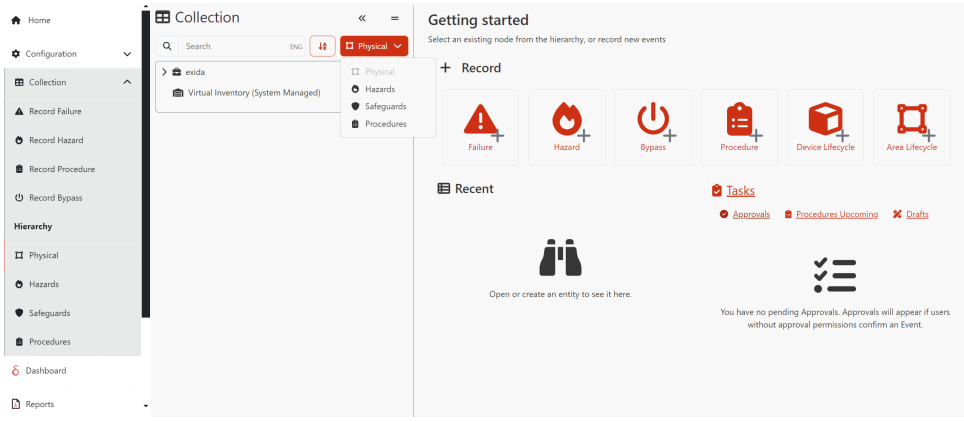
Part 4

Collection

Chapter 15 Collection

At the core of SILstat's functionality is Collection which allows you to record Lifecycle events that are critical within your process. The collected data is key to the evaluation of your actual performance compared to the assumed performance. The collection event types that are used in SILstat are:

- Install
- Bypass
- Decommission
- Failure
- Repair
- Replace
- Hazard
- Procedure



The navigation tree in the SILstat Collection section knows 4 different views of your plant hierarchy:

- Physical
- Hazards
- Safeguards
- Procedures

The following table summarizes the relevant plant hierarchy views and applicable hierarchy nodes for the identified collection events.

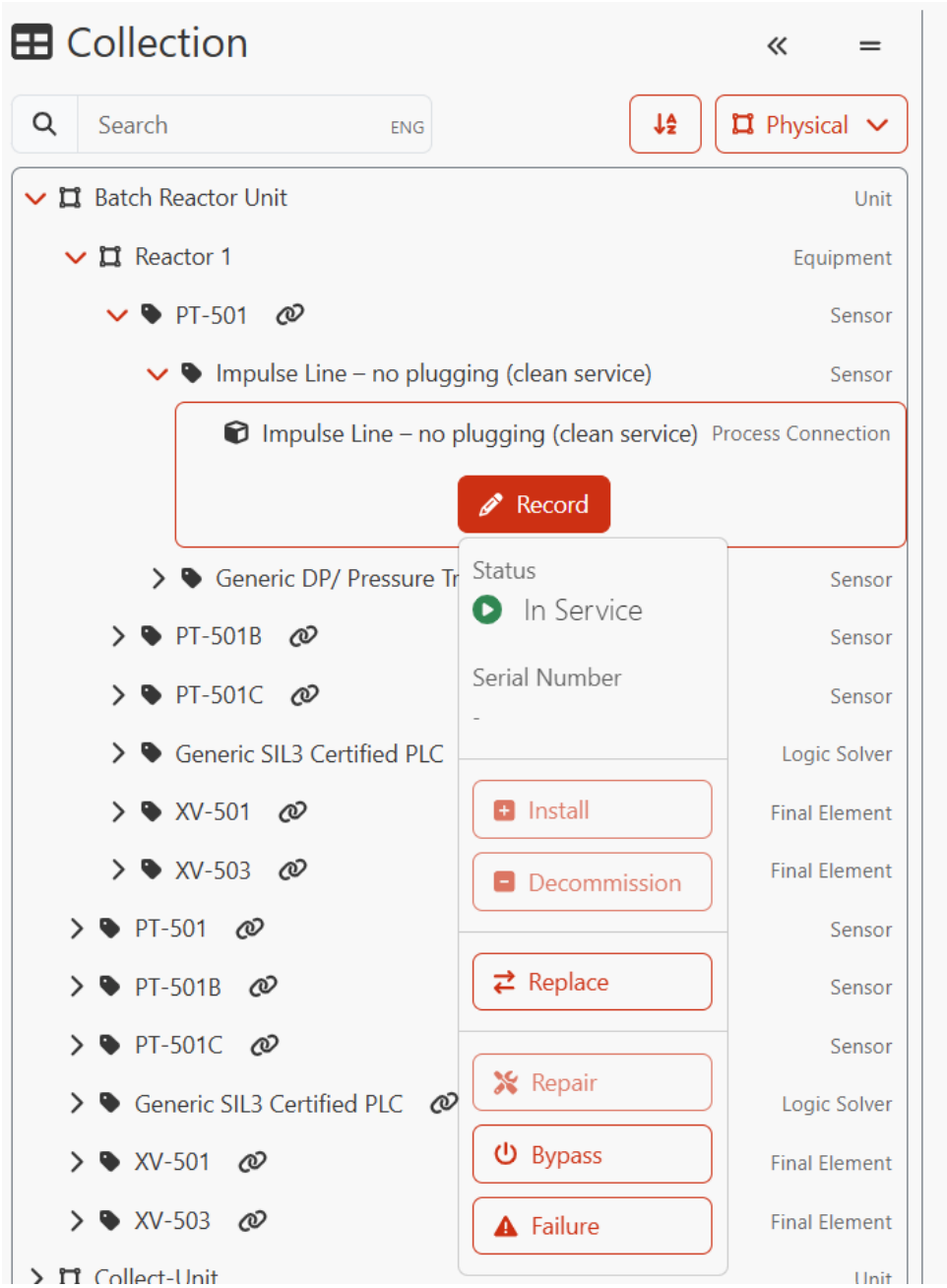
Collection Event Type	Plant Hierarchy View	Plant Hierarchy View
Install	All	Areas (Process Area, Unit, Equipment, etc.)
		Tags & Sub-tags
		Devices

Collection Event Type	Plant Hierarchy View	Plant Hierarchy View
Bypass	All	Areas (Process Area, Unit, Equipment, etc.)
		Tags & Sub-tags
Decommission	All	Areas (Process Area, Unit, Equipment, etc.)
		Tags & Sub-tags
		Devices
Failure	All	Devices
Repair	All	Devices
Replace	All	Devices
Hazard	Hazards	Hazard Scenarios
		Initiating Events
Procedure	Procedures	Procedures

15.1 Recording Events

To record a Collection Event through the Plant Hierarchy, select a Plant Hierarchy view and navigate to the desired Node. Upon selecting the Node, the Node's view will show on the right-hand side as read-only. At the top of the view, select the 'Record' button. This will provide options for Collection Events that can be recorded against that node.

Alternatively, you can right-click the desired Node and see a drop-down list. This will provide options for Collection Events that can be recorded against that node.



15.1.1 Plant Hierarchy View - Physical

The Physical hierarchy view represents the location of each Area, Process Area, Unit, Equipment, Tag, and Device defined within the SILstat environment. The following Collection Events can be recorded from the Physical Plant Hierarchy.

Plant Hierarchy Node	Collection Event Type
Areas (Process Area, Unit, Equipment, etc.)	Install
	Bypass
	Decommission
Tags & Sub-tags	Install
	Bypass
	Decommission
Devices	Install
	Bypass
	Failure
	Repair
	Replace
	Decommission

15.1.2 Plant Hierarchy View - Hazards

The Hazards hierarchy view groups items associated with a Hazard Scenario together, showing Initiating Events, Modifiers, and all Safeguards as children of a Hazard Scenario. If an Initiating Event, Modifier, or Safeguard is re-used across multiple Hazard Scenarios, it will be listed for each Hazard in the Hazards hierarchy view. The link symbol next to the name signifies that it has been reused / linked / associated in multiple areas. The following Collection Events can be recorded from the Hazards Plant Hierarchy.

Plant Hierarchy Node	Collection Event Type
Areas (Process Area, Unit, Equipment, etc.)	Install
	Bypass
	Decommission
Tags & Sub-tags	Install
	Bypass
	Decommission
Devices	Install
	Bypass
	Failure
	Repair
	Replace
	Decommission
Hazard Scenarios & Initiating Events	Hazard Event

15.1.3 Plant Hierarchy View - Safeguards

The Safeguards hierarchy view groups items within a Safeguard together, showing the logical relationship between Tags. You will see the Area, Process Area, Unit, Equipment, and all Safeguards including SIFs, Alarms, Relief Devices, etc. Expanding the SIF Safeguards shows the Sensor, Logic Solver, and Final Element parts. If a Tag or Device is re-used across multiple SIFs, it will be listed for each SIF Safeguard in the Safeguard hierarchy view. The link symbol next to the name signifies that it has been reused / linked / associated in multiple areas. The following Collection Events can be recorded from the Safeguard Plant Hierarchy

Plant Hierarchy Node	Collection Event Type
Areas (Process Area, Unit, Equipment, etc.)	Install
	Bypass
	Decommission
Tags & Sub-tags	Install
	Bypass
	Decommission
Devices	Install
	Bypass
	Failure
	Repair
	Replace
	Decommission

15.1.4 Plant Hierarchy View - Procedures

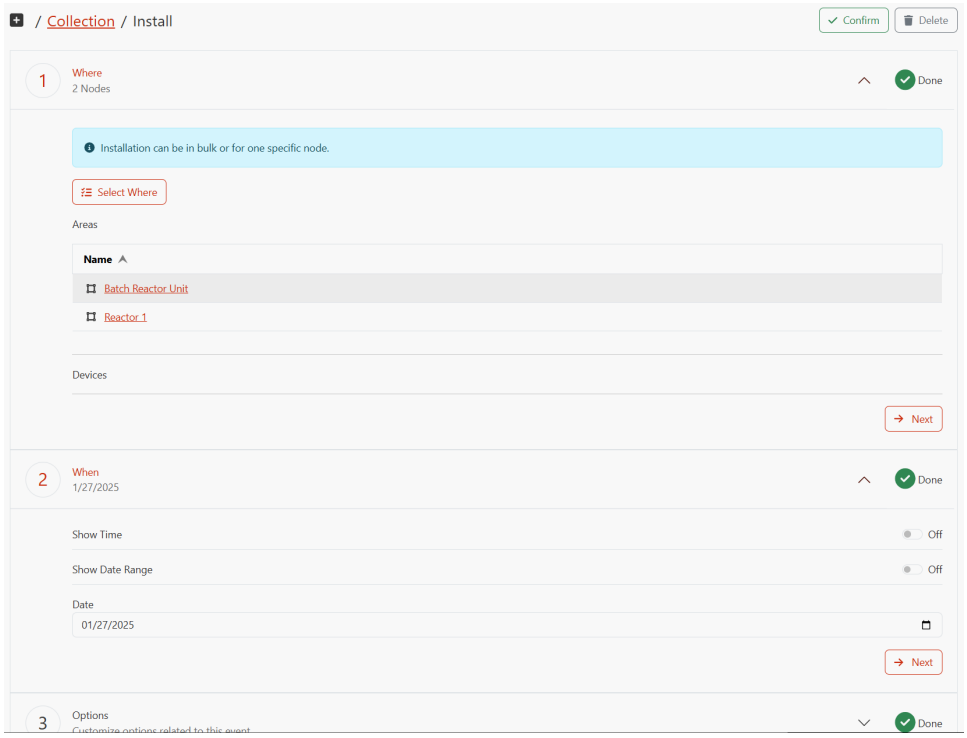
The Procedure hierarchy view shows proof tests and procedures assigned throughout your SILstat hierarchy. Depending on their scope, Procedures can be assigned to Units, Equipment, Safeguards, and Tags. If a Procedure is assigned to multiple Areas, it will be listed for each one. Selecting a Procedure will show you where the instance of the Procedure is applied to in that specific part of the hierarchy. The following Collection Events can be recorded from the Procedures Plant Hierarchy.

Plant Hierarchy Node	Collection Event Type
Areas (Process Area, Unit, Equipment, etc.)	Install
	Bypass
	Decommission
Tags & Sub-tags	Install
	Bypass
	Decommission

Plant Hierarchy Node	Collection Event Type
Devices	Install
	Bypass
	Failure
	Repair
	Replace
	Decommission
Procedures	Proof Test
	Procedure

15.2 Installation Events

Installation Events, or Install Events for short, can be initiated in the Collection section, by selecting *Area Lifecycle* or *Device Lifecycle* buttons, then selecting *Install* from the drop-down. Alternatively, Install Events can be initiated by navigating through the hierarchy and selecting a Node to be installed. See section *15.1 Recording Events* for Event options included in each Hierarchy view.



Once initiated, the Install Event view will show on the right-hand side of the application. Here you can specify the details of the event:

1. The ***Where*** section allows you to specify the Node to be installed. For Events initiated through the hierarchy, the selected node will be listed. If not yet specified, select the 'Select Where' button. A plant hierarchy view will appear in a panel to the far right. Navigate through the hierarchy to find the Node to be installed. Once finished with your selection, press Next. An indication that the step is complete is shown, and the section will collapse to show the next step.
2. The ***When*** section allows you to specify the Installation Date. By default, the date is the current date. You can select the 'Show Time' toggle switch to enter a Time. You can select the 'Date Range' toggle switch to specify a Start and End date. By default, the date range is one day. Once finished with your selection, press Next. An indication that the step is complete is shown, and the section will collapse to show the next step.
3. The ***Options*** section allows you to specify more details about your event. For Install Events, you can select the option to align all assigned procedure start dates with the install date. Once finished with your selection, press Next. An indication that the step is complete is shown, and the section will collapse to show the next step.
4. The ***Details*** section includes all relevant information for this event. You can specify a Name, Description, and include Common Properties (Custom Data, Resources, References, Labels) for the event.

Once each section is completed, press Confirm at either the top or bottom of the screen. As SILstat processes the event, the following notifications may be provided:

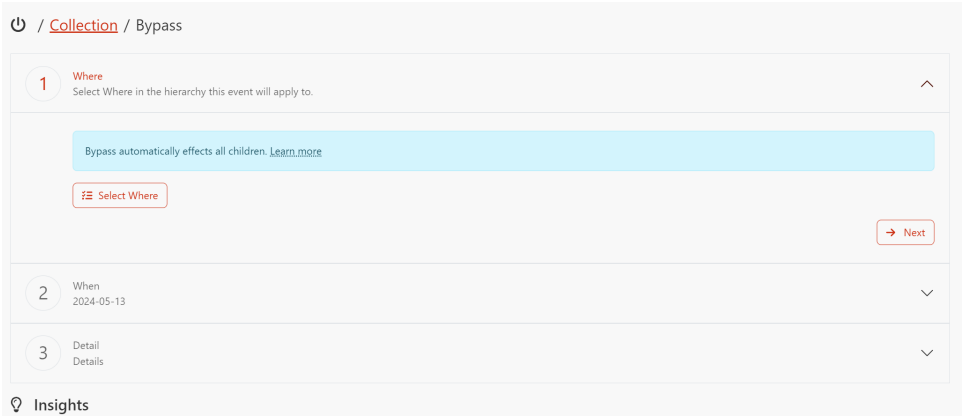
1. The event is queued for processing.
2. The event has been successfully completed.
3. Error

Once the event is confirmed, press Enable Editing to edit details of the event.

Install Events can be recorded in bulk or on one specific node. To record in bulk, select multiple Nodes to install in the Where Section of the Install Event.

15.3 Bypass Events

Bypass Events can be initiated in the Collection section, by selecting the *Bypass* button. Alternatively, Bypass Events can be initiated by navigating through the hierarchy and selecting a Node to be bypassed. See section *15.1 Recording Events* for Event options included in each Hierarchy view.



