Import Utility

Overview

The Import utility enables you to import data from most common database formats into a selected table or module in the SmartPlant Instrumentation database. The Import utility also provides you access to database platforms other than your own (Oracle, SQL Server, or Sybase Adaptive Server Anywhere).

To import data, you need to have some knowledge of the SmartPlant Instrumentation database structure and concepts such as naming conventions. You should also know how to connect to the source and target databases (for example, correct ODBC profile, or native connection to the database). To learn more about the SmartPlant Instrumentation database structure, see Data Import Order.

The Import utility is essential because inserting data into SmartPlant Instrumentation is not a trivial matter. Since the SmartPlant Instrumentation table structure is relational, there is a constant maintenance of integrity constraints. You have to keep the relation between the tables and create unique values in the primary key. You therefore have to insert data into SmartPlant Instrumentation only through the SmartPlant Instrumentation interface or by using the Import utility.

You can find the following information in the help topics that follow:

- the database platforms supported by the Import utility.
- working with log files.
- building new links.
- executing an existing link.
- moving links from one domain to another.
- setting the import comparison criteria.
- maintaining the source and target rows.
- selecting and applying system codes.

Caution

- We recommend proceeding cautiously with the import process, as some of the Import utility features change the structure and contents of the target database.

Database Platform Support

The Import utility provides you with inherent support of the following database platforms and database file formats:

- Oracle (only if you have select Oracle as your current database platform during Setup)
- SQL Server (only if you have select SQL Server as your current database platform during Setup)
- Sybase Adaptive Server Anywhere (only if you have select Sybase Adaptive Server Anywhere as your current database platform during Setup)
- Microsoft Access
- DBF
- ASCII delimited files
- Excel worksheets
- Text files

The above databases are available to you as files in a folder (for example, DBF, Text files) or as structured tables (for example, Excel, Microsoft Access).

The configuration of the above database platforms is done automatically during the setup process. (See Installation Guide to learn more about the setup process.)

Note

- To install drivers and profiles of ODBC platforms other than those listed above, you need to install the appropriate software, for example, Excel 7 or later, Microsoft Access, and so forth.

You can import data from a database platform (for example, Oracle, SQL Server or Sybase Adaptive Server Anywhere) other than your current SmartPlant Instrumentation database platform. To do this you will have to comply with the appropriate system requirements of the external database platform.

For example:

If your current SmartPlant Instrumentation database platform is Sybase Adaptive Server Anywhere and you want to import data from an Oracle database, you must have Oracle client installed and running in your computer.

You can also import from database platforms other than those specified above. To do this you need to provide drivers and modify the appropriate configuration files.

SmartPlant Instrumentation provides you with examples of DBF files which are installed to the Import folder during setup. (See Installation Guide, Installing SmartPlant Instrumentation on Oracle, Installing SmartPlant Instrumentation on Microsoft SQL Server, or Installing SmartPlant Instrumentation Stand-Alone for Sybase, Running SmartPlant Instrumentation Setup to learn more about the setup process.) You can use these example files to learn how to import DBF files.

Import Prerequisites

Before importing data into SmartPlant Instrumentation, the following conditions must be met:

- There must be a target SmartPlant Instrumentation domain containing at least one plant hierarchy item at the lowest level of the hierarchy (by default, this is a unit).
- There must be a naming convention (both loop and component) for each <unit>. This is necessary only if you intend to work with tables whose fields which require naming conventions (for example, COMPONENT, LOOP).
- The plant's custom fields must be declared if a custom field is targeted. This is necessary only if you intend to work with tables whose fields which require naming conventions (for example, COMPONENT, LOOP).

Before you start importing data we recommend that you check and update the instrument type table (from the SmartPlant Instrumentation interface) where you declare all your instrument types with their profiles, the default device panel with its default cable and the landing type between them (see Instrument Index Module, Supporting Properties Tables), and the default spec form.

Preparing the profile in advance will enable you to build a device panel automatically and/or a spec when entering a tag.

Data Import Process

The data import process involves creating links that map between the source and the target object (module or table). After defining the links, you perform the actions that import the data into SmartPlant Instrumentation. The process is described in outline as follows:

1. Select the type of target (module or table) for import.

2. Select the required target SmartPlant Instrumentation table / module for the import. When importing data to tables, the order of the import is important. You should first import data into a table that the next table refers to (for example, before importing data into **component** table you should import data into **component_location** table, if appropriate (for a full description of relationships between the data tables, see Data Import Order).

3. Set the import parameters. This includes:

   - selecting specific source rows.
   - specifying a filtering condition.
   - reviewing and modifying the table definition.
   - defining a source consisting of more than one table or file.

4. Establish a link between the source and the target data. You can:

   - use an existing link that was saved previously
   - build a new link and save it (see step 5).

5. To build a new link, do the following:

   a) Set the appropriate parameters for the import.

   b) Where appropriate, define the structure of the import link.

   c) Define the link mapping between the source and the target table fields.

6. Run an import test or perform the import process.

   The results of running a test provide you with information about the expected outcome of the actual import process.

Notes

- You can modify the source definition after creating the link to insure that all required data exists in your source database. Use the SmartPlant Instrumentation Data Dictionary to help you identify target SmartPlant Instrumentation tables.
- You can run import links in batch mode from the command line. For details, including the appropriate parameters, see Link Groups and Running an Import Session Using Command-Line Parameters.
- If required, you can reset the import order as well as select the reference tables to import. (See Setting the Import Comparison Criteria and Working with Reference Tables to learn how to control the import order.)

The Import utility also allows you to:

- Map source codes and units of measure (see System Codes Table and Unit of Measure Codes Table).
- Move links between databases or domains (see Moving Links between Databases or Domains).
- Rename links.
- Delete links.
- Associate your links with other links and group them together for a batch operation.
- Associate multiple sources for use as a single source.
- Define links using arithmetic functions (see Using Formulas and Arithmetic Functions in Import Links).
- Expand the source data by associating the selected source data with additional data.
- Coordinate the rows to be updated, inserted, or deleted.
- Set the import comparison criteria (for import to tables only): this enables comparison between source and target data, filtering of rows for import, or deleting rows in the target.

Matching Naming Conventions

In general, the predefined import links apply to all naming convention standards (for example, ISA, Loop, and so forth). The only thing that changes from one domain to another is its naming convention. Therefore, it is very important to adjust the links so that they match the naming conventions used in the domain into which you are about to import.