Once initiated, the Bypass Event view will show on the right-hand side of the application. Here you can specify the details of the event:

1. The ***Where*** section allows you to specify the Node to be bypassed. For Events initiated through the hierarchy, the selected node will be listed. If not yet specified, select the 'Select Where' button. A plant hierarchy view will appear in a panel to the far right. Navigate through the hierarchy to find the Node to be bypassed, or an existing bypass. Once finished with your selection, press Next. An indication that the step is complete is shown, and the section will collapse to show the next step.
2. The ***When*** section allows you to specify the Bypass Date. By default, the date is the current date. You can select the 'Show Time' toggle switch to enter a Time. You can select the 'Date Range' toggle switch to specify a Start and End date. By default, the date range is one day. *Please Note: For a Bypass Event, you cannot choose an end date in the future. If the Start Date is specified only, the device will remain in the 'Bypassed' State. To end a bypass, update an existing Bypass Event with an end date, or you can create a new Bypass Event that specifies an end date.* Once finished with your selection, press Next. An indication that the step is complete is shown, and the section will collapse to show the next step.
3. The ***Details*** section includes all relevant information for this event. You can specify a Name, Description, and include Common Properties (Custom Data, Resources, References, Labels) for the event.

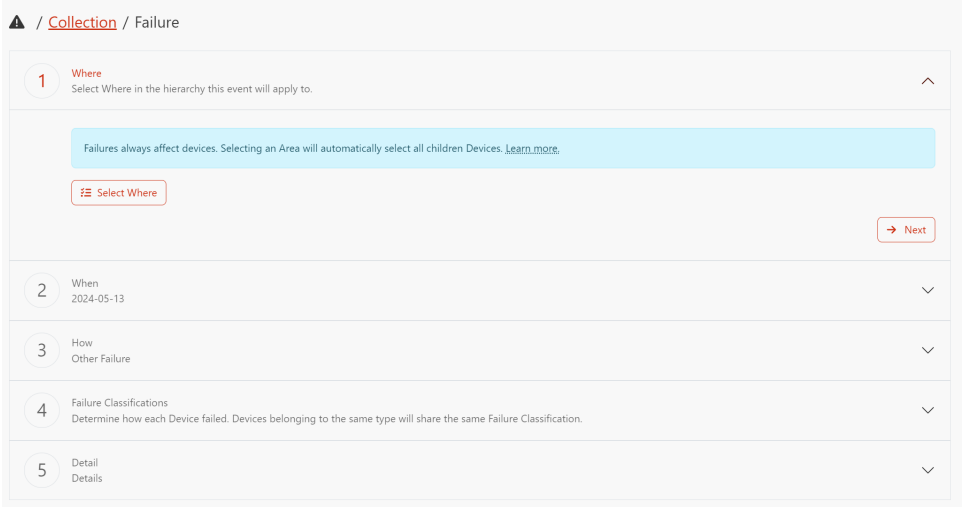
Once each section is completed, press Confirm at either the top or bottom of the screen. As SILstat processes the event, the following notifications may be provided:

1. The event is queued for processing.
2. The event has been successfully completed.
3. Error

If you create a Bypass Event that only has a Start Date, return to the Event and navigate to the Resolution accordion. In this accordion, you can enter the End date of the Bypass.

15.4 Failure Events

Failure Events can be initiated in the Collection section, by selecting the *Failure* button. Alternatively, Failure Events can be initiated by navigating through the hierarchy and selecting the failed Device. See section *15.1 Recording Events* for Event options included in each Hierarchy view. Finally, Failure Events may be initiated after a failed Procedure Event or a Hazard Event.



Once initiated, the Failure Event view will show on the right-hand side of the application. Here you can specify the details of the event:

1. The ***Where*** section allows you to specify the failed Device. For Events initiated through the hierarchy, the selected device will be listed. If not yet specified, select the 'Select Where' button. A plant hierarchy view will appear in a panel to the far right. Navigate through the hierarchy to find the failed Device. Once finished with your selection, press Next. An indication that the step is complete is shown, and the section will collapse to show the next step.
2. The ***When*** section allows you to specify the Failure Date. By default, the date is the current date. You can select the 'Show Time' toggle switch to enter a Time. You can select the 'Date Range' toggle switch to specify a Start and End date. By default, the date range is one day. Once finished with your selection, press Next. An indication that the step is complete is shown, and the section will collapse to show the next step.
3. The ***How*** or ***Why*** (if the Failure Event is associated with a Hazard Event) section refers to how the failure occurred. The Detection Method can be chosen from a drop-down menu.
4. The ***Failure Classifications*** section provides a grid showing the Device associated with the Failure Event. The Tag, Name, and Device Type are shown. Here you can specify the Failure Classification from a drop-down list.
5. The ***Details*** section includes all relevant information for this event. You can specify a Name, Description, and include Common Properties (Custom Data, Resources, References, Labels) for the event.

Once each section is completed, press Confirm at either the top or bottom of the screen. As SILstat processes the event, the following notifications may be provided:

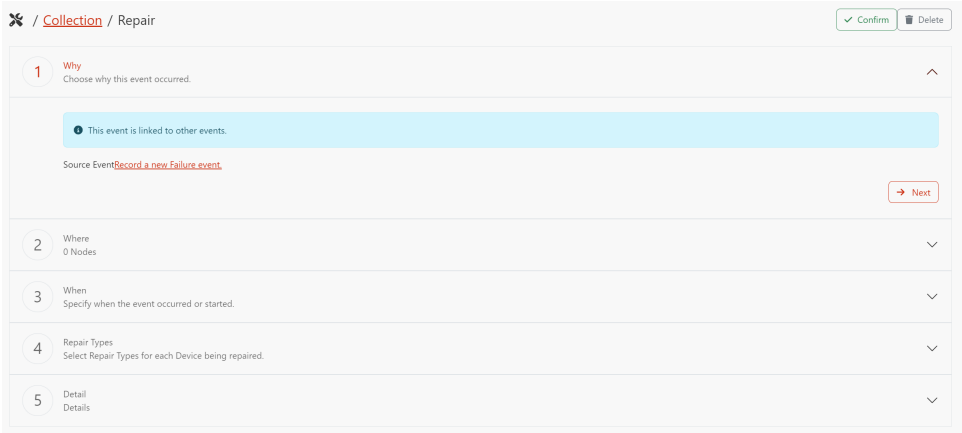
1. The event is queued for processing.
2. The event has been successfully completed.
3. Error

Once the Failure Event is confirmed / occurred, you have the option to repair or replace the affected device. See section *15.5* for Repair Events and Section *15.6* for Replace Events.

Please note: Failure Classifications can be specified in SILstat Settings. See Section *5.3* for more details.

15.5 Repair Events

Repair Events can be initiated in the Collection section, by selecting the *Device Lifecycle* button, and selecting *Repair* from the drop-down. Alternatively, Repair Events can be initiated by navigating through the hierarchy and selecting the repaired Device. See section *15.1 Recording Events* for Event options included in each Hierarchy view. Finally, Repair Events may be recorded as part of a Failure Event.



Once initiated, the Repair Event view will show on the right-hand side of the application. Here you can specify the details of the event:

1. The ***Where*** section allows you to specify the failed Device. For Events initiated through the hierarchy or as part of a Failure Event, the selected device will be listed. If not yet specified, select the 'Select Where' button. A plant hierarchy view will appear in a panel to the far right. Navigate through the hierarchy to find the repaired Device. Once finished with your selection, press Next. An indication that the step is complete is shown, and the section will collapse to show the next step.
2. The ***When*** section allows you to specify the Repair Date. By default, the date is the current date. You can select the 'Show Time' toggle switch to enter a Time. You can select the 'Date Range' toggle switch to specify a Start and End date. By default, the date range is one day. Once finished with your selection, press Next. An indication that the step is complete is shown, and the section will collapse to show the next step.
3. The ***Devices to Repair*** section provides a grid showing the Device associated with the Repair Event. The Tag, Name, and Device Type are shown . Here you can specify the Repair Type from a drop-down list.
4. The ***Details*** section includes all relevant information for this event. You can specify a Name, Description, and include Common Properties (Custom Data, Resources, References, Labels) for the event.

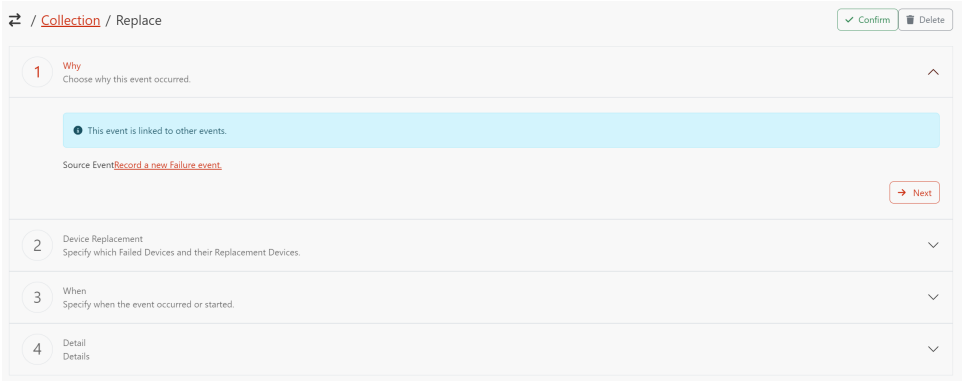
Once each section is completed, press Confirm at either the top or bottom of the screen. As SILstat processes the event, the following notifications may be provided:

1. The event is queued for processing.
2. The event has been successfully completed.
3. Error

Please note: Repair Types can be specified in SILstat Settings. See Section *5.5* for more details.

15.6 Replace Events

Replace Events can be initiated in the Collection section, by selecting the *Device Lifecycle* button, and selecting *Replace* from the drop-down. Alternatively, Replace Events can be initiated by navigating through the hierarchy and selecting the replaced Device. See section *15.1 Recording Events* for Event options included in each Hierarchy view. Finally, Replace Events may be recorded as part of a Failure Event.



Once initiated, the Replace Event view will show on the right-hand side of the application. Here you can specify the details of the event:

1. The ***Why*** section allows you to specify the associated Failure Event for the Device to be replaced (and related Events).
2. The ***Device Replacement*** section allows you to choose the replacement device from the devices available in your database. At present, you can only replace one device at a time.
3. The ***Where*** section allows you to specify the replaced Device. For Events initiated through the hierarchy or as part of a Failure Event, the selected device will be listed. If not yet specified, select the 'Select Where' button. A plant hierarchy view will appear in a panel to the far right. Navigate through the hierarchy to find the replaced Device. Once finished with your selection, press Next. An indication that the step is complete is shown, and the section will collapse to show the next step.
4. The ***When*** section allows you to specify the Replacement Date. By default, the date is the current date. You can select the 'Show Time' toggle switch to enter a Time. You can select the 'Date Range' toggle switch to specify a Start and End date. By default, the date range is one day. Once finished with your selection, press Next. An indication that the step is complete is shown, and the section will collapse to show the next step.
5. The ***Details*** section includes all relevant information for this event. You can specify a Name, Description, and include Common Properties (Custom Data, Resources, References, Labels) for the event.

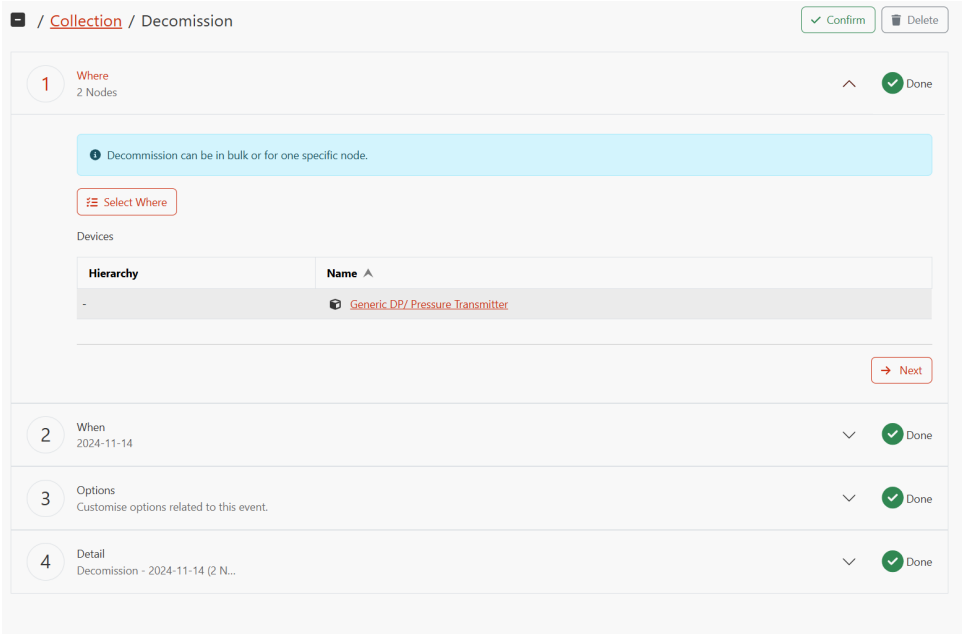
Once each section is completed, press Confirm at either the top or bottom of the screen. As SILstat processes the event, the following notifications may be provided:

1. The event is queued for processing.
2. The event has been successfully completed.
3. Error

Please note: Only Devices not in service can be used as replacement. New Devices can be added to the Library, see section *11.3 Devices* for more details.

15.6 Decommission Events

Decommission Events can be initiated in the Collection section, by selecting *Area Lifecycle* or *Device Lifecycle* buttons, then selecting *Decommission* from the drop-down. Alternatively, Decommission Events can be initiated by navigating through the hierarchy and selecting a Node to be decommissioned. See section *15.1 Recording Events* for Event options included in each Hierarchy view.



Once initiated, the Decommission Event view will show on the right-hand side of the application. Here you can specify the details of the event:

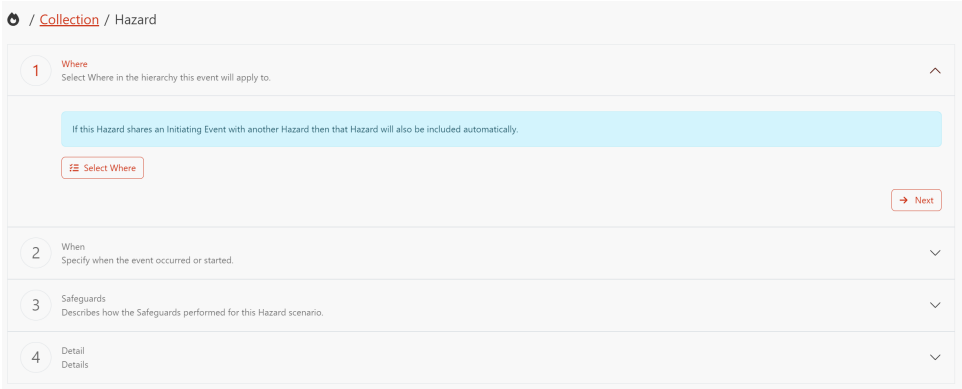
1. The ***Where*** section allows you to specify the Node to be removed. For Events initiated through the hierarchy, the selected node will be listed. If not yet specified, select the 'Select Where' button. A plant hierarchy view will appear in a panel to the far right. Navigate through the hierarchy to find the Node to be removed. Once finished with your selection, press Next. An indication that the step is complete is shown, and the section will collapse to show the next step.
2. The ***When*** section allows you to specify the Removal Date. By default, the date is the current date. You can select the 'Show Time' toggle switch to enter a Time. You can select the 'Date Range' toggle switch to specify a Start and End date. By default, the date range is one day. Once finished with your selection, press Next. An indication that the step is complete is shown, and the section will collapse to show the next step.
3. The ***Options*** section allows you to specify more details about your event. For Decommission Events, you can select the *Discard* option. This indicates that you are discarding the node from the hierarchy and do not want to record any data on it. If chosen, it will be marked as deleted and will discard any data from the database. Once finished with your selection, press Next. An indication that the step is complete is shown, and the section will collapse to show the next step.
4. The ***Details*** section includes all relevant information for this event. You can specify a Name, Description, and include Common Properties (Custom Data, Resources, References, Labels) for the event.

Once each section is completed, press Confirm at either the top or bottom of the screen. As SILstat processes the event, the following notifications may be provided:

1. The event is queued for processing.
2. The event has been successfully completed.
3. The event is awaiting approval.
4. The event has been approved.
5. The event has been rejected.
6. Error

15.6 Hazard Events

Hazard Events can be initiated in the Collection section, by selecting the *Hazard* button. Alternatively, Hazard Events can be initiated by navigating through the hierarchy and selecting a Hazard Scenario or Initiating Event Node. See section *15.1 Recording Events* for Event options included in each Hierarchy view.



Once initiated, the Hazard Event view will show on the right-hand side of the application. Here you can specify the details of the event:

1. The ***Where*** section allows you to specify the Hazard Scenario or Initiating Event Node. For Events initiated through the hierarchy, the selected node will be listed. If not yet specified, select the 'Select Where' button. A plant hierarchy view will appear in a panel to the far right. Navigate through the hierarchy to find the Hazard Scenario or Initiating Event Node. Once finished with your selection, press Next. An indication that the step is complete is shown, and the section will collapse to show the next step.
2. The ***When*** section allows you to specify the Hazard Date. By default, the date is the current date. You can select the 'Show Time' toggle switch to enter a Time. You can select the 'Date Range' toggle switch to specify a Start and End date. By default, the date range is one day. Once finished with your selection, press Next. An indication that the step is complete is shown, and the section will collapse to show the next step.
3. The ***Safeguards*** section provides a diagram showing your Hazard Scenario. The diagram displays Initiating Events and Safeguards associated with the Hazard. An Advanced view of the diagram shows Enabling Conditions, Conditional Modifiers, and Safeguards that are not credited for this Hazard. If a Safeguard succeeded at the time of the Hazard, select that safeguard in the diagram. This provides options to indicate if the safeguard partially succeeded or succeeded. SILstat will assume safeguards preceding the successful safeguard failed, and safeguards listed after were not called to action.
4. The ***Details*** section includes all relevant information for this event. You can specify a Name, Description, and include Common Properties (Custom Data, Resources, References, Labels) for the event.

Once each section is completed, press Confirm at either the top or bottom of the screen. Upon confirmation, a Resolution section appears. This shows all failed devices associated with the Hazard Event, including their Tag, Name, Initiating Event, and Hazard. In the *Failure Event* column, select *New* to initiate a Failure Collection event. Any associated Repair or Replacement event will show in the *Resolution* column. See section *15.4* , *15.5* , and *15.6* respectively, for more details on the Failure, Repair, and Replace Events.

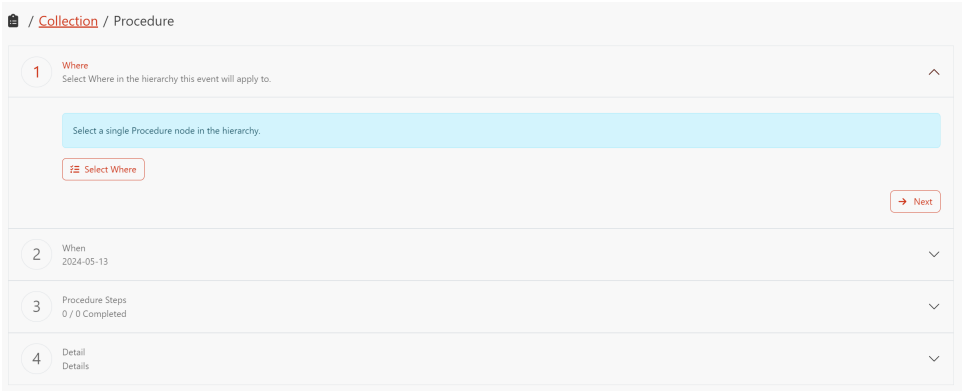
As SILstat processes the event, the following notifications may be provided:

1. The event is queued for processing.
2. The event has been successfully completed.
3. Error

Please note: Hazards can be created in Configuration. See section 14.3 Building a Hazards Hierarchy for more details.

15.6 Procedure Events

Procedure Events can be initiated in the Collection section, by selecting the 'Procedure' button. Alternatively, Procedure Events can be initiated by navigating through the hierarchy and selecting a Procedure Node. See section *15.1 Recording Events* for Event options included in each Hierarchy view.



Once initiated, the Procedure Event view will show on the right-hand side of the application. Here you can specify the details of the event:

1. The ***Where*** section allows you to specify the Procedure Node. For Events initiated through the hierarchy, the selected node will be listed. If not yet specified, select the 'Select Where' button. A plant hierarchy view will appear in a panel to the far right. Navigate through the hierarchy to find the Procedure Node. Once finished with your selection, press Next. An indication that the step is complete is shown, and the section will collapse to show the next step.
2. The ***When*** section allows you to specify the Procedure Date. By default, the date is the current date. You can select the 'Show Time' toggle switch to enter a Time. You can select the 'Date Range' toggle switch to specify a Start and End date. By default, the date range is one day. Once finished with your selection, press Next. An indication that the step is complete is shown, and the section will collapse to show the next step.
3. The ***Procedure Steps*** section displays each step of the Proof Test or Procedure. Steps are displayed in two view options: Summary (grid version) or Detailed (list version). For each step, a Step Name and Description are shown. If specified, an estimated Step Duration is also shown. Some steps include additional prompts for information. These are mandatory and may determine if the Procedure passes or fails. Complete each procedure step before moving on.
4. The ***Details*** section includes all relevant information for this event. You can specify a Name, Description, and include Common Properties (Custom Data, Resources, References, Labels) for the event.

Once each section is completed, press Confirm at either the top or bottom of the screen. As SILstat processes the event, the following notifications may be provided:

1. The event is queued for processing.
2. The event has been successfully completed.
3. Error

If a Procedure Event fails, you will be prompted to initiate a Failure Event for associated Devices. See section *15.4* for details on Failure Events.

Please note: Procedures can be created in Configuration. See section 14.5 Building a Procedures Hierarchy for more details.

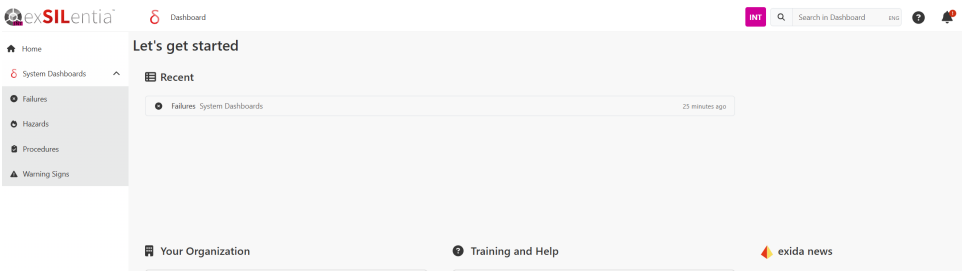
Part 5

Analysis

Chapter 17 Dashboard

SILstat's Dashboard contextualizes data collected in the SILstat application. The dashboard's widgets provide an at a glance look at critical safety metrics. These can help users keep up with critical safety tasks, identify any bad actors in the safety instrumented system, and validate assumptions made earlier in the safety lifecycle.

To navigate to the Dashboard, select **Dashboard** on the left side panel of SILstat. Alternatively, select the **SILstat** icon at the top of the application and select **Dashboard** from the drop-down.



17.1 Landing Page

The Dashboard Landing Page includes the following sections:

- Recent
- Your Organization
- Training & Help
- Latest News

17.1.1 Recent

The Recent section lists the latest items you have viewed in Dashboard, ordered by the last edited. Double click on an item in the list to return to that view.

17.1.2 Your Organization

Your Organization displays company information from the licensing integration system.

17.1.3 Training and Help

Training and Help shows exida's latest information on Training and Software Support.

17.1.4 Latest News

exida News displays the latest company news.

17.2 Dashboards

17.2.1 System Dashboards

System Dashboards are curated by exida. All the Dashboard's available widgets are organized in the following categories:

- Failures
- Hazards
- Procedures
- Warning Signs

Chapter 18 System Dashboards

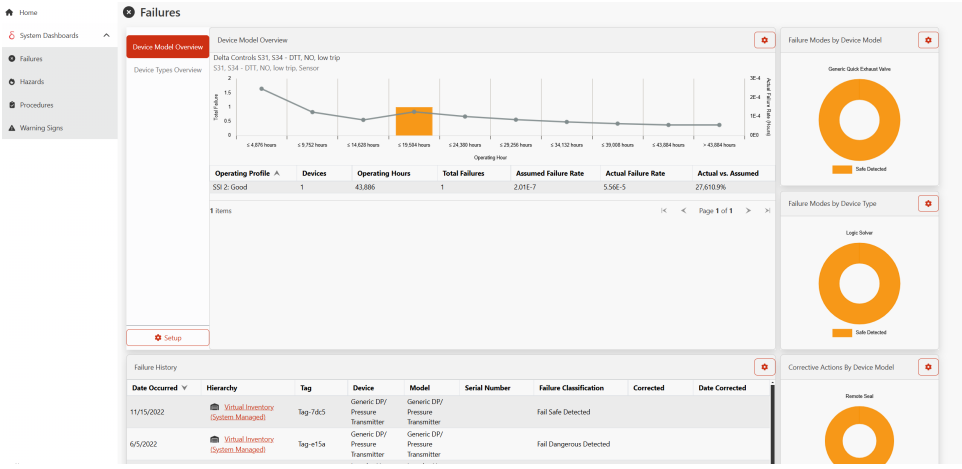
System Dashboards are curated by exida. All the Dashboard's available widgets are organized in the following categories:

- Failures
- Hazards
- Procedures
- Warning Signs

18.1 Failures Dashboard

The SILstat Failures Dashboard includes the following widgets:

- Device Model Overview Grid
- Device Type Overview Grid
- Failure History Grid
- Failure Modes by Device Model Pie Chart
- Failure Modes by Device Type Pie Chart
- Corrective Actions by Device Model Pie Chart
- Corrective Actions by Device Type Pie Chart



18.1.1 Device Model & Device Type Overview Grid

In the Failures Dashboard, the Device Model Overview and Device Type Overview are combined into a single widget. These display high-level failure data based on events collected in your SILstat database and compare Actual Failure Rates calculated by SILstat to Assumed Failure Rates used in SIL Verification.

On the left-side panel of the widget, you can choose to view per Device Model or Device Type. To change the order in which they are listed, select the **Setup** button at the bottom of the left-side panel. This will allow you to change the order under **Edit List**.

To view data in the widget, a Device Model or Device Type must be selected. To do this, select the gear icon on the top right-hand corner to open the widget settings. In the **Filters** section, select the **Device Model** or **Device Type** from the drop down.

The widget settings include the following items.

Property	Description
Device Model/Device Type	This will list all available Device Models or Types in your SILstat database. A selection must be made to view data in this widget.
Failure Rate Unit	Choose how failure rates are displayed from the drop-down. Options include Failures per Hour, Failures per Year, and FITs (Failure in Billion Hours)
Number of Failures for Problematic Device	Enter this is as a number.
Bucket Size: Number of Intervals	This represents the amount of intervals to create where the data will be represented in the chart.
Page Size	Choose the number of rows showing in the grid in a single page.

The Device Model Overview provides the following data.

Property	Description
Operating Profile	This displays the Device Model's Assumed SSI used in SIL Verification. This is imported into the database or entered directly by the user.
Devices	This shows the total number of Devices associated with the Device Model in the database.
Operating Hours	This shows the total number of Operating hours associated with the Device Model in the database.

Property	Description
Total Failures	This shows the total number of Failures for Devices associated with the Device Model in the database.
Assumed Failure Rate	This displays the Device Model's Assumed Failure Rate used in SIL Verification. This is imported into the database or entered directly by the user.
Actual Failure Rate	This shows the Device Model's Actual Failure Rate calculated by SILstat based on the Failure Events collected in the database.
Actual vs. Assumed Failure Rate	This shows the difference between the Actual and Assumed Failure Rates.

The bottom of the grid shows the number of items displayed in the widget, based on the Filters set in the widget settings. It also shows the page you are viewing out of the total number of pages. Arrow icons allow you to proceed to the next page of the grid or return to a previous page.

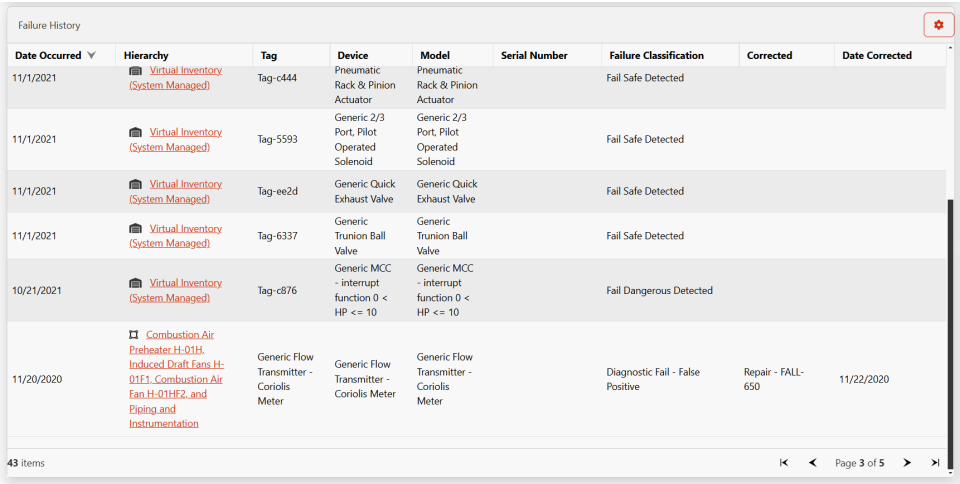
The Device Types Overview provides the following data.

Property	Description
Operating Profile	This displays the Device Model's Assumed SSI used in SIL Verification. This is imported into the database or entered directly by the user.
Devices	This shows the total number of Devices associated with the Device Model in the database.
Operating Hours	This shows the total number of Operating hours associated with the Device Model in the database.
Total Failures	This shows the total number of Failures for Devices associated with the Device Type in the database.
Actual Failure Rate	This shows the Device Type's Actual Failure Rate calculated by SILstat based on the Failure Events collected in the database.
Problematic	This provides an indication that the Actual Failure rate is too high. The criteria for this indication can be set by the user in the widget settings.

The bottom of the grid shows the number of items displayed in the widget, based on the Filters set in the widget settings. It also shows the page you are viewing out of the total number of pages. Arrow icons allow you to proceed to the next page of the grid or return to a previous page.

18.1.2 Failure History Grid

The Failure History widget provides a grid showing details for failure events collected in the database. This can be filtered by Area to show a specific part of the hierarchy. To do this, select the gear icon on the top right-hand corner to open the widget settings. In the **Area Filters** section, navigate through the hierarchy and select the Areas you wish view.



Failure History

Date Occurred	Hierarchy	Tag	Device	Model	Serial Number	Failure Classification	Corrected	Date Corrected
11/1/2021	Virtual Inventory (System Managed)	Tag-c444	Pneumatic Rack & Pinion Actuator	Pneumatic Rack & Pinion Actuator		Fail Safe Detected		
11/1/2021	Virtual Inventory (System Managed)	Tag-5593	Generic 2/3 Port, Pilot Operated Solenoid	Generic 2/3 Port, Pilot Operated Solenoid		Fail Safe Detected		
11/1/2021	Virtual Inventory (System Managed)	Tag-ee2d	Generic Quick Exhaust Valve	Generic Quick Exhaust Valve		Fail Safe Detected		
11/1/2021	Virtual Inventory (System Managed)	Tag-6337	Generic Trunion Ball Valve	Generic Trunion Ball Valve		Fail Safe Detected		
10/21/2021	Virtual Inventory (System Managed)	Tag-c876	Generic MCC - interrupt function 0 < HP <= 10	Generic MCC - interrupt function 0 < HP <= 10		Fail Dangerous Detected		
11/20/2020	Combustion Air Preheater H-01H, Induced Draft Fans H-01F1, Combustion Air Fan H-01HF2, and Piping and Instrumentation	Generic Flow Transmitter - Coriolis Meter	Generic Flow Transmitter - Coriolis Meter	Generic Flow Transmitter - Coriolis Meter		Diagnostic Fail - False Positive	Repair - FALL-650	11/22/2020

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The widget settings include the following items.