For example, the SmartPlant Instrumentation demonstration domain (**IN_DEMO**) uses the ISA naming conventions standard which exhibits the following tag structure:

108-AAAA-BBBB

where the prefix is the <unit> number (108), AAAA represents the instrument type and BBBB represents the tag number (the hyphens are part of the naming convention). Therefore, a block tag with tag number **108FE22212** should be represented in the demonstration domain as:

108-FE -2212

Before starting the import setup process, you need to pay attention to the source columns that construct the source tag and loop and how they match the SmartPlant Instrumentation tag and loop data. SmartPlant Instrumentation uses two naming convention categories: Component (Tag) and Loop.

When you select an import link that is associated with either tags or loops, you will be prompted to define the naming convention structure.

Caution

- When redefining the naming convention structure, make sure that no data redundancy is created (for example, duplicate tags or loops). Such a redundancy may be caused, for example, if the source fields use data segments that are shorter than those used in the target fields.

  For example, the 108PS2212 source tag uses only a two character field for the instrument type. In SmartPlant Instrumentation, this tag will appear as: 108-PS -2212. This situation may cause data redundancy, since this tag can stand for either 108-PSH -2212 or 108-PSL-2212.

Starting the Import Utility

You can start an import session in one of two ways:

- By selecting the Import utility from the **SmartPlant Instrumentation** program group in the Windows **Start** menu.
- By running an import session using a command-line (see Running an Import Session Using Command-Line Parameters).

Note

- The Import utility is automatically installed when selected during SmartPlant Instrumentation setup.
- However, if the Import utility was not installed in your computer, you can install it by running the SmartPlant Instrumentation setup and selecting to install the Import utility (see Installation Guide to learn how to install SmartPlant Instrumentation.)

Caution

- You must have Domain Administrator access rights to be able to perform import activities.

Running an Import Session Using Command-Line Parameters

You can use command-line parameters to start an import session that will execute an existing import link. This way you can import data using the settings in the selected link without having to utilize the Import utility.

➢ To start a command-line import session

1. On the Windows **Start** menu, click **Run**.
2. In the **Run** dialog box, type the following parameters (on one line):

```
[home folder]\import [username],[password],[Domain name],
[<plant> name], intermediate plant hierarchy item 1
[/intermediate plant hierarchy item 2][/intermediate plant
hierarchy item 3]...,[<unit> name],[link name] - or - @[group
name],[Project name]
```

Note

- Plant hierarchy item names into which you intend to import data may not contain '/' characters because the software interprets these characters as separators between successive hierarchy levels.

The phrases in brackets stand for the following parameters:

- **[home folder]** - the folder where you installed SmartPlant Instrumentation.
- **[username]**, **[password]** - the Domain Administrator's username and password.
- **[Domain name]** - the target domain.
- **[<plant> name]** - the plant or equivalent highest level item in the plant hierarchy.
- **[intermediate plant hierarchy item 1][/ intermediate plant hierarchy item 2][/ intermediate plant hierarchy item 3]… -** when you want to import source data from multiple plant hierarchies into the target plant hierarchy and the intermediate plant hierarchy has two or more levels, use the character defined in the Administration module as the plant hierarchy separator for the domain, for example, '/'. (If no separator is defined in the Administration module, use '/'as the default.)
- **[<unit> name]** - the unit or equivalent lowest level item in the plant hierarchy.
- **[link name]** - the name of the import link you want to execute in the current import session.

- **[group name]** - the name of the group whose links you want to execute in the current import session. When used, this parameter is always preceded by a commercial 'at' sign ('**@**').

- **[Project name]** - the target project when working in an Operating owner domain.

Examples

The following are two examples of using the command-line syntax:

a) Importing data to the demonstration domain by executing a link named Flow in an Operating owner domain (the following statement should be typed on one line):

```
import DBA,DBA,Demo Domain,Plant 1 - DEMO,Main
Building/North/Room 1,Unit 3,Flow,Demo Project
```

b) Importing data to the demonstration domain by executing all the links in a group named 'Process Data' in an EPC domain (the following statement should be typed on one line):

```
import DBA,DBA,Demo Domain,Plant 1 - DEMO,Main
Building/North/Room 1,Unit 3,@ Process Data
```

3. Press **Enter**.

   You see the links that you specified in the statement being carried out.

Running an Import Session from the User Interface

Use this procedure to run an Import session from the user-interface. This can also be performed using command line parameters described in the previous topic.

➢ To start the Import user interface

1. Select the **Import** application from the **SmartPlant Instrumentation** program group in the Windows **Start** menu.

2. In the **Login** dialog box, type the Domain Administrator name and password.

3. In the **Open** dialog box, drill down to select the target <unit> into which you will import data.

   Note

   - Whenever you start the Import utility, you are prompted to select a target <unit>. For some data it is inapplicable to be associated to a particular plant hierarchy item, however, you must always select a <unit> to import data into.

4. In the **Domain Name** data field, select the **target** domain, for example, the domain to which data will be imported.

5. In the data window, double-click the icons for the appropriate plant hierarchy items to expand them and select the required target **<unit>**.

6. Click **OK** to open the Import utility **Link Explorer**.

Log File Options

Overview

A log file allows you to keep track of all your import operations. Log files carry all the information about your import activities. When you first start the Import utility, you will create your first log file. It will keep growing as you continue importing data unless you decide to change the current log file. The information in the log file is organized in an ascending chronological order. This information includes:

- The domain details.
- The source and target details (the source table/file name; the target table/module name).
- Rejected data rows details (if there are any).
- The import results (the number of total rows, inserted, updated, and rejected rows).

Note

- You can perform the import process without a log file but it is not advisable, as you will not have a record of the import execution. If you start the Import utility with no log file defined, you will get a message after you select the target <unit> in the **Open** dialog box.

You can create a new log file, open an existing log file, delete a log file, view a log file, check the name of the current log file, or close the current log file.

Creating a New Log File

It is advisable to create a new log file each time you perform an important import operation. You should also create a new log file if your existing log file has become too long.

➢ To create a new log file

1. On the **Log File** menu, click **New**.
2. In the **New Log File** dialog box, type the name of your new log file, select the required path and click **OK**.

   The Import utility opens a new (empty) log file automatically (even though you do not see it).

Opening an Existing Log File

It is advisable to open a log file before you perform an import procedure so that you have a record of the import process.

➢ To open an existing log file

1. On the **Log File** menu, click **Open**.
2. In the **Open Log File** dialog box, select the name of the log file you want to open and click **OK**.