Property	Description
Area Filters	Navigate through the hierarchy and select the Areas you wish view.
Page Size	Choose the number of rows showing in the grid in a single page.
Column Visibility	Use the toggle button next to each column header to choose which columns are shown in the grid.

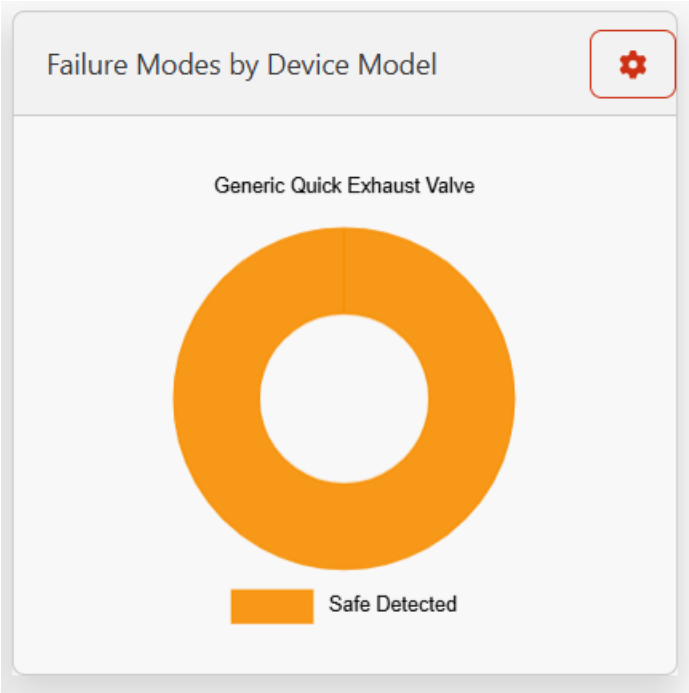
The Failure History widget provides the following data.

Property	Description
Date Occurred	This shows the date of the Failure Event.
Hierarchy	This lists all parents of the Device the Failure Event was recorded for.
Tag	This shows the Tag associated with the failed Device.
Device	This shows the Device Name.
Model	This shows the Device Model associated with the failed Device.
Serial Number	This shows the Serial Number associated with the failed Device.
Failure Classification	This shows the Failure Classification associated with this Failure Event.
Corrected	This shows any associated event recorded as a resolution to the Failure. This could include a Repair, Replace or Remove Event.
Date Corrected	This shows the date of the associated event.

The bottom of the grid shows the number of items displayed in the widget, based on the Filters set in the widget settings. It also shows the page you are viewing out of the total number of pages. Arrow icons allow you to proceed to the next page of the grid or return to a previous page.

18.1.3 Failure Modes by Device Model Donut Chart

The Failure Modes by Device Model widget provides a donut chart showing the number of Failure Events recorded per Failure Mode for the selected Device Model.



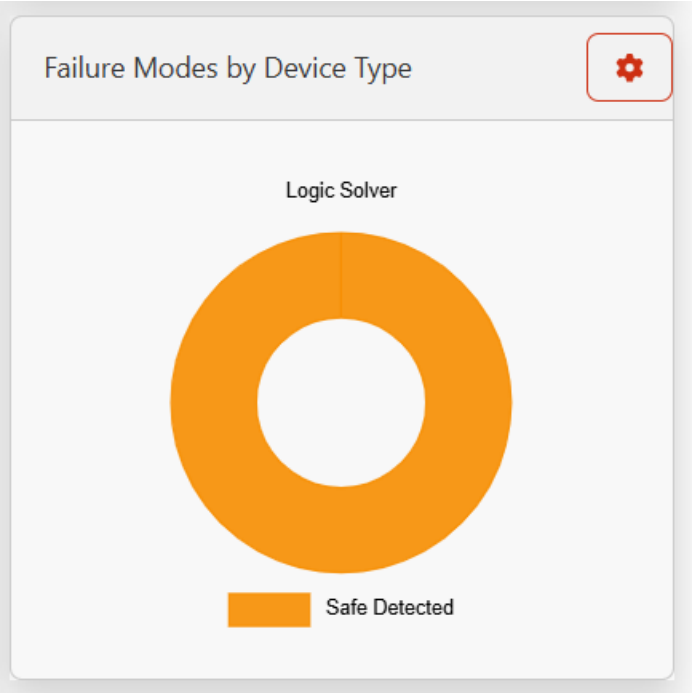
To view data in the widget, a Device Model must be selected. To do this, select the gear icon on the top right-hand corner to open the widget settings. In the **Filters** section, select the **Device Model** from the drop down.

The widget settings include the following items.

Property	Description
Device Model	This will list all available Device Models in your SILstat database. A selection must be made to view data in this widget.
Chart Title: Show Title	Select the toggle button to choose to show the chart title or not.
Chart Title: Title Position	Choose the Chart Title location. Options include Bottom, Top, Right and Left.
Chart Legend: Show Legend	Select the toggle button to choose to show the chart legend or not.
Chart Legend: Legend Position	Choose the Chart Legend location. Options include Bottom, Top, Right and Left.

18.1.4 Failure Modes by Device Type Donut Chart

The Failure Modes by Device Type widget provides a donut chart showing the number of Failure Events recorded per Failure Mode for the selected Device Type.



To view data in the widget, a Device Type must be selected. To do this, select the gear icon on the top right-hand corner to open the widget settings. In the **Filters** section, select the **Device Type** from the drop down.

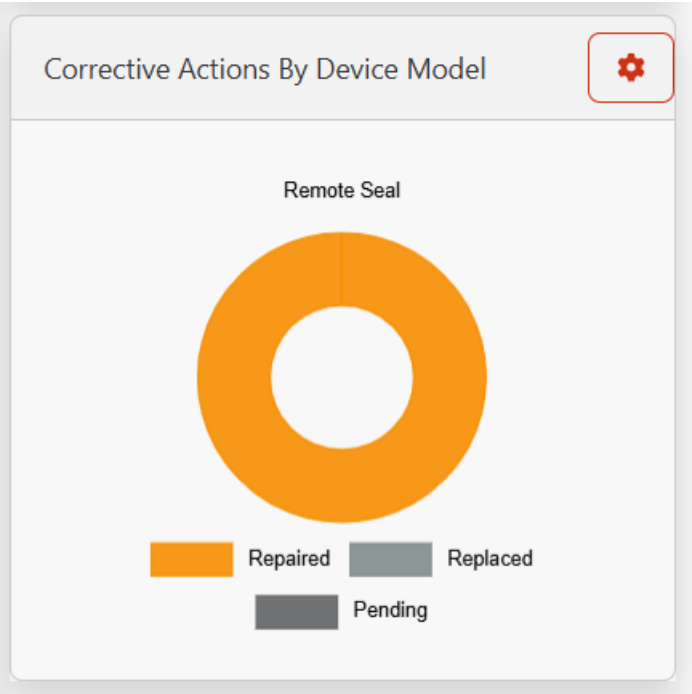
The widget settings include the following items.

Property	Description
Device Type	This will list all available Device Types in your SILstat database. A selection must be made to view data in this widget.
Chart Title: Show Title	Select the toggle button to choose to show the chart title or not.
Chart Title: Title Position	Choose the Chart Title location. Options include Bottom, Top, Right and Left.
Chart Legend: Show Legend	Select the toggle button to choose to show the chart legend or not.
Chart Legend: Legend Position	Choose the Chart Legend location. Options include Bottom, Top, Right and Left.

18.1.5 Corrective Action by Device Model Donut Chart

The Corrective Action by Device Model widget provides a donut chart showing the number of each type of Corrective Action events recorded in response to Failure Events associated with the selected Device Model. These include:

- Repaired: if a Repair Event was created and completed in response to a Failure Event.
- Replaced: if Replace Event was created and completed in response to a Failure Event.
- Pending: started Repair/Replace Event, but not yet completed (pending corrective action on this device model).



To view data in the widget, a Device Model must be selected. To do this, select the gear icon on the top right-hand corner to open the widget settings. In the **Filters** section, select the **Device Model** from the drop down.

The widget settings include the following items.

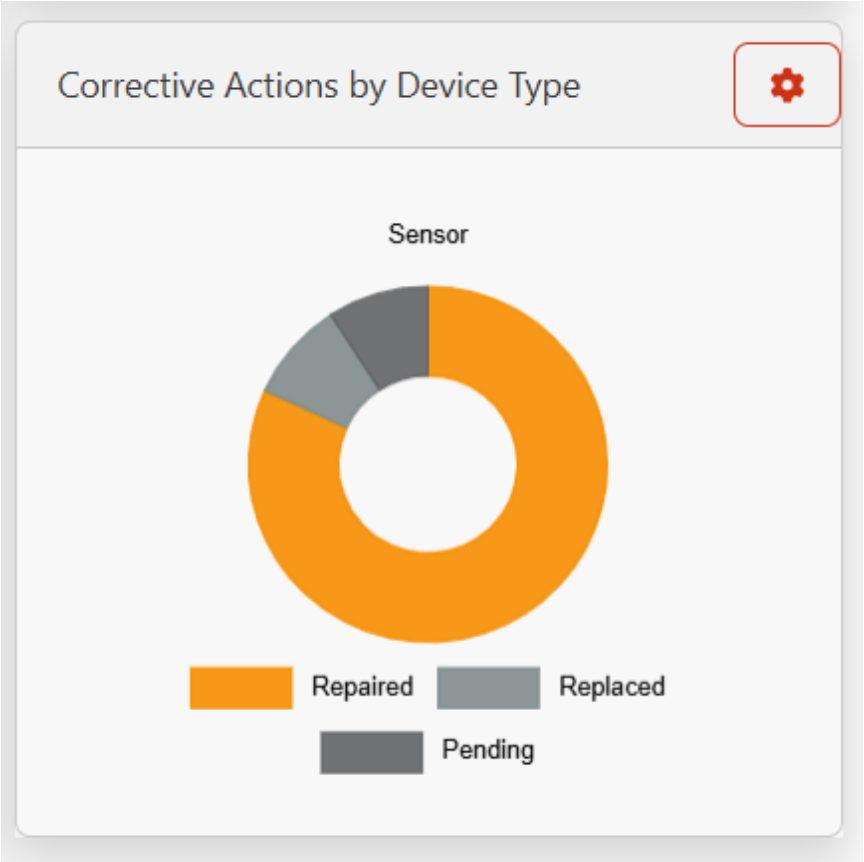
Property	Description
Device Model	This will list all available Device Models in your SILstat database. A selection must be made to view data in this widget.
Chart Title: Show Title	Select the toggle button to choose to show the chart title or not.
Chart Title: Title Position	Choose the Chart Title location. Options include Bottom, Top, Right and Left.

Property	Description
Chart Legend: Show Legend	Select the toggle button to choose to show the chart legend or not.
Chart Legend: Legend Position	Choose the Chart Legend location. Options include Bottom, Top, Right and Left.

18.1.6 Corrective Action by Device Type Donut Chart

The Corrective Action by Device Type widget provides a donut chart showing the number of each type of Corrective Action events recorded in response to Failure Events associated with the selected Device Type. These include:

- Repaired: if a Repair Event was created and completed in response to a Failure Event.
- Replaced: if Replace Event was created and completed in response to a Failure Event.
- Pending: started Repair/Replace Event, but not yet completed (pending corrective action on this device model).



To view data in the widget, a Device Type must be selected. To do this, select the gear icon on the top right-hand corner to open the widget settings. In the **Filters** section, select the **Device Type** from the drop down.

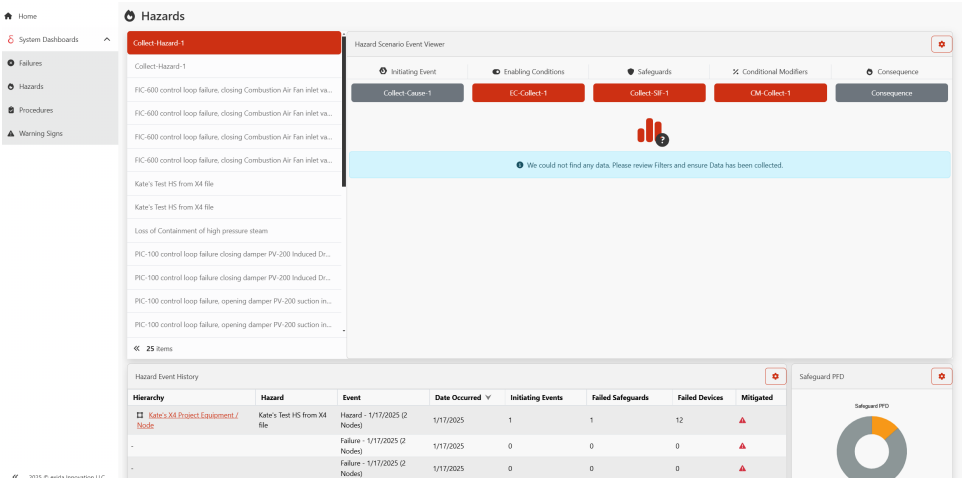
The widget settings include the following items.

Property	Description
Device Type	This will list all available Device Types in your SILstat database. A selection must be made to view data in this widget.
Chart Title: Show Title	Select the toggle button to choose to show the chart title or not.
Chart Title: Title Position	Choose the Chart Title location. Options include Bottom, Top, Right and Left.
Chart Legend: Show Legend	Select the toggle button to choose to show the chart legend or not.
Chart Legend: Legend Position	Choose the Chart Legend location. Options include Bottom, Top, Right and Left.

18.2 Hazards Dashboard

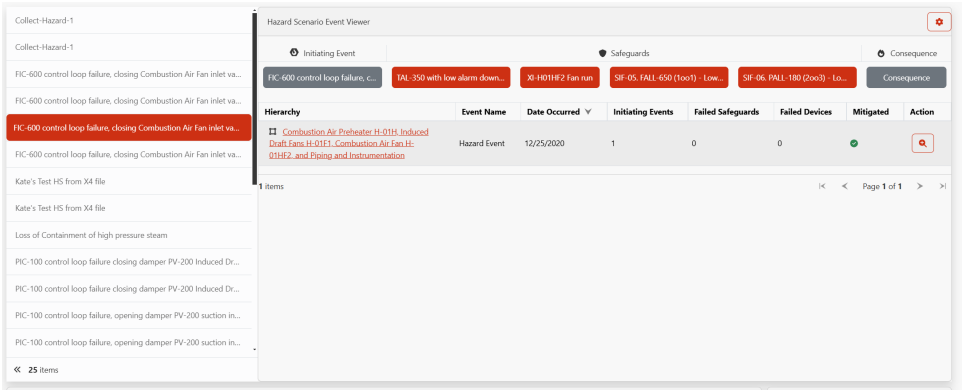
The SILstat Hazards Dashboard includes the following widgets:

- Hazard Scenario Overview Grid
- Hazard Event History Grid
- Safeguard Probability of Failure Pie Chart
- Hazard Scenarios Mitigated Pie Chart



18.2.1 Hazard Scenario Overview Grid

The Hazard Scenario Event Viewer displays high-level event data based on Hazard Events collected in your SILstat database to compare Actual Frequencies and Probabilities of Failure calculated by SILstat to Assumed Frequencies and Probabilities of Failure used in LOPA.



On the left-side panel of the widget, you can choose a Hazard Scenario to view. The bottom of the panel shows the number of Hazard Scenarios available to view. This will show all Hazards with data collected in your database for the Areas selected in the Area Filter. To adjust the Area Filter, select the gear icon on the top right-hand corner to open the widget settings. In the **Area Filters** section, navigate through the hierarchy and select the Areas you wish view. This will allow you to select up to 100 Areas.

The widget settings include the following items.