Note

- After you create a new log file or open an existing one, it stays open even though you do not see it displayed. The log file will remain active until you close the Import utility. (See Closing the Current Log File to learn how to close the current log file manually.) When you exit the Import utility, the Log File closes automatically and reopens when you restart the Import utility.

Viewing a Log File

You can view the current log file to review the previous import process information. You can also view any other existing log file.

➢ To view the current log file

- Do one of the following:
  - Click  .
  - On the **Log File** menu, click **View**.

  The **current** log file is opened for viewing by Notepad.

Note

- SmartPlant Instrumentation uses Notepad to view the log file. However, Notepad is limited by file size that it can handle. If your log file becomes too large for Notepad, you will get an appropriate message. In this case you can view your log file using Windows Write or another appropriate utility.

Checking the Name of the Current Log File

You can check which log file is currently in use.

➢ **To check the name of the current log file**

- On the **Log File** menu, click **Log File Name**.

  The Import utility shows you a message where it states the path and filename of your current log file.

Closing the Current Log File

You can also import data without a log file. If you choose to do this and there is a current log file, you can close it.

➢ **To close the current log file**

- On the **Log File** menu, click **Close**.

  The Import utility immediately closes the current log file. After you close the current log file you need to define a new log file to resume tracking the import process (see Creating a New Log File to learn how to define a new log file).

Deleting an Existing Log File

You can delete a log file when the information in it becomes unimportant.

Caution

- **This action will delete the selected log file from your hard disk.**

➢ **To delete an existing log file**

1. On the **Log File** menu, click **Delete**.
2. In the **Open Log File Name** dialog box, select the name of the log file you want to delete and click **OK**.

   The specified log file is deleted from your hard disk.

Logging the Import Parameters

You can log the import parameters which you use in the current import process. See Setting the Properties for a Link to learn how to do this.

➢ To log the import parameters

- On the **Log File** menu, click **Show Link Parameters** (repeat this step to deselect this option).

  The menu item you selected is checked.

After you run the import process, a section named Link Parameters is added in the current log file, where you see the import parameters used in this import process.

Working with Links

New Link Creation Overview

Before the actual import can take place, you must have a link between the source and the target data. If you do not have a previously saved link or you do not want to use an existing link, you will need to build a new one.

The first step in building a new link is to define the source and the target data. You do this by selecting the source and target database platform and the source and target data. The source / target database platforms that you can select depend on the database platform on which you installed SmartPlant Instrumentation (for example, Oracle, SQL Server, Sybase Adaptive Server Anywhere), and the database platform which is supported by your Windows environment.

Creating a New Link for the ODBC Platform

This section describes the setup for the ODBC platform

➢ **To create a new link (ODBC) with a database as the source data**

1. Do one of the following:
   - On the **Actions** menu, click **New Group** (or click ) to create a new link group.
   - In the link list, select an existing link group.
2. Do one of the following:
   - Click  .
   - On the **Actions** menu, click **New Link**.
3. In the **Import Link Source and Target Definitions** dialog box, under **Target**, click **Table** or **Module** and select the appropriate target table or module from the list.

    **Caution**

   - You can import data only into a target table which has a table definition (for example, a table which has a correct definition of a **Primary Value**, **Foreign Keys** and **Reference Tables**). If you import data into a target module, **all** the tables in the target module must have a table definition.
   - If you select a target table which does not have a table definition or has an incorrect table definition, an appropriate message will be displayed. In this case you will have to select another target table or modify the table definition.
4. Under **Source**, from the **Database type** list, select ODBC as the source database platform.
5. From the **SQL Data Source** list, select the required **database profile**.

    **Note**

   - The database types that are currently available to you are those which you have installed during SmartPlant Instrumentation Setup and those which you have installed manually on your computer.

6. Click **Connect** to establish connection to the selected source database.

   Note

   - If the connection attempt is unsuccessful, an appropriate message is displayed. In this case make sure that the appropriate database server is accessible to you.

7. From the **Table Name** list, select the required source table.
8. Click **Save Link** and in the **Link name** text box of the dialog box that opens, type a name for the link.
9. Click **OK**.
10. Click **Close** to close the **Import Link Source and Target Definitions** dialog box.
11. Click to display the link you defined in the **Link Explorer**.

Selecting dBase / Text Files as the Source Profile

When you select dBase files as the source profile, the options in the **Import Link Source and Target Definitions** dialog box are a little different.

➢ To create a new link (ODBC) with dBase / text files as the source data

1. Do one of the following:
   - On the **Actions** menu, click **New Group** (or click ) to create a new link group.
   - In the link list, select an existing link group.
2. Do one of the following:
   - Click  .
   - On the **Actions** menu, click **New Link**.
3. In the **Import Link Source and Target Definitions** dialog box, under **Target**, click **Table** or **Module** and select the appropriate target table or module from the list.

    **Caution**

   - You can import data only into a target table which has a table definition (for example, a table which has a correct definition of a **Primary Value**, **Foreign Keys** and **Reference Tables**). If you import data into a target module, **all** the tables in the target module must have a table definition. If you select a target table which does not have a table definition or has an incorrect table definition, an appropriate message will be displayed. In this case you will have to select another target table or modify the table definition (see Setting the Import Comparison Criteria to learn more about setting the table definition).
4. Under **Source**, from the **Database type** list, select ODBC as the source database platform.
5. From the **SQL Data Source** list, select the appropriate **database file** type.
6. Click **Browse** to open the **Select File** dialog box and navigate to the source database file.

7. Click **Open** to return to the **Import Link Source and Target Definitions** dialog box where the source file name with its path appears in the **File Name** data field.

   Note

   - The Import utility supports long filenames for the source.

8. Click **Save Link** and in the **Link name** text box of the dialog box that opens, type a name for the link.

9. Click **OK**.

10. Click **Close** to close the **Import Link Source and Target Definitions** dialog box.

11. Click  to display the link you defined in the **Link Explorer**.

Creating a New Link for Platforms other than ODBC

You can build a new link using a source database platform other than ODBC. To do this you must have access rights to the database server as well as the appropriate database drivers. You must also have the appropriate settings in the configuration files (for example, INI files) and in the Windows registry.

➢ To create a new link (other platforms than ODBC)

1. Do one of the following:
   - On the **Actions** menu, click **New Group** (or click ) to create a new link group.
   - In the link list, select an existing link group.
2. Do one of the following:
   - Click  .
   - On the **Actions** menu, click **New Link**.
3. In the **Import Link Source and Target Definitions** dialog box, under **Target**, click **Table** or **Module** and select the appropriate target table or module from the list.

    **Caution**

   - You can import data only into a target table which has a table definition (for example, a table which has a correct definition of a **Primary Value**, **Foreign Keys** and **Reference Tables**). If you import data into a target module, **all** the tables in the target module must have a table definition.
   - If you select a target table which does not have a table definition or has an incorrect table definition, an appropriate message will be displayed. In this case you will have to select another target table or modify the table definition (see Setting the Import Comparison Criteria to learn more about setting the table definition).
4. Under **Source**, from the **Database type** list, select a source database platform.

    **Note**

   - Your selection affects the way you connect to the SQL data source and the dialog box options change accordingly.

5. Type the required information in the other text boxes that are displayed for the selected platform.

Note

- The database types that are currently available to you (in the **SQL Data Source** list), are those which you have installed during SmartPlant Instrumentation Setup and those which you have installed manually on your computer.

6. Click **Connect** to establish a connection to the selected source.

Note

- If the connection attempt is unsuccessful, an appropriate message is displayed. In this case make sure that the appropriate database server is accessible to you.

7. From the **Table Name** list, select the required source table.
8. Click **Save Link** and in the **Link name** text box of the dialog box that opens, type a name for the link.
9. Click **OK**.
10. Click **Close** to close the **Import Link Source and Target Definitions** dialog box.
11. Click to display the link you defined in the **Link Explorer**.

Using the Link Explorer Window

You can perform the following actions in the **Link Explorer** window.

To do this…	With the mouse…	From the keyboard…	Notes
Move a link	Select a link in the left pane and drag the link to the new location	Press **Ctrl**+**X** to cut the selected link; press **Ctrl**+**V** to paste in the new location	The link always appears below the position you drag it to; drag to the group to make it the first link in the group
Copy a link	Select a link in the left pane and hold down **Ctrl** while dragging the link to the new location	Press **Ctrl**+**C** to copy the selected link; press **Ctrl**+**V** to paste in the new location	The link always appears below the position you drag it to; drag to the group to make it the first link in the group
Move a group of links	Select a group in the left pane and it to the new location	Press **Ctrl**+**X** to cut the selected group; press **Ctrl**+**V** to paste in the new location	If one or more of the links already exists in the target, it is not deleted in the source
Copy a group of links	Select a group in the left pane and hold down **Ctrl** while dragging it to the new location	Press **Ctrl**+**C** to copy the selected group; press **Ctrl**+**V** to paste in the new location	
Move multiple links	In the right pane, hold down **Shift** or **Ctrl** while selecting the required links and drag to the new location in the left pane		The links always appear below the position you drag it to; drag to the group to make it the first link in the group
Copy multiple links	In the right pane, hold down **Shift** or **Ctrl** while selecting the required links and drag to the new location in the left pane while holding down **Ctrl**		The links always appear below the position you drag it to; drag to the group to make it the first link in the group
Change the link order	Drag links up or down in the group	Press **Ctrl**+**X** to cut the selected link; press **Ctrl**+**V** to paste in the new location	The link always appears below the position you drag it to; drag to the group to make it the first link in the group

Changing Link Source Paths

You can change the path or name of the source file of an existing link when you need to update the source path. You can change the source path of a single link or you can set one default folder for all your links in that group.

➢ To change the source path of an existing link

1. In the **Link Explorer**, select the required group and click ⊞ to expand the group and display its links.
2. Click  to open the **Import Link Source and Target Definitions** dialog box where you can edit the selected link.
3. Click **Browse**.
4. Navigate to the required source file and click **Open**.
5. Click **Close** to close the **Import Link Source and Target Definitions** dialog box.

➢ To specify a new default folder for all links

1. In the **Link Explorer**, do one of the following:
   - Click  .
   - On the **Actions** menu, click **Folder**.
2. In the **Default Source File Folder** dialog box, click  .
3. Navigate to a file in the required folder and click **Open**.
4. Click **Apply**.
5. To undo the current default folder settings, click **Clear** next to the default path.
6. Click **Close**.

 **Note**

- You can change the source path only if its platform is a database **file** (for example, dBase, Excel, ASCII, and so forth).

Moving Links Between Databases or Domains

You can move the links you have created to other databases or other domains (note that links are used per domain). This process consists of two stages. First, you transfer the link information to an ASCII file (**export** the links) and then you create a group of links from that ASCII file in the other database (**import** the links). You can export and import only a group of links and not an individual link. Hence, if you want to move a single link, you need create a group to which you associate the link.

Caution

- Make sure that special data such as a tag naming convention is the same in both databases / domains. In case the naming convention is not the same, you will not be able to carry out the import process automatically. In this case you will first need to modify the links of the naming convention of the required part of the name. The source and the target domain / database for the links have to be of the same version and subversion of the Import utility.

Exporting Links

The first stage in moving a link to another database or domain is exporting a group of links. When you export a group of links you transfer the information about a group of links to an ASCII file which has the .imp extension. You can then use the exported links in other domains or databases.

➢ To export a group of links

1. On the **Service** menu, click **Export Links**.
2. In the **Export Link Groups** dialog box, select the link group that you want to export.
3. Click **Export**.
4. In the **Enter Export Link File Name** dialog box, do the following:
   a) Type the filename of the link file name (you do not have to add the IMP extension).
   b) Navigate to the required location where you will save the link file.
   c) Click **Save** to save the link file.

The link information is saved to an ASCII file which you can use for import (see the next section to learn how to import saved link groups.)

Importing Links

You can use a file with the .imp extension to create a group of links based on the information you have saved in this file.

Note

- A number of predefined link groups are provided by Intergraph for use with the interfaces (for example, PDS, SmartPlant P&ID, CENTUM CS, and so forth). When you first install SmartPlant Instrumentation, you must import these link groups as add-ins in the Administration module (an appropriate license is required). After you have added the predefined import links, you can export and import them freely between domains.

➢ To import a group of links

1. On the **Service** menu, click **Import Links**.
2. In the **Open File** dialog box, navigate to the required ASCII file with the IMP extension which you want to use for import and click **OK**.
3. At the prompt, click **Yes** to import the group of links from the IMP file you selected in the **Open File** dialog box.
4. In the **Database Table Definition** dialog box, select the **Import link table definition** check box to import the table definition saved in the group of links as well as the links themselves, or clear the check box to import only the group of links.
5. Under **Duplicate table definition names**:
   - Click **Create new** to import the link table definition if the imported table definition name is the same as the current table definition. This way, the Import utility will rename the imported table definition by adding a '$' sign next to the table definition name.