Property	Description
Area Filters	Navigate through the hierarchy and select the Areas you wish view.
Page Size	Choose the number of rows showing in the grid in a single page.

Upon selection of a Hazard Scenario, the widget will show the associated Hazard Scenario Diagram including the following items:

- Initiating Events
- Enabling Conditions
- Safeguards
- Conditional Modifiers

You can select the items to see associated data including Assumed Frequency of Initiating Events, Assumed Probability for Enabling Conditions and Conditional Modifiers, and Assumed Probability of Failure for Safeguards. The assumed data is imported from the LOPA or entered by the user into the SILstat application.

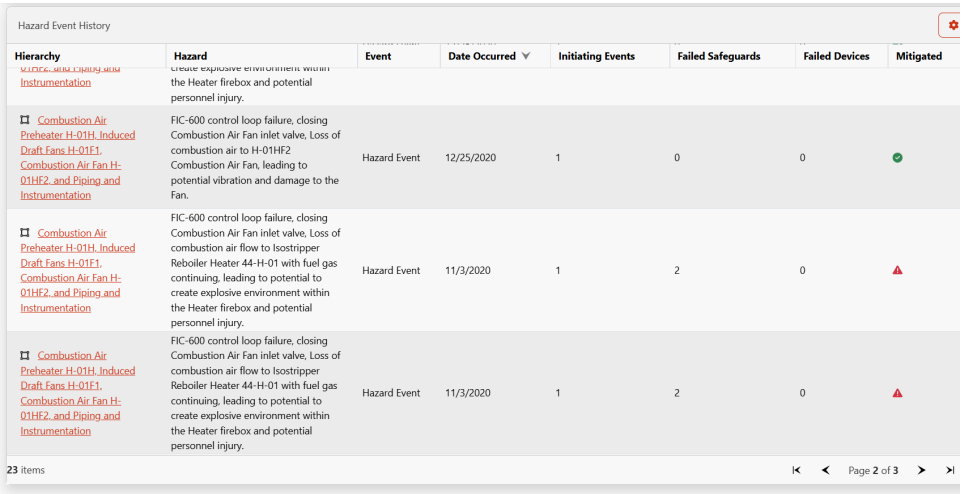
The Hazard Event Overview provides the following data.

Property	Description
Hierarchy	This shows all parents of the Hazard selected, as configured in the SILstat database.
Event Name	This shows the Hazard Event Name.
Event Date	This shows the Hazard Event Date.
Failed Safeguards	This shows the number of failed Safeguards.
Initiating Events	This shows the number of Initiating Events.
Failed Devices	This shows the number of failed Devices.
Mitigated	This indicates if the Hazard was successfully mitigated or not.
Action	This allows you to view event detail in the Hazard Diagram, which provides an indication of which safeguards succeeded or failed.

The bottom of the grid shows the number of items displayed in the widget, based on the Filters set in the widget settings. It also shows the page you are viewing out of the total number of pages. Arrow icons allow you to proceed to the next page of the grid or return to a previous page.

18.2.2 Hazard Event History Grid

The Hazard Event History widget provides a grid showing details for hazard events collected in the database.



The widget can be filtered by Area to show a specific part of the hierarchy. To do this, select the gear icon on the top right-hand corner to open the widget settings. In the **Area Filters** section, navigate through the hierarchy and select the Areas you wish view.

The widget settings include the following items.

Property	Description
Area Filters	Navigate through the hierarchy and select the Areas you wish view.

Property	Description
Page Size	Choose the number of rows showing in the grid in a single page.
Column Visibility	Use the toggle button next to each column header to choose which columns are shown in the grid.

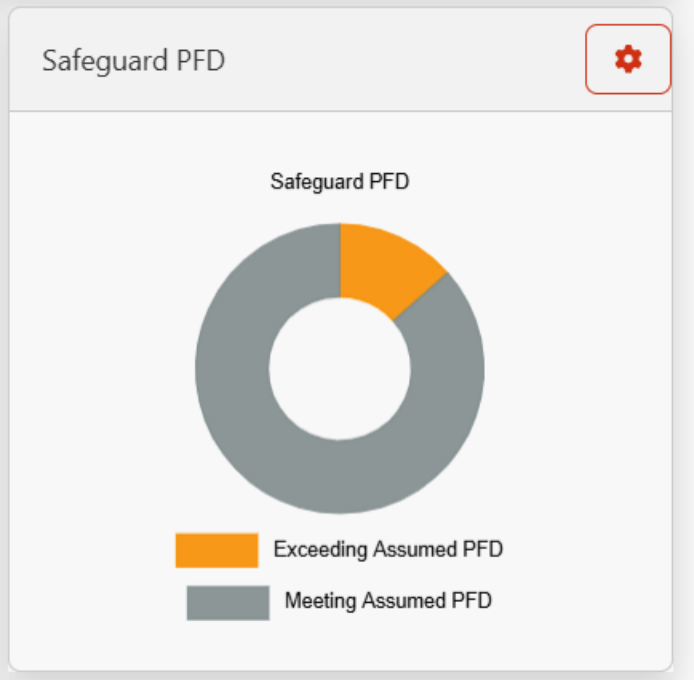
The Hazard Event History widget provides the following data.

Property	Description
Hierarchy	This shows all parents of the Hazard selected, as configured in the SILstat database.
Hazard Name	This shows the Hazard Name.
Event Name	This shows the Hazard Event Name.
Event Date	This shows the Hazard Event Date.
Initiating Events	This shows the number of Initiating Events.
Failed Safeguards	This shows the number of failed Safeguards.
Failed Devices	This shows the number of failed Devices.
Mitigated	This indicates if the Hazard was successfully mitigated or not.

The bottom of the grid shows the number of items displayed in the widget, based on the Filters set in the widget settings. It also shows the page you are viewing out of the total number of pages. Arrow icons allow you to proceed to the next page of the grid or return to a previous page.

18.2.3 Safeguard Probability of Failure Donut Chart

The Safeguard Probability of Failure widget provides a donut chart showing the number of Safeguards Meeting the Assumed Probability of Failure vs. Exceeding the Assumed Probability of Failure. The Assumed Probability of Failure is imported from the LOPA or entered by the user into the SILstat application.



The widget shows all Safeguards with data collected in your database for the Areas selected in the Area Filter. To adjust the Area Filter, select the gear icon on the top right-hand corner to open the widget settings. In the **Area Filters** section, navigate through the hierarchy and select the Areas you wish view. This will allow you to select up to 100 Areas.

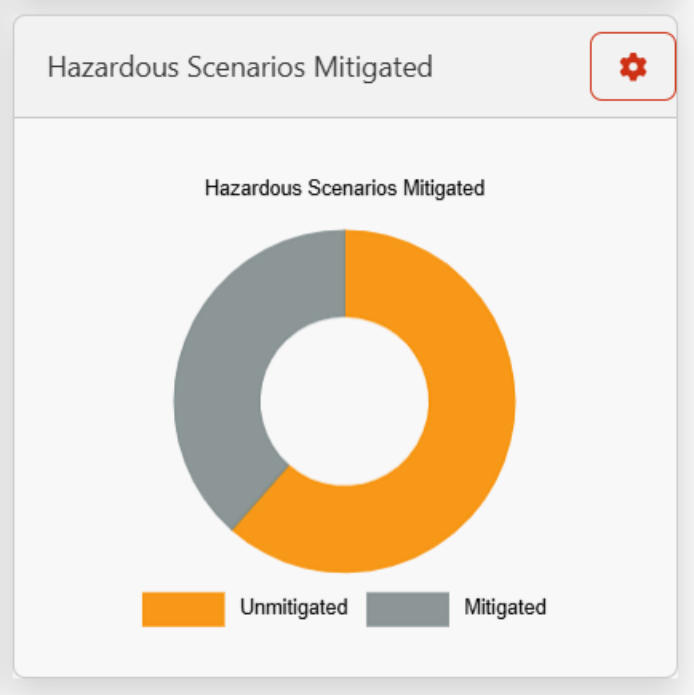
The widget settings include the following items.

Property	Description
Area Filters	Navigate through the hierarchy and select the Areas you wish view.
Chart Title: Show Title	Select the toggle button to choose to show the chart title or not.
Chart Title: Title Position	Choose the Chart Title location. Options include Bottom, Top, Right and Left.
Chart Legend: Show Legend	Select the toggle button to choose to show the chart legend or not.
Chart Legend: Legend Position	Choose the Chart Legend location. Options include Bottom, Top, Right and Left.

In the widget, you can hover over sections of the pie chart to see the number of Safeguards per category.

18.2.4 Hazard Scenarios Mitigated Donut Chart

The Hazard Scenarios Mitigated widget provides a donut chart showing the number of Hazard Scenarios that were successfully mitigated vs. those that were not.



The widget shows all Hazard Scenarios with data collected in your database for the Areas selected in the Area Filter. To adjust the Area Filter, select the gear icon on the top right-hand corner to open the widget settings. In the **Area Filters** section, navigate through the hierarchy and select the Areas you wish view. This will allow you to select up to 100 Areas.

The widget settings include the following items.

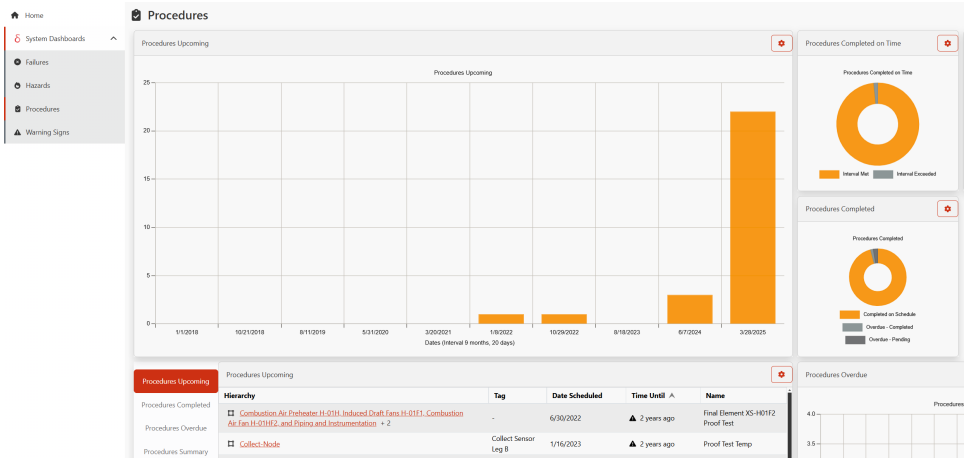
Property	Description
Area Filters	Navigate through the hierarchy and select the Areas you wish view.
Chart Title: Show Title	Select the toggle button to choose to show the chart title or not.
Chart Title: Title Position	Choose the Chart Title location. Options include Bottom, Top, Right and Left.
Chart Legend: Show Legend	Select the toggle button to choose to show the chart legend or not.
Chart Legend: Legend Position	Choose the Chart Legend location. Options include Bottom, Top, Right and Left.

In the widget, you can hover over sections of the pie chart to see the number of Hazard Scenarios per category.

18.3 Procedures Dashboard

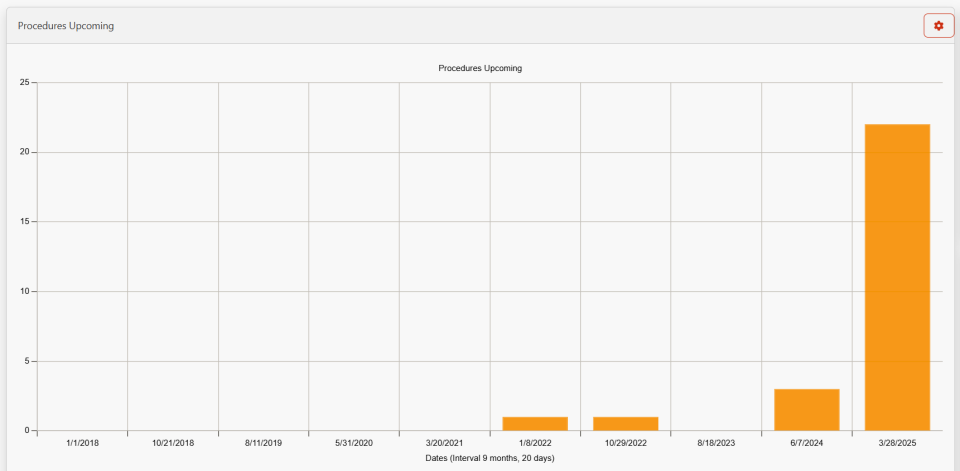
The SILstat Procedures Dashboard includes the following widgets:

- Procedures Upcoming Chart
- Procedures Overdue Chart
- Procedures Upcoming Grid
- Procedures Completed Grid
- Procedures Overdue Grid
- Procedures Summary Grid
- Procedures Completed on Time Donut Chart
- Procedures Completed Donut Chart
- Proof Tests Passed Donut Chart



18.3.1 Procedures Upcoming Chart

The Procedures Upcoming Chart provides a visual indication of how many Procedures have an upcoming due date.



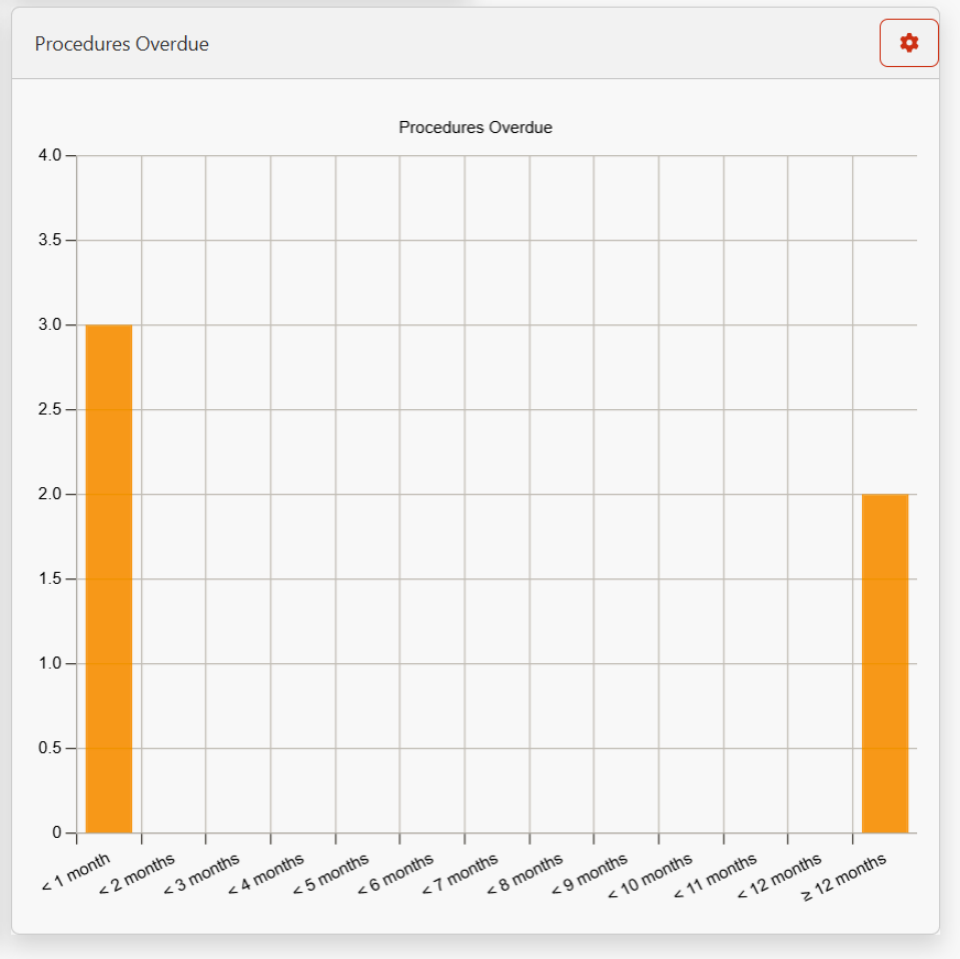
The widget shows Procedures in your database for the Areas selected in the Area Filter. To adjust the Area Filter, select the gear icon on the top right-hand corner to open the widget settings. In the **Area Filters** section, navigate through the hierarchy and select the Areas you wish view. This will allow you to select up to 100 Areas.