     For example, Process Data will be renamed as Process Data$.
   - Click **Skip** to skip the import of the table definition if the current table definition name is the same as the imported table definition.
6. Click **OK** to import the group of links.

Import Parameter Settings

Setting the Properties for a Link

After you define a link, setting the properties for the link is the next step in the import setup process.

- To open the **Link Properties** dialog box, do one of the following:
  - Click  .
  - On the **Actions** menu, click **Properties**.

The **Link Properties** dialog box consists of the following tabs:

- **General**: Setting general parameters of the import setup process.
- **Import mode**: From this tab, you can perform the following activities:
  - Determining how the utility handles data in the target database.
  - Setting parameters for handling source and target data with the same primary values.
  - Setting refreshing parameters which you use to keep your target tables up to date.
- **Tag/Loop**: Setting parameters for loop and tag naming conventions during the import setup process.
- **Source**: From this tab, you can perform the following activities:
  - Applying a filtering condition to the source data.
  - Associating additional data to the currently selected source data.
  - Defining source fields as Instrument Types and Instrument Type Descriptions.
- **Comparison**: Reviewing and defining import keys in the target data.
- **PAU**: Targeting additional plant hierarchy items.
- **Custom**: Setting the custom field parameters. This option is only available when importing instrument index data into the Instrument Index or Process Data modules - Line.
- **Specs**: Selecting the specification form and the specification drawing and revision. This option is only available when importing data into the Specifications module.
- **Style**: Selecting a browser view that will determine which fields will be displayed in the **Import Link** window.

In this dialog box, you can also click **Target Definition** to review and modify the target table definition.

Setting General Parameters

By selecting the **General** tab folder In the **Link Properties** dialog box, you control various features which influence the import setup process. The available options depend on whether you selected to import data to a module or to a table. The options available will also differ slightly depending on the module that was selected.

Notes

- When importing from a module where the same set of data appears in more than one table (for example, loop name and loop name reference when importing to the Instrument Index module), the Import module automatically handles the data so that it only appears once in the link.

- Customizing drawing names may come in handy especially when you want to use revisions for process data sheets, calculation sheets, or both. However, if you decide to use revisions for any of these sheet types, you must make sure that the drawing names associated with the process data or calculation sheet are unique on the plant level.

- The **Import revisions**, **Use custom drawing names**, and **Create calculation sheet** options may be utilized in conjunction, in which case you need to define the links for the appropriate data. You can use the following table as a guide to the option combinations you can use and the data for which you need to define the links:

Import revisions	Use custom drawing names	Create calculation sheet	Data to link
✓			Revisions (Process Data)
	✓		Process Data drawing names
✓	✓		Process Data drawing names and revisions
		✓	Calculation data
✓		✓	Calculation and Process Data revisions
	✓	✓	Calculation and Process Data drawing names
✓	✓	✓	Calculation and Process Data drawing names and revisions

To handle mismatched data (for example, imported source rows with invalid empty fields which are defined as NOT NULL but contain no value) click one of the following radio buttons:

- **Use default value**: This option sets any reference fields values in the target table to zero during the import process if these fields do not appear in the appropriate reference table.
- **Reject rows**: This option rejects all source rows that contain reference fields which do not appear in the appropriate reference table during the import process.

 **Note**

- Selecting the **Use default value** option overrides any selections you make in the **Default** column in the **Table Definition** dialog box. (See Setting the Import Comparison Criteria to learn how to use the **Table Definition** dialog box.)

Creating Complementary Elements (Import to Table)

This option allows you to select complementary elements which will be created during the import of data to a target **table**. Some elements will be created in the target database, while for other elements (for example, wiring data) only the appropriate connection between the relevant entities will be established. This option is available to you when an additional task can be performed during the import process, and when the appropriate profile definitions exist in target domain (see Instrument Index > Defining Instrument Type Default Settings to learn how to define instrument type profiles).

When this option is accessible, an additional part of the **General** tab appears, where you can select the required function(s) to perform from those available to you.

You can create any of the following elements, if available:

- Create a device panel and a cable for an instrument whose function type profile indicates wiring, and which has the following default elements: panel, cable, and connection type.
- Create a drawing row and a default revision row (which is initially empty) for a specification, process data sheet and calculation sheet.
- Associate tags with the appropriate I/O type, location and hook-up profiles.

Setting the Import Mode Parameters

The update operation is carried out automatically whenever a source row contains the same **Primary Value** as the target row.

You can:

- Determine the way SmartPlant Instrumentation treats identical source and target rows by setting the appropriate parameters in the **Import mode** tab.
- Determine how the Import utility updates target rows during the import process.
- Select source and target keys that the Import utility will use to **refresh** the target data during the import process. This option is available to you only if the source and target tables have been already used in a previous import session.

➢ To set the import mode parameters for identical source and target rows

1. In the **Link Properties** dialog box, click the **Import Mode** tab.
2. Do one of the following:
   - Click **Insert & update** to enable the Import utility to insert new source rows and update existing target rows during the import process.
   - Click **Insert** to prevent the Import utility from updating target rows and to enable insertion of only **new** source rows in the target domain during the import process.
   - Click **Delete** to delete existing rows in the target domain during the import process.
   - Click **Move** to move the rows in the target domain to a different <unit> in the same domain.
3. If you chose the **Insert & update** option in step 2, select **one or more** of the following check boxes:

   a) **If the source contains a NULL value**
      - Select to overwrite the target field even if the corresponding source field contains a NULL value.
      - Clear to skip source fields that contain a NULL value.

   b) **If the source contains a space or a zero value**
      - Select to overwrite the target field even if the corresponding source field contains a space value or a zero value.
      - Clear to skip source fields that contain a space value or a zero value.

Notes

- Some database drivers interpret spaces in a source field as a NULL value. To avoid incorrect overwriting of data in the target, it is highly recommended that you select both or neither of the above two check boxes.

- When inserting null data for fields of data type **String** that can normally accept a NULL value, you can specify the insertion of a single space instead of NULL. To do so, in the Intools.ini file, under the [Import] section, type the line:

  ```
  FillSpace=Y.
  ```

c) **Do not insert**

- Select to skip inserting source rows that do not exist in the target table.

- Clear to insert source rows that do not exist in the target table.

Setting the Refresh Parameters

You can keep **tables** that you have already used in a previous import session up to date by refreshing them.

To refresh tables you previously imported, you need to select the same source and target data as you did in the previous import session. Then you select the appropriate source and target refreshing keys which are the source and target fields according to which contents the target data will be refreshed during the import process.

If the Import utility detects a change in the selected **source** refreshing key contents (in comparison to the selected **target** refreshing key contents), the **target** field contents will be updated accordingly.

➢ To refresh previously imported data

1. In the **Link Properties** dialog box, select the **Import Mode** tab.
2. Click **Insert & update** to enable refreshing.
3. Under **Refresh from source**, select the **Apply** check box.
4. Click **Parameters**.
5. In the **Refresh Parameters** dialog box, under **Target**:

   a) From the **Table name** list, do one of the following:

   - Select the appropriate target table.
   - Accept the given default value (the current target table).

   Note

   - The target tables which are available to you in the **Target** section **Table name** list depend on your target data **type** that you selected in the beginning of the current import session:
   - If you selected to import data into a **target table**, only that target table would appear in the **Table name** list.
   - If you selected to import data into a **target module**, all the tables which are associated with that target module would appear in the **Table name** list.

   b) From the **Refresh key** list, do one of the following:

   - Select the target field to refresh during the import process.
   - Accept the given default value (the current target table).

6. Under **Source**:

   a) From the **Table name** list, select the appropriate source table (this field is empty by default).

   b) From the **Refresh key** list, select the source field to refresh from during the import process (this field is empty by default).

7. Select **View saved parameters** to automatically select the last saved refreshing parameters.

8. Click **Delete** to delete the last saved refreshing parameters.

   An appropriate message is displayed, where you need to either click **Yes** to delete the refreshing parameters, or click **No** to keep the last saved parameters.

9. Click **Save** to save the refreshing parameters you currently selected in the **Refresh Parameters** dialog box.

10. At the prompt to confirm the new selection, do one of the following:

    - Click **Yes** to overwrite the last saved refreshing parameters and return to the **Link Properties** dialog box.

    - Click **No** to return to the **Refresh Parameters** dialog box without overwriting the last saved refresh parameters.

Note

- If you enable the data refresh option or select the **Overwrite** option, you will be prompted to use data refreshing or overwrite the existing target data during the current import session.

Filtering the Source Data

You can define a filtering condition which will be used by Import to selectively import data from the source table. The filtering condition can contain any combination of the following:

- Source fields
- Operators or functions
- Alphanumeric values

➢ To specify a filtering condition

1. In the **Link Properties** dialog box, click the **Source** tab.
2. Select **Filter the source table** to enable filtering during the import process.
3. Click **Modify** to open the **Import Source Filter** dialog box.
4. To create a filtering condition, do one or more of the following:
   - In the **Source Table Fields** data window, double click the field that you want to add to the filter condition in the data window.
   - Under **Operators & Functions**, click the appropriate operator or function buttons to add the appropriate operator or function to the filtering condition.
   - Under **Operators & Functions**, select the required SQL function from the appropriate list. Then right-click the selected SQL function to be applied in the filter condition.
   - In the **Import Source Filter** dialog box, type the appropriate expression. You can also add this expression to the filtering condition already displayed in the **Import Source Filter** data window.

The **Filter** feature provides you with the following built-in operators and functions.

Tip

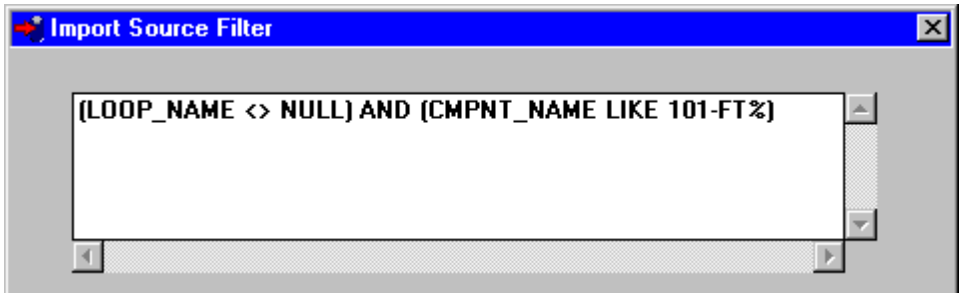
- The above built-in operators and functions are those used in the **WHERE** SQL statement. See your database platform manual to learn more about database statements.

The **Filter** feature also provides you with special functions which are native to the source database.

The following table describes some of the most common functions. The source databases which provide each function are specified beneath the function name (in Italics) in the **Function** column. The function output is described beneath the syntax example (in Italics) in the **Example** column.

5. Repeat step 4 to add as many fields, operators, functions and values as required.

   The new condition appears in the window of the **Import Source Filter** dialog box, for example:



6. To check the filter condition syntax, click **Verify**.

   An appropriate message is displayed, notifying you that:

   - The condition in the data window is valid - in this case the message also indicates the number of rows which match the condition.
   - The condition in the data window is invalid - in this case you can correct the condition and try again.

7. To view the way the filtering condition affects the source data, click **View Source** (see Viewing the Source Data for details).

8. Click **OK** to close the **Import Source Filter** dialog box and return to the **Source** tab where your condition appears in the data window.

   Note

   - You can disable the current filtering condition without deleting it. To do this clear **Filter the source table** after you define a condition.

9. Under **Associate source tables**, select **Apply** to associate additional source data with the source data that you selected when you started this import session. To make the source data definitions, click **Define** (see Associating Additional Source Data to learn how to do this).

10. Under **Assign process function**, select **Apply** to assign SmartPlant Instrumentation process functions to the imported data based on their instrument types. To make the source data definitions, click **Define** (see Defining Source Instrument Type Names and Descriptions to learn how to do this).

Importing Data into Additional Plant Hierarchy Items

You use the **PAU** tab options when you want to import source tables which are defined per plant hierarchy item from a database which contains more than one plant hierarchy item.

In SmartPlant Instrumentation, tables are defined per plant hierarchy item. This means that when a table is defined at a specified level, it contains data which is unique at that level.

For example:

The CABLE table is defined per area. Therefore the CABLE table contains data which is unique only at the area level.

When importing data that includes more than one plant hierarchy item, some of the source rows may recur (due to the existence of several plant hierarchy items). In this case, you can use the **PAU** options to instruct the Import utility to differentiate rows of different plant hierarchy items during the import process, thus importing data into the appropriate plant hierarchy items.

Note

- If you do not use the **PAU** options, the Import utility will reject all recurring source rows during the import process (for example, the Import utility will not differentiate between rows of different plant hierarchy items).

When you select to import data into additional plant hierarchy items you can also specify the level of import, for example, if the Import utility will differentiate rows per plant, per area or per unit. If you select to import data per plant or per area, the Import utility will reject rows of lower subdivisions (for example, rows defined per area or per unit).