The widget settings include the following items.

Property	Description
Area Filters	Navigate through the hierarchy and select the Areas you wish view.
Bucket Size: Number of Intervals	This allows you to choose the time interval dates shown on the X-axis of the chart.
Date Range Filter: Start Date	This allows you to choose the start date shown on the X-axis.
Date Range Filter: End Date	This allows you to choose the last date shown on the X-axis.
Procedures Type Filter	Choose between All, Procedure, or Proof Test.

18.3.2 Procedures Overdue Chart

The Procedures Overdue Chart provides a visual indication of how many Procedures are Overdue for a given time overdue.



The widget shows Procedures in your database for the Areas selected in the Area Filter. To adjust the Area Filter, select the gear icon on the top right-hand corner to open the widget settings. In the **Area Filters** section, navigate through the hierarchy and select the Areas you wish view. This will allow you to select up to 100 Areas.

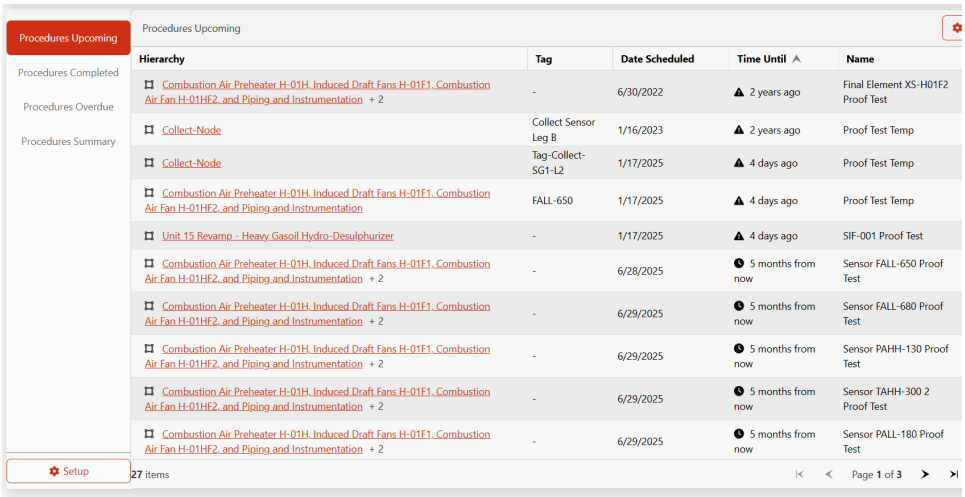
The widget settings include the following items.

Property	Description
Area Filters	Navigate through the hierarchy and select the Areas you wish view.
Bucket Size: Upper Bound, Number of Intervals	This allows you to choose the time interval dates shown on the X-axis of the chart.
Date Range Filter: Start Date	This allows you to choose the start date shown on the X-axis.
Date Range Filter: End Date	This allows you to choose the last date shown on the X-axis.
Procedures Type Filter	Choose between All, Procedure, or Proof Test.
Chart Title: Show Title	Select the toggle button to choose to show the chart title or not.

Property	Description
Chart Title: Title Position	Choose the Chart Title location. Options include Bottom, Top, Right and Left.

18.3.3 Procedures Upcoming, Completed, Overdue, & Summary Grid

In the Procedures Dashboard, the Procedures Upcoming, Completed, Overdue, and Summary grids are combined into a single widget. These display high-level Procedure Event data based on events collected in your SILstat database.



On the left-side panel of the widget, you can choose to view Upcoming, Completed, Overdue or Summary. To change the order in which they are listed, select the **Setup** button at the bottom of the left-side panel. This will allow you to change the order under **Edit List**.

The widget shows Procedures with data collected in your database for the Areas selected in the Area Filter. To adjust the Area Filter, select the gear icon on the top right-hand corner to open the widget settings. In the **Area Filters** section, navigate through the hierarchy and select the Areas you wish view. This will allow you to select up to 100 Areas.

The widget settings include the following items.

Property	Description
Area Filters	Navigate through the hierarchy and select the Areas you wish view.
Page Size	Adjust the number of items that display per page.
Procedure Type Filter	Choose between All, Procedure, or Proof Test.
Column Visibility	Use the toggle button next to each column header to choose which columns are shown in the grid.

The Procedures Upcoming Grid provides the following data.

Property	Description
Hierarchy	This shows all parents of the Procedure selected, as configured in the SILstat database.
Tag	This shows the Tag associated with the Procedure. This will list the tag to which the Procedure was directly assigned.
Date Scheduled	This shows the Procedure's due date.
Time Until	This shows the number of days until the Procedure's due date.
Name	This shows the Procedure Name.

The bottom of the grid shows the number of items displayed in the widget, based on the Filters set in the widget settings. It also shows the page you are viewing out of the total number of pages. Arrow icons allow you to proceed to the next page of the grid or return to a previous page.

The Procedures Completed Grid provides the following data.

Property	Description
Hierarchy	This shows all parents of the Procedure selected, as configured in the SILstat database.
Tag	This shows the Tag associated with the Procedure. This will list the tag to which the Procedure was directly assigned.
Target Interval	This shows the target procedure interval or time between procedures. This is imported from SIL Verification or entered by the user directly into SILstat.
Actual Interval	This shows the actual procedure interval calculated by SILstat based on Procedure Events recorded in the database.
Name	This shows the Procedure Name.
Date Start	This shows the date the Procedure Event was initiated.
Date End	This shows the Procedure's end date.
Status	This gives an indication if the Procedure passed or failed.
Action	This allows you to view failure data associated with the Procedure including Device Name, Serial Number, Device Type, Device Model, Failure Classification, Corrected Date and Corrected.

The bottom of the grid shows the number of items displayed in the widget, based on the Filters set in the widget settings. It also shows the page you are viewing out of the total number of pages. Arrow icons allow you to proceed to the next page of the grid or return to a previous page.

The Procedures Overdue Grid provides the following data.

Property	Description
Hierarchy	This shows all parents of the Procedure selected, as configured in the SILstat database.

Property	Description
Tag	This shows the Tag associated with the Procedure. This will list the tag to which the Procedure was directly assigned.
Date Scheduled	This shows the Procedure's due date.
Time Overdue	This shows the amount of time passed since the Procedure due date.
Name	This shows the Procedure Name.

The bottom of the grid shows the number of items displayed in the widget, based on the Filters set in the widget settings. It also shows the page you are viewing out of the total number of pages. Arrow icons allow you to proceed to the next page of the grid or return to a previous page.

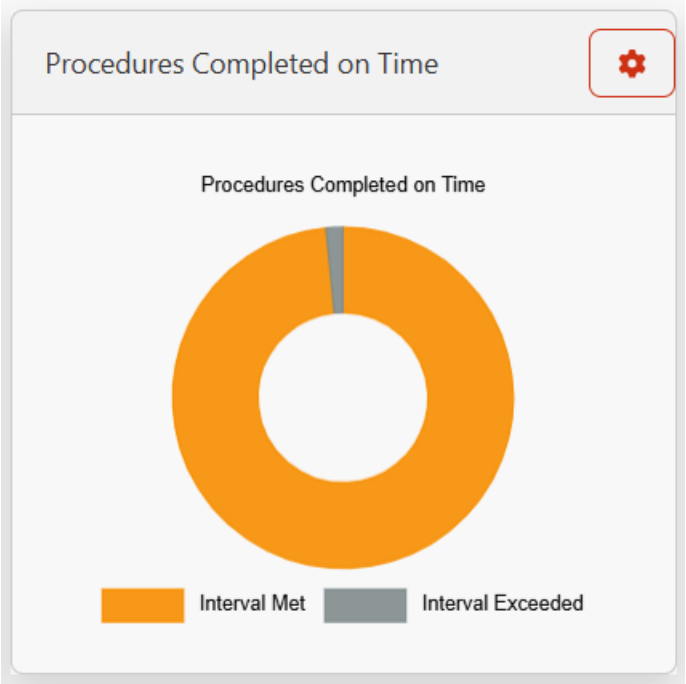
The Procedures Summary Grid provides the following data.

Property	Description
Hierarchy	This shows all parents of the Procedure selected, as configured in the SILstat database.
Tag	This shows the Tag associated with the Procedure. This will list the tag to which the Procedure was directly assigned.
Target Interval	This shows the target procedure interval or time between procedures. This is imported from SIL Verification or entered by the user directly into SILstat.
Actual Interval	This shows the actual procedure interval calculated by SILstat based on Procedure Events recorded in the database.
Names	This shows the Procedure Name.
Rate	This provides an indication of how often this Procedure passes or results in a failure.
Action	This provides detail on procedures recorded against the Tag including Procedure Name, Date Scheduled, Date Start, Date End, Passed.

The bottom of the grid shows the number of items displayed in the widget, based on the Filters set in the widget settings. It also shows the page you are viewing out of the total number of pages. Arrow icons allow you to proceed to the next page of the grid or return to a previous page.

18.3.4 Procedures Completed on Time Donut Chart

The Procedures Completed on Time widget provides a donut chart showing the number of Procedures Meeting their Assumed Interval vs. Exceeding their Assumed Interval. The Assumed Procedure Interval (or Proof Test Interval) is imported from the SIL Verification or entered by the user into the SILstat application.



The widget shows Procedures with data collected in your database for the Areas selected in the Area Filter. To adjust the Area Filter, select the gear icon on the top right-hand corner to open the widget settings. In the **Area Filters** section, navigate through the hierarchy and select the Areas you wish view. This will allow you to select up to 100 Areas.

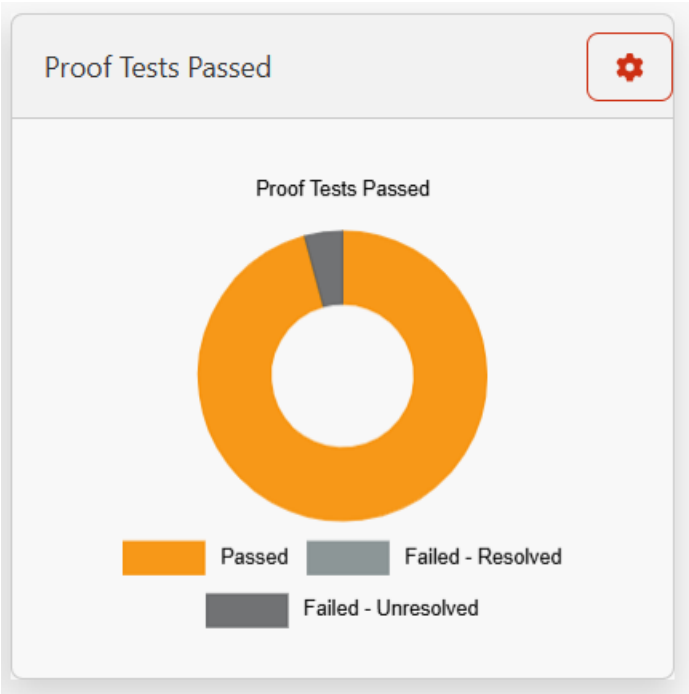
The widget settings include the following items.

Property	Description
Area Filters	Navigate through the hierarchy and select the Areas you wish view.
Procedures Type Filter	Choose between All, Procedure, or Proof Test.
Chart Title: Show Title	Select the toggle button to choose to show the chart title or not.
Chart Title: Title Position	Choose the Chart Title location. Options include Bottom, Top, Right and Left.
Chart Legend: Show Legend	Select the toggle button to choose to show the chart legend or not.
Chart Legend: Legend Position	Choose the Chart Legend location. Options include Bottom, Top, Right and Left.

In the widget, you can hover over sections of the pie chart to see the number of Procedures per category.

18.3.5 Procedures Completed Donut Chart

The Procedures Completed widget provides a donut chart showing the number of Procedures that passed vs. those that failed. The pass/fail criteria for Procedures are imported from the Proof Test Generation or entered by the user into the SILstat application.



The widget shows Procedures with data collected in your database for the Areas selected in the Area Filter. To adjust the Area Filter, select the gear icon on the top right-hand corner to open the widget settings. In the **Area Filters** section, navigate through the hierarchy and select the Areas you wish view. This will allow you to select up to 100 Areas.

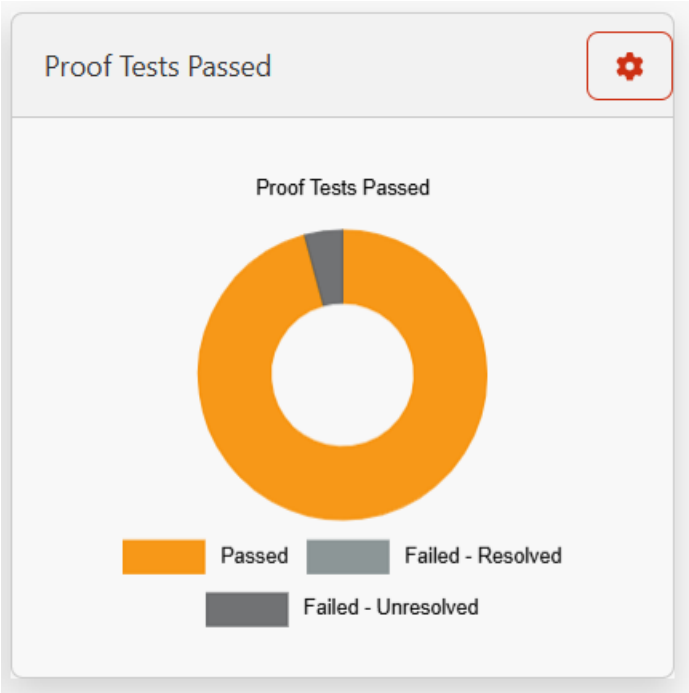
The widget settings include the following items.

Property	Description
Area Filters	Navigate through the hierarchy and select the Areas you wish view.
Procedures Type Filter	Choose between All, Proof Test, or Procedure.
Chart Title: Show Title	Select the toggle button to choose to show the chart title or not.
Chart Title: Title Position	Choose the Chart Title location. Options include Bottom, Top, Right and Left.
Chart Legend: Show Legend	Select the toggle button to choose to show the chart legend or not.
Chart Legend: Legend Position	Choose the Chart Legend location. Options include Bottom, Top, Right and Left.

In the widget, you can hover over sections of the pie chart to see the number of Procedures per category.

18.3.6 Proof Tests Passed Donut Chart

The Proof Tests Passed widget provides a donut chart showing the number of Proof Tests that passed vs. those that failed. The pass/fail criteria for Proof Tests are imported from the Proof Test Generation or entered by the user into the SILstat application.



The widget shows Proof Tests with data collected in your database for the Areas selected in the Area Filter. To adjust the Area Filter, select the gear icon on the top right-hand corner to open the widget settings. In the **Area Filters** section, navigate through the hierarchy and select the Areas you wish view. This will allow you to select up to 100 Areas.

The widget settings include the following items.

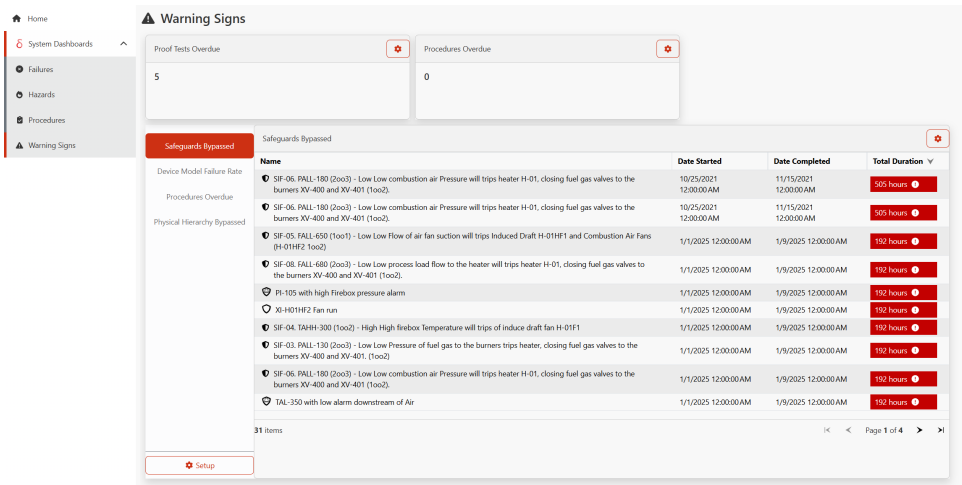
Property	Description
Area Filters	Navigate through the hierarchy and select the Areas you wish view.
Chart Title: Show Title	Select the toggle button to choose to show the chart title or not.
Chart Title: Title Position	Choose the Chart Title location. Options include Bottom, Top, Right and Left.
Chart Legend: Show Legend	Select the toggle button to choose to show the chart legend or not.
Chart Legend: Legend Position	Choose the Chart Legend location. Options include Bottom, Top, Right and Left.

In the widget, you can hover over sections of the pie chart to see the number of Procedures per category.

18.4 Warning Signs Dashboard

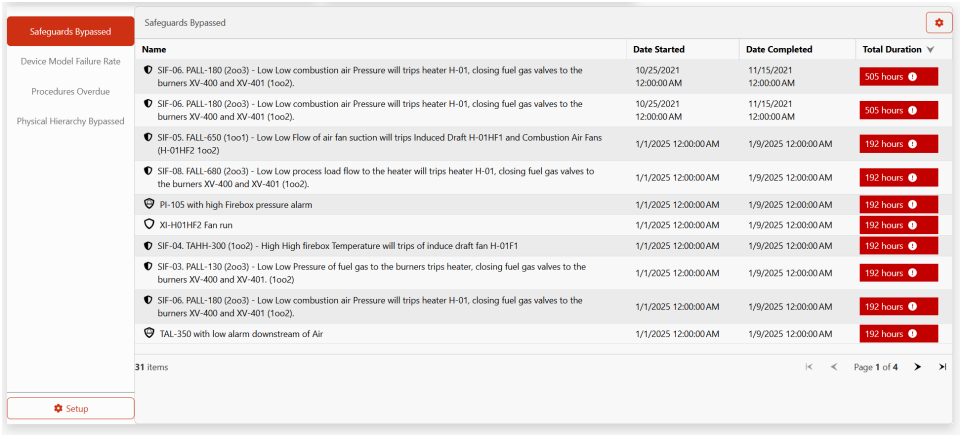
The SILstat Warning Signs Dashboard includes the following widgets:

- Safeguards Bypassed Grid
- Device Model Failure Rate Grid
- Procedures Overdue Grid
- Physical Hierarchy Bypassed Grid
- Procedures Overdue Count
- Proof Tests Overdue Count



18.4.1 Warning Signs Summary Grid

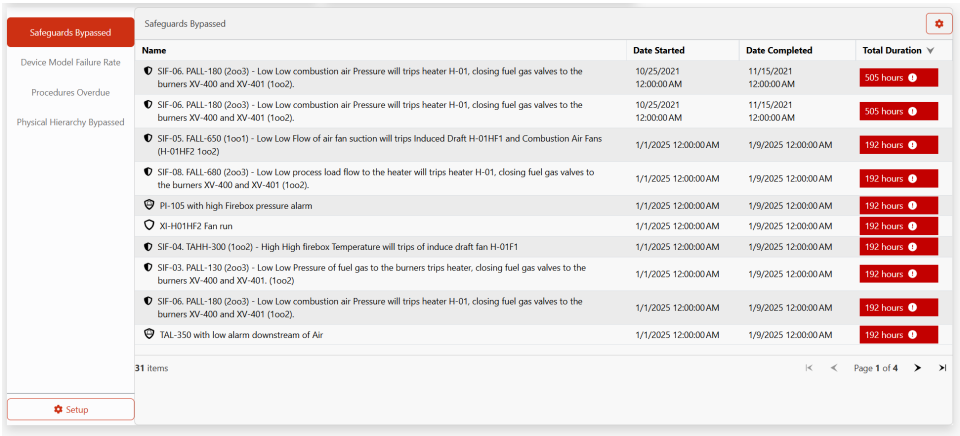
In the Warning Signs Dashboard, the Safeguards Bypassed, Device Model Failure Rate, Procedures Overdue, and Hazards Exceeding Analyzed Frequency, and Physical Hierarchy Bypassed grids are combined into a single widget. These display high-level data for bad actors based on events collected in your SILstat database.



On the left-side panel of the widget, you can choose to view the Safeguards Bypassed, Physical Hierarchy Bypassed, Device Model Failure Rate, Procedures Overdue, and Hazards Exceeding Assumed Frequency grids. To change the order in which they are listed, select the **Setup** button at the bottom of the left-side panel. This will allow you to change the order under **Edit List**.

18.4.2 Safeguards Bypassed Grid

The Safeguards Bypassed grid will show Safeguards with Bypass Events recorded in your database. This provides the ability for the user to indicate if a Safeguard has been on bypass too long.



The widget settings include the following items.

Property	Description
Grid Settings: Time Unit	Choose to display Bypass Duration in minutes, hours, days, or months.
Page Size	Choose the number of rows showing in the grid in a single page.

Property	Description
Conditional Formatting	This allows you to configure formatting for ranges of bypass duration to indicate, at a glance, how long the safeguard has been bypassed. You can choose the display color and indicate if a row should be highlighted, or an icon should show based on the bypass duration value.

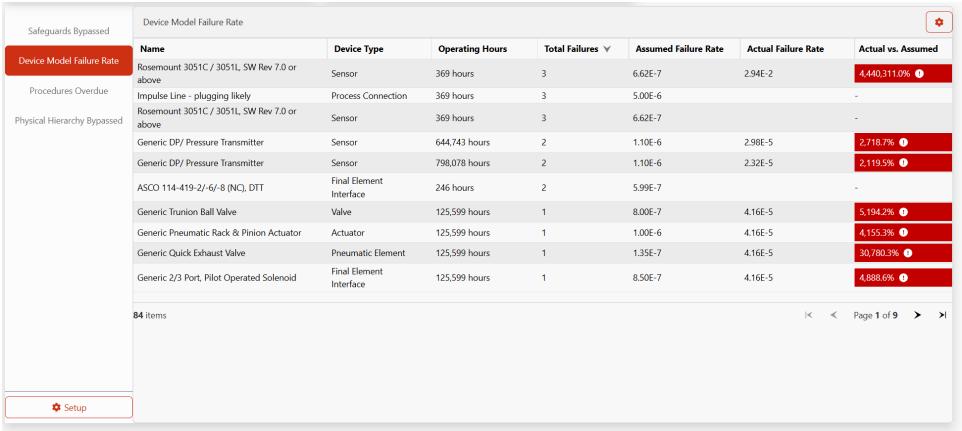
The Safeguards Bypassed Grid widget provides the following data.

Property	Description
Safeguard Name	This shows the name of the bypassed Safeguard.
Date Started	This shows the date and time the bypass started.
Date Completed	This shows the date and time the bypass ends.
Bypass Duration	This shows the total time on bypass to date, displaying the conditional formatting configured in the widget settings.

The bottom of the grid shows the number of items displayed in the widget, based on the Filters set in the widget settings. It also shows the page you are viewing out of the total number of pages. Arrow icons allow you to proceed to the next page of the grid or return to a previous page.

18.4.3 Device Model Failure Rate Grid

The Device Model Failure Rate grid will show Device Models with Failure Events recorded in your database. The widget displays high-level failure data based on events collected in your SILstat database and compare Actual Failure Rates calculated by SILstat to Assumed Failure Rates used in SIL Verification.



Name	Device Type	Operating Hours	Total Failures	Assumed Failure Rate	Actual Failure Rate	Actual vs. Assumed
Rosemount 3051C / 3051L, SW Rev 7.0 or above	Sensor	369 hours	3	6.62E-7	2.94E-2	4,440,311.0%
Impulse Line - plugging likely	Process Connection	369 hours	3	5.00E-6		-
Rosemount 3051C / 3051L, SW Rev 7.0 or above	Sensor	369 hours	3	6.62E-7		-
Generic DP/ Pressure Transmitter	Sensor	644,743 hours	2	1.10E-6	2.98E-5	2,718.7%
Generic DP/ Pressure Transmitter	Sensor	798,078 hours	2	1.10E-6	2.32E-5	2,119.5%
ASCO 114-419-2/-6/-8 (NC), DTT	Final Element Interface	246 hours	2	5.99E-7		-
Generic Trunion Ball Valve	Valve	125,599 hours	1	8.00E-7	4.16E-5	5,194.2%
Generic Pneumatic Rack & Pinion Actuator	Actuator	125,599 hours	1	1.00E-6	4.16E-5	4,155.3%
Generic Quick Exhaust Valve	Pneumatic Element	125,599 hours	1	1.35E-7	4.16E-5	30,780.3%
Generic 2/3 Port, Pilot Operated Solenoid	Final Element Interface	125,599 hours	1	8.50E-7	4.16E-5	4,888.6%

The widget settings include the following items.

Property	Description
Failure Rate Unit	Choose how failure rates are displayed from the drop-down. Options include Failures per Hour, Failures per Year, and FITs (Failure in Billions Hours)
Conditional Formatting	This allows you to configure formatting for ranges Actual vs. Assumed Failure Rates to indicate, at a glance, which may be bad actors. You can choose the display color and indicate if a row should be highlighted, or an icon should show based on the Actual vs. Assumed Failure Rates value.
Column Visibility	Use the toggle button next to each column header to choose which columns are shown in the grid.

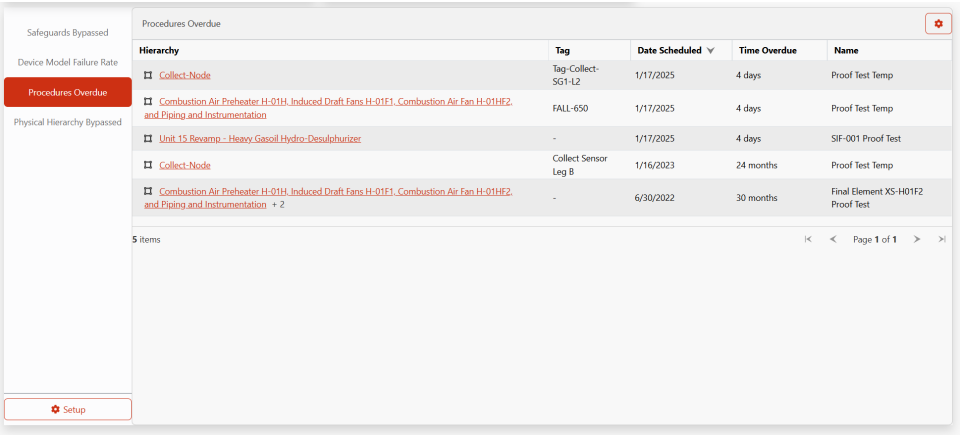
The Device Model Failure Rate Grid widget provides the following data.

Property	Description
Name	This displays the Device Name.
Device Type	This displays the Device Type Name.
Operating Hours	This shows the total number of Operating hours associated with the Device Model in the database.
Total Failures	This shows the total number of Failures for Devices associated with the Device Model in the database.
Assumed Failure Rate	This displays the Device Model's Assumed Failure Rate used in SIL Verification. This is imported into the database or entered directly by the user.
Actual Failure Rate	This shows the Device Model's Actual Failure Rate calculated by SILstat based on the Failure Events collected in the database.
Actual vs. Assumed Failure Rate	This shows the difference between the Actual and Assumed Failure Rates, displaying the conditional formatting configured in the widget settings.

The bottom of the grid shows the number of items displayed in the widget, based on the Filters set in the widget settings. It also shows the page you are viewing out of the total number of pages. Arrow icons allow you to proceed to the next page of the grid or return to a previous page.

18.4.4 Procedures Overdue Grid

The Procedures Overdue Grid shows Procedures in your database that have not been completed by the due date.



The widget shows Procedures in your database for the Areas selected in the Area Filter. To adjust the Area Filter, select the gear icon on the top right-hand corner to open the widget settings. In the **Area Filters** section, navigate through the hierarchy and select the Areas you wish view. This will allow you to select up to 100 Areas.

The widget settings include the following items.

Property	Description
Area Filters	Navigate through the hierarchy and select the Areas you wish view.
Time Unit	Choose time unit for Time Overdue from the drop-down. Choose between seconds , days, weeks, months, and years.
Page Size	Adjust the number of items that display per page.
Procedures Type Filter	Choose between All, Proof Test, or Procedure.
Column Visibility	Use the toggle button next to each column header to choose which columns are shown in the grid.

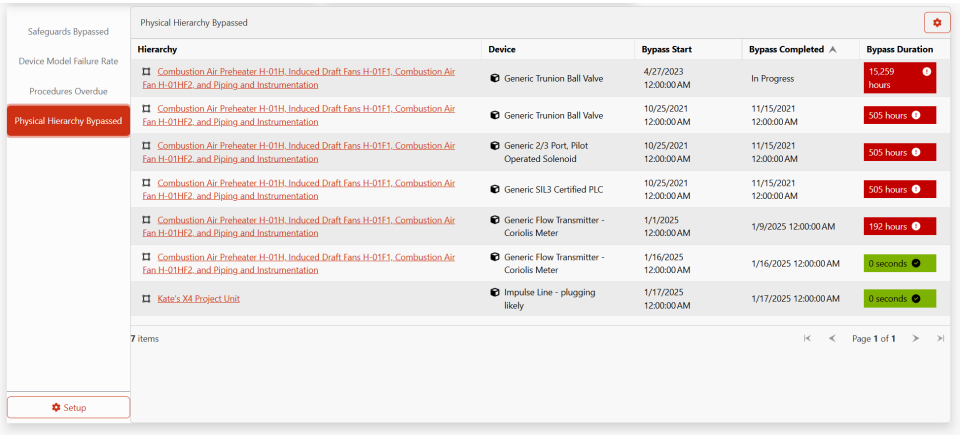
The Procedures Overdue Grid widget provides the following data.

Property	Description
Hierarchy	This shows all parents of the Procedure selected, as configured in the SILstat database.
Tag	This shows the Tag associated with the Procedure. This will list the tag to which the Procedure was directly assigned.
Date Scheduled	This shows the Procedure's due date.
Time Overdue	This shows the amount of time passed since the Procedure due date.
Names	This shows the Procedure Name.

The bottom of the grid shows the number of items displayed in the widget, based on the Filters set in the widget settings. It also shows the page you are viewing out of the total number of pages. Arrow icons allow you to proceed to the next page of the grid or return to a previous page.

18.4.5 Physical Hierarchy Bypassed Grid

The Physical Hierarchy Bypassed grid will show Areas with Bypass Events recorded in your database. This provides the ability for the user to indicate if an Area has been on bypass too long.



The widget shows Areas with Bypass Events Recorded in your database for the Areas selected in the Area Filter. To adjust the Area Filter, select the gear icon on the top right-hand corner to open the widget settings. In the **Area Filters** section, navigate through the hierarchy and select the Areas you wish view. This will allow you to select up to 100 Areas.

The widget settings include the following items.

Property	Description
Area Filters	Navigate through the hierarchy and select the Areas you wish view.
Grid Settings: Time Unit	Choose to display Bypass Duration in minutes, hours, days, or months.
Page Size	Adjust the number of items that display per page.
Conditional Formatting	This allows you to configure formatting for ranges of bypass duration to indicate, at a glance, how long the safeguard has been bypassed. You can choose the display color and indicate if a row should be highlighted, or an icon should show based on the bypass duration value.
Column Visibility	Use the toggle button next to each column header to choose which columns are shown in the grid.