For example:

If you select to import data **per area**, the Import utility will distinguish **only rows of different areas** during the import process. However, the Import utility will reject rows of different units if an area contains more than one unit.

The Import utility defines the **Primary Value** and the **Foreign Key** fields of the target table (which you selected in the **Import Link Source and Target Definitions** dialog box) in three possible ways:

1. You select the **same** import level as the level of the target table (this is the default option): in this case only the fields regarding this level (for example, UNIT_ID, AREA_ID, and so forth) will be automatically defined by Import as a **Primary Value** in the target table.

   For example:

   The target table is COMPONENT (a table defined **per unit**) and you select in the **PAU** tab the unit level: the UNIT_ID field is also defined as a **Primary Value** field in the target table.

2. You select a **higher** import level than the level of the target table: in this case all the fields regarding the level of the target table and the levels above (for example, PLANT_ID, AREA_ID) will be automatically defined as **Primary Value** fields in the target table.

   For example:

   The target table is COMPONENT (a table defined **per unit**) and you select in the **PAU** tab the area level. In this case both the AREA_ID field and the UNIT_ID field become **Primary Value** fields in the COMPONENT Table.

3. You select a **lower** import level than the level of the target table: In this case all the fields regarding the level you select and the levels below will be automatically defined as **Foreign Key** fields in the target table.

   For example:

   The target table is CHANNEL (a table defined per plant) and you select in the **PAU** tab the unit level. In this case the AREA_ID and UNIT_ID fields become **Foreign Key** fields in the CHANNEL Table.

After you select the level for which the Import utility will distinguish unique data during the import process, you need to select the tag naming convention which will be used during the import process.

Note

- When importing data, the Import utility uses for each tag the tag naming conventions of the <unit> to which that tag belongs.

➢ To import data into an additional plant hierarchy item

1. In the **Link Properties** dialog box, click the **PAU** tab to make it active.
2. Select **Apply** to make the options in the **PAU** tab active during the current import process.
3. Under **Plant-Area-Unit definition**, do one of the following:
   - Click **Plant** to define the target table per plant.
   - Click **Area** to define the target table per area.
   - Click **Unit** to define the target table per unit.
4. If you selected to define the import target at the unit level, under **Import unit data using**, do one of the following:
   - Click **Unit name** to import the data according to the unit name.
   - Click **Unit number** to import the data according to the unit number.

Setting the Import Comparison List Options

During the import process the Import utility modifies the contents of the SmartPlant Instrumentation database (for example, the target module or table). This is done by inserting, deleting and updating rows in the SmartPlant Instrumentation database. It is therefore advisable to be able to coordinate between these rows before you start the import process.

This feature provides you with the means to coordinate between the rows to be inserted, deleted or updated during the import process. You do this by reviewing the source and target rows and selecting the appropriate rows which will be processed during the import process.

Note

- The **Comparison** tab only becomes active after the first time you have imported data and saved the selected link.

Setting the Tag / Loop Parameters

You can determine the way the Import utility handles the naming conventions of the source data during the import process.

Note

- This option is available only if the **target** table/module you selected requires naming conventions (for example, COMPONENT Table, LOOP Table, Instrument Index module, and so forth).

➢ To set the Tag/Loop parameters

1. In the **Link Properties** dialog box, click the **Tag/Loop** tab to make it active.
2. Do one of the following:
   - Select **Define the naming conventions in the link** to enable the Import utility to define the naming conventions structure automatically by extracting the naming conventions structure from the current link.
   - Clear **Define the naming conventions in the link** to define the naming convention structure manually by entering a naming convention string in the **Define Tag Name Structure** dialog box and/or the **Define Loop Name Structure** dialog box.
3. If you cleared the check box in the previous step, do one of the following:
   - Select **Redefine the naming convention** to redefine links for the tag/loop naming conventions parts of the source table.
   - Clear **Redefine the naming convention** to use the current naming conventions without redefining their links.

   Note

   - The tag naming conventions are defined in the Administration module. If you select to redefine the naming conventions, you will need to assign new values (for example, links) to the tag segments.

4. Select **Validate tag and loop segments** to verify the following during the import process:

   - Whether the instrument type values of the imported tags (in the COMPONENT table) exist in the Instrument Type table (for example, the COMPONENT_FUNCTION_TYPE table).
   - Whether the loop function values of the imported loops (in the LOOP table) exist in the Loop Function table (for example, the LOOP_FUNCTION table).
   - Whether the measured variables of the imported loops (in the LOOP table) exist in the Loop Process Variable table (for example, the LOOP_PROC table). Note that selecting this option will slow down the import process.

   Note

   - **Validate tag and loop segments** is selected by default, thus enabling the validation check of the imported tags and loops before transferring data. It is recommended you do not clear this box to avoid import failure due to missing data.

5. Do one of the following:

   - Select **Use the loop reference data** to also import loop reference tables of the COMPONENT table during the import process.
   - Clear **Use the loop reference data** to disregard any loop reference tables of the COMPONENT table.

   Caution

   - To prevent import failure, clear **Use Loop reference data** if the imported COMPONENT table contains empty loop reference fields.

6. If you selected in the beginning of the current import session to import into the Instrument Index module, the **Use Tag data** check box appears in the **Tag/Loop** tab folder. In this case, do one of the following:

   - Select the check box to include source tag number data from supporting tables in the current import. You will need to redefine the naming conventions for all target <units> in the Administration module before you start the import process.
   - Clear the check box to exclude tag supporting table data from the current import session.

Setting Custom Field Parameters (Import to Module Only)

The selections that you make in this tab folder enable you to show in the **Import Link** window only those fields used in a selected Browser module view style. This way you can use these fields in creating the current import link.

Note

- This option is available to you only if you selected to import data into the following modules: Instrument Index, Process Data - Line, or Dimensional Data for Piping. (See New Link Creation Overview to learn how to select a SmartPlant Instrumentation module as a target.)

➢ To set custom parameters

1. In the **Link Properties** dialog box, click the **Custom** tab to make it active.
2. To show the fields of a custom line style in the **Import Link (module)** window, under **Line**, do the following:
   a) Select **Apply** to include the fields of the selected style in the **Import Link (module)** window.
   b) From the list, select the Browser module view style whose fields you want to show in the **Import Link (module)** window.
3. To show a custom equipment style in the **Import Link (module)** window, under **Equipment**, do the following:
   a) Select **Apply** to include the fields of the selected style in the **Import Link (module)** window.
   b) From the list, select the Browser module view style whose fields you want to show in the **Import Link (module)** window.
4. To show a custom loop style in the **Import Link (module)** window, under **Loop**, do the following:
   a) Select **Apply** to include the fields of the selected style in the **Import Link (module)** window.
   b) From the list, select the Browser module view style whose fields you want to show in the **Import Link (module)** window.