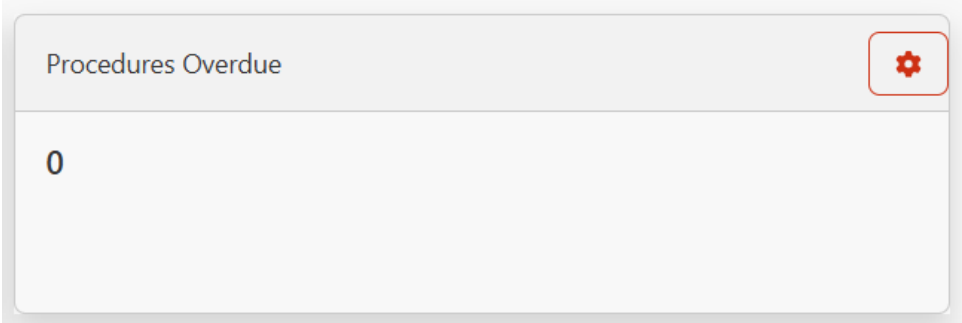
The Physical Hierarchy Bypassed Grid widget provides the following data.

Property	Description
Hierarchy	This shows all parents of the Area bypassed, as configured in the SILstat database.
Device	This shows devices associated with the Area bypassed.
Date Started	This shows the date and time the bypass started.
Date Completed	This shows the date and time the bypass ends.
Bypass Duration	This shows the total time on bypass to date, displaying the conditional formatting configured in the widget settings.

The bottom of the grid shows the number of items displayed in the widget, based on the Filters set in the widget settings. It also shows the page you are viewing out of the total number of pages. Arrow icons allow you to proceed to the next page of the grid or return to a previous page.

18.4.6 Procedures Overdue Count

This widget shows the number or percentage of Procedures Overdue in your database for the Areas selected in the Area Filter.



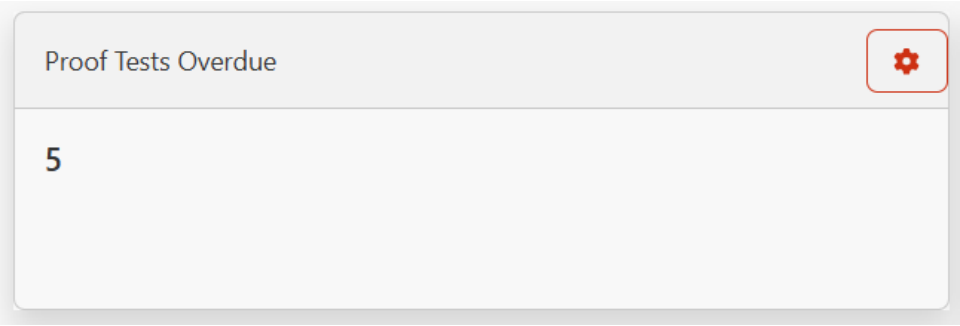
To adjust the Area Filter, select the gear icon on the top right-hand corner to open the widget settings. In the **Area Filters** section, navigate through the hierarchy and select the Areas you wish view. This will allow you to select up to 100 Areas.

The widget settings include the following items.

Property	Description
Area Filters	Navigate through the hierarchy and select the Areas you wish view.
Procedures Type Filter	Choose between All, Proof Test, or Procedure.
Display as Percentage	Use the toggle button to indicate if you would like to view the percentage of overdue procedures instead of the total number of overdue procedures.

18.4.7 Proof Tests Overdue Count

This widget shows the number or percentage of Proof Tests Overdue in your database for the Areas selected in the Area Filter.



To adjust the Area Filter, select the gear icon on the top right-hand corner to open the widget settings. In the **Area Filters** section, navigate through the hierarchy and select the Areas you wish view. This will allow you to select up to 100 Areas.

The widget settings include the following items.

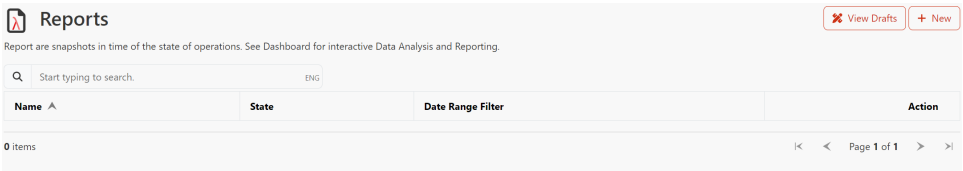
Property	Description
Area Filters	Navigate through the hierarchy and select the Areas you wish view.
Procedures Type Filter	Choose between All, Proof Test, or Procedure.
Display as Percentage	Use the toggle button to indicate if you would like to view the percentage of overdue proof tests instead of the total number of overdue proof tests.

Chapter 19 Reports

SILstat's Reports contextualize data collected in the SILstat application. Each Report provides a detailed look at critical safety metrics. These can help users keep up with critical safety tasks, identify any bad actors in the safety instrumented system, and validate assumptions made earlier in the safety lifecycle.

The following Reports are available through SILstat.

- Procedures Due



To navigate to your Reports, select **Reports** on the left side panel. A grid shows the following properties for each report.

- Name
- State
- Date Range
- Action

To create a New report, select the **New** button on the top-right hand corner of the reports view. This will open the Reports view. To View or Edit a Report, select the **Edit** button in the Action column.

You can input the following properties for your report.

Property	Description
Type	Select the Report type from drop down.
Name	This can be entered as text.
Description	This can be entered as text.

You can input the following properties in the Options section.

Property	Description
Date Range Filter Start	Select the start date of the data filter through the calendar button.
Date Range Filter End	Select the start date of the data filter through the calendar button.
Select Areas	Press the 'Add' button to select the Areas the report will be filtered to.

To create the Report, select the **Confirm** button in the top-right hand corner. Reports that are not created will be saved as a draft.

To delete the item, select the **Delete** button in the top right-hand corner. After deleting the item, it becomes a *soft delete*. A *soft delete* means the item can be recovered with the help of exida for a period of 180 days. After that period is over, the item will become permanently deleted.

Part 6

Miscellaneous

Abbreviations

BPCS	Basic Process Control System
CM	Conditional Modifier
DCS	Distributed Control System
DTT	De-energize To Trip
EC	Enabling Condition
ESD	Emergency Shutdown
ETT	Energize To Trip
FAT	Factory Acceptance Test
FSA	Functional Safety Assessment
FSM	Functional Safety Management
H&RA	Hazard and Risk Assessment
HFT	Hardware Fault Tolerance
IE	Initiating Event
IPL	Independent Protection Layer
LOPA	Layer of Protection Analysis
MOC	Management Of Change
MRT	Mean Repair Time
MTTFS	Mean Time To Fail Spurious
MTTR	Mean Time To Restoration
PFD	Probability of Failure on Demand
PFD_{AVG}	Average Probability of Failure on Demand
PFH	Probability of a Dangerous Failure per Hour
PHA	Process Hazard Analysis
PIU	Proven In Use / Prior Use
PTI	Proof Test Interval
RRF	Risk Reduction Factor
SAT	Site Acceptance Test
SERH	Safety Equipment Reliability Handbook
SFF	Safe Failure Fraction
SIF	Safety Instrumented Function
SIL	Safety Integrity Level
SIS	Safety Instrumented System
SLC	Safety Lifecycle
SRS	Safety Requirements Specification
SSI	Site Safety Index
UOM	Unit Of Measure
DD	Dangerous Detected
DU	Dangerous Undetected
SD	Safe Detected

SU	Safe Undetected
AD	Annunciation Detected
AU	Annunciation Undetected
NE	No Effect

Terms and Definitions

Basic Process Control System	System that responds to input signals from the process, its associated equipment, other programmable systems and/or an operator and generates output signals causing the process and its associated equipment to operate in the desired manner but that does not perform any safety instrumented functions with a claimed SIL greater than or equal to 1.
Conditional Modifier	One of several possible probabilities included in scenario risk calculations when risk criteria endpoints are expressed in impact terms (e.g., fatalities) instead of in primary loss event terms (e.g., release, vessel rupture).
Consequence	The undesirable result of an incident, usually measured in health and safety effects, environmental impacts, loss of property, and business interruption costs.
Enabling Condition	A condition that makes possible the initiating event or initiating cause of a scenario. An enabling condition is neither a failure nor a protection layer. It consists of an operation or condition that does not directly cause the scenario, but that must be present or active in order for the scenario to proceed to a loss event.
Event	An occurrence involving a process that is caused by equipment performance or human action or by an occurrence external to the process. Events include initiating events, loss events and success or failure of safeguards.
Failure Modes	
Fail Low	Failure that will result in an output current that is lower than 4mA or under range per NAMUR recommendation 43.
Fail High	Failure that will result in an output current that is higher than 20mA or over range per NAMUR recommendation 43.
Fail Detected	Failure that is detected by internal diagnostics whose external effect depends on equipment item settings. In a transmitter, for example, a detected failure could result in over range or under range output depending on a jumper setting.
Fail Dangerous Detected	Failure that is dangerous and that is detected by internal diagnostics or by a connected safety logic solver. A dangerous failure is defined as a failure that does not respond to a demand from the process (i.e. being unable to go to the defined fail-safe state).
Fail Dangerous Undetected	Failure that is dangerous and that is not diagnosed by internal diagnostics or by a connected safety logic solver. A dangerous failure is defined as a failure that does not respond to a demand from the process (i.e. being unable to go to the defined fail-safe state).
Fail Safe Detected	Failure that leads to a safe state and that is detected by internal diagnostics or by a connected safety logic solver. A safe failure is defined as a failure that results in the presentation of the selected fail-safe input or output condition without a demand from the process.

Fail Safe Undetected	Failure that leads to a safe state and that is not detected by internal diagnostics or by a connected safety logic solver. A safe failure is defined as a failure that results in the presentation of the selected fail-safe input or output condition without a demand from the process.
Fail Annunciation Detected	Failure that leads to a false diagnostic alarm annunciation. An annunciation failure is defined as a failure that has no effect on the safety function but does affect the ability to detect future faults, for example, a failure of an internal diagnostic function of an equipment item.
Fail Annunciation Undetected	Failure that leads to the inability to annunciate future failures. An annunciation failure is defined as a failure that has no effect on the safety function but does affect the ability to detect future faults, for example, a failure of an internal diagnostic function of an equipment item.
Fail No Effect	Failure of a component that is part of the safety critical circuit that has no impact on the successful execution of the safety function.
Hardware Fault Tolerance	The number of dangerous random failures tolerated by a system while still maintaining the ability to successfully perform the safety function.
Hazard Scenario	Scenario that consists of one or more sequence of events that results in a final consequence of concern. Each Hazard Scenario consists of at least one cause - consequence pair.
Independent Protection Layer	A device, system, or action that is capable of preventing a scenario from proceeding to the undesired consequence regardless of the initiating event or the action of any other protection layer associated with the scenario.
Initiating Event	The event that initiates the scenario leading to the undesired consequence.
Layer of Protection Analysis	An approach that analyzes incident scenario(s) (cause-consequence pair(s)) using values for the initiating event frequencies, enabling conditions, independent protection layer failure probabilities, and conditional modifiers as applicable in order to compare a Hazard Scenario risk estimate to risk criteria to determine if additional risk reduction or more detailed analysis is needed. Scenarios are identified elsewhere, typically using a scenario based hazard evaluation procedure such as a HAZOP Study.
Mean Repair Time	The expected overall repair time of equipment items in case of a detected failure.
Mean Time To Restoration	The expected time to achieve complete restoration. The mean time to restore encompasses, the time to detect the failure, the time spent before starting the repair, the effective time to repair (the MRT), and the time before the component is put back into operation.
Mission Time	The time period that a SIF is expected to be operational. Typically this period corresponds to the interval when all devices are either replaced or refurbished to “as new condition”. It should not be confused with the proof test interval.

Probability of Failure on Demand	The probability that a system or other protective measure will fail to perform a specified function on demand. PFD is expressed as a dimensionless number ranging from zero to one.
Process Hazard Analysis	A hazard evaluation of broad scope that identifies and analyzes the significance of hazardous situations associated with a process or activity.
Proven In Use / Prior Use	A Proven In Use assessment is a study of product operational hours, revision history, fault reporting system, and field failures to determine if there is evidence of systematic design faults in a product. The IEC 61508 standard provides levels of operational history required for each SIL level.
Risk Reduction Factor (RRF)	The ratio of unmitigated risk divided by mitigated risk. It is used to express the required risk reduction to achieve tolerable risk as well as to express the achieved risk reduction by an implemented safeguard or protection strategy.
Safety	Freedom from unacceptable risk.
Safety Integrity Level	Discrete level (one out of a possible four) for specifying the safety integrity requirements of the safety functions to be allocated to the electronic / programmable electronic safety-related systems, where safety integrity level 4 has the highest level of safety integrity and safety integrity level 1 has the lowest [IEC 61508-4].
Systematic Capability	Indication of systematic failure protection for an equipment item. Per IEC 61511 users of existing hardware either need to select hardware that is developed and assessed per IEC 61508 or justify the use of that hardware. The objective of the assessment or justification is to identify that there are “no” systematic problems with the equipment item under consideration. Systematic failure protection is part of IEC 61508 compliant development processes, alternatively sufficient recorded experience can also be used to identify that there is no known systematic problem.
Useful Life	That portion of life when the failure rate can be described by the exponential distribution, i.e. constant failure rate. The useful life follows infant mortality or burn-in and precedes the wear-out portions of the overall life. For functional safety applications, devices are expected to be replaced at the end of their useful life.

Disclaimer and Assumptions

Limitations and assumptions associated with the use of SILstat™ are documented in the following sections.

Disclaimer

The user of the exSILentia® SILstat™ software is responsible to ensure that all data is entered correctly into the SILstat™ database. Calculations are performed per guidelines in applicable international standards and common methods described in subject matter literature. *exida Innovation LLC* accepts no responsibility for the correctness of the regulations, standards, or literature on which the software tool is based.

In particular, *exida Innovation LLC* accepts no liability for decisions based on the results of the exSILentia® SILstat™ software. The *exida Innovation LLC* guarantee is restricted to the correction of errors or deficiencies within a reasonable period when such errors or deficiencies are brought to the attention of *exida Innovation LLC* in writing. *exida Innovation LLC* accepts no responsibility for adjustments made by the user to any reports and exports automatically generated by the exSILentia® SILstat™ software.

Assumptions exida SERH Database

exida has compiled a proprietary equipment failure database. This database is a compilation of failure data collected from detailed predictive analysis performed through Failure Modes, Effects, and Diagnostics Analysis (FMEDA) for specific manufacturer specific products and a variety of public and confidential sources. The failure rate data presents an average worst-case estimate of failure rates to be expected during normal operation of a particular equipment item. The database is published as the "Safety Equipment Reliability Handbook, fourth edition" ISBN 978-1-934977-15-6. The reliability data collection process is described in the SERH book.

The user is responsible for determining the applicability of the failure data to any particular environment. The stress levels assumed to determine the equipment failure rate are average worst-case for an industrial environment and are documented in the SERH book. Accurate plant specific data is preferable to general industry average data. Industrial plant sites with high levels of stress must use failure rate data that is adjusted to a higher value to account for the specific conditions of the plant.

Assumptions SILstat™

To correctly calculate actual performance-based parameters, it is essential that all data is entered correctly and completely into the SILstat™ database.

When determining failure rates, SILstat™ assumes that 1) all failure records are assigned to a device, 2) all devices are assigned to a device model, and 3) all device models are assigned to a device type. Failure to assign failure records, device, or device models will yield optimistic results.

When determining event frequencies, SILstat™ assumes that 1) all events are recorded and 2) all events are assigned to a hazard scenario. Failure to assign event records or hazard scenarios will yield optimistic results.

When determining demand rates and probability of failures, SILstat™ assumes that 1) all events are recorded, 2) all events are assigned to a hazard scenario, and 3) all corrective actions are adequately documented. Failure to assign event records, hazard scenarios, or corrective actions will yield optimistic results.

When providing a list of procedures due or procedures overdue, SILstat™ assumes that the status of all procedures is kept up to date within the SILstat™ database.

Open Source Disclosure

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