5. To select the dimensional group to be used in the **Import Link (module)** window for importing data to the Dimensional Data for Piping module custom fields, under **Select dimensional group for custom name**, do the following:

   a) Select **Apply** to enable a selection to be made from the list.

   b) From the list, select the Browser module view style whose fields you want to show in the **Import Link (module)** window. The following options are available:

   - **Computed Group Name**: Selecting this option automatically creates the source for the **Dimensional Group Name** field in the **Import Link (module)** window, using the group from the COMPONENT_DIMENSIONAL table to which the tag defined in the link belongs.

   - **All Groups**: Selecting this option will import data for all custom fields in the module. The **Dimensional Group Name** section in the **Import Link (module)** window consists of two fields: **Dimensional Group CAD Code** and **Dimensional Group Description**. With this option, you can enter for the source name an existing group or a new one.

Note

- In the above cases, all the custom fields are displayed in the **Import Link (module)** window and are assigned sequential numbers.

   - **(Named Dimensional Group)**: Selecting this option will import data for an existing dimensional group. In this case, the name of the group appears as the source for the **Dimensional Group Name** field, and only the custom fields defined in the group's style are displayed (with the appropriate names).

   c) Do one of the following:

   - Select **Apply** to include the fields of the selected style in the **Import Link (module)** window.

   - Clear the check box to import all the groups (equivalent to selecting All Groups in the list).

Setting the Specification Sheet Parameters (Import to Specifications Module Only)

When importing data into the Specifications module, the **Link Properties** dialog box opens on the **Specs** tab. You need to select a form for inputting the data to and you can also select other options that determine how the imported data is presented in SmartPlant Instrumentation.

➢ To set the specification sheet parameters

1. From the **Spec form list** field, select the required spec form (the list is arranged in alphabetical order and also shows the form numbers) into which the data will be imported.

   The form you select will affect which data tables are actually imported.

2. Click **View Form** if you want to see what the selected form looks like.

3. Under **Specification Drawing & Revision**, select the following check boxes as required:

   a) **Custom drawing name**:

   - Select to use a custom drawing name for the imported specification (you will need to define the name in the link). The drawing names must be unique.
   - Clear to use a default drawing name (made up of the tag number and suffix).

   b) **Import revisions**:

   - Select to include imported data from previous revisions.
   - Clear to import data only from the last revision.

4. **Custom drawing name for Process Data**:

   - Select to use a custom drawing name for imported process data. The drawing names must be unique.
   - Clear to use a default drawing name.

5. If the spec form is defined for multi-tag specifications, select the **Multiple-item specification** check box to import the data into a multi-tag specification, or clear the check box to import the data into a single-tag specification.

6. If the selected form has more than one format defined, do one of the following:

   - Select the required format from the **Multi-item spec format** list.
   - Select **All formats** to select all of the available formats.

Setting the Style Parameters (Import to Module)

Selecting the **Style** tab in the **Link Properties** dialog box allows you to control what fields are displayed in the **Import Link** window if you are defining a link where data will be inserted into reference tables. When creating such a link in the **import to module mode**, the **Display all fields** option lets you display all the fields in the target module and not just the fields contained in a special list that limits the field list that appears in the **Import Link** window. This special list is part of the SmartPlant Instrumentation database and it serves two purposes:

- to shorten the field list displayed in the **Import Link** window
- to display engineering field names instead of the names used in the database.

Selecting the **Display all fields** check box adds the fields to the **Import Link** window that are not included in the database list so that all the pertinent fields are displayed. The filed names will appear as they are in the database if they are not included in the database list. The fields that are included in the database list will display engineering names.

Caution

- Note that this option is not available when importing data into the Specifications module.

➢ To set the style import parameters in the import to module mode

1. In the **Link Properties** dialog box, click the **General** tab.
2. Select the **Insert data into reference tables** check box.
3. Click the **Style** tab.
4. Do one of the following:
    - Select the **Display all fields** check box to display in the **Import Link** window all the pertinent fields of the target module.
    - Clear the **Display all fields** check box to display in the **Import Link** window only those fields that are included in the database list.

Setting the Style Parameters (Import to Table)

Selecting the **Style** tab in the **Link Properties** dialog box allows you to control what fields are displayed in the **Import Link** window if you are defining a link where data will be inserted into reference tables. When creating such a link in the **import to table** mode, you can select an existing browser view that will determine which fields will be displayed in the **Import Link** window. It is possible to display all the fields that are associated with the selected browser view or just the ones selected in the browser view you highlight in the **Style** page of the **Link Properties** dialog box. If there is no browser view that satisfies the needs of the current import session, create a browser view in the **Browse Manager**.

➢ To set the style import parameters in the import to table mode

1. In the **Link Properties** dialog box, click the **General** tab.
2. Select the **Insert data into reference tables** check box.
3. Click the **Style** tab.
4. Highlight the required browser view in the data window.

   Tip

   - Click **View** to display the field list defined in the selected view. Initially only the fields that are selected for the current browser view are displayed. If you want to display all the fields that are available in the Browser to which the current view belongs, close the **View Style** dialog box and select **Display all fields** check box. You can now click **View** again to see which fields are displayed. When opening the **Import Link** window, all the fields associated with the current Browser will be displayed if this check box is selected. You can define a new browser view if you find no suitable browser view for the current import session.

   Note

   - Click **Clear** to deselect any highlighted browser view and not to use any **Style** parameter options at all.

5. Click **Save** to apply the style settings.

Mapping Data Links

Link Definitions

Defining data links involves:

- Defining the Naming Convention Structure (if required)
- Configuring Source Data for Variable Length Fields (if required)
- Opening Import Links
- Mapping Source and Target Data

Defining the Naming Convention Structure

This is the stage where you define the source naming conventions of the tag name and the loop name. You will have to go through this stage in one of the following situations:

- You have selected the **Redefine the naming conventions** check box in the **Tag/Loop** tab in the **Link Properties** dialog box.
- You have started a **new** import session but you did not clear **Define the naming conventions in the link** check box in the **Tag/Loop** tab in the **Link Properties** dialog box.

You define the links for the naming conventions in the **Define Tag Name Structure** dialog box and/or in the **Define Loop Name Structure** dialog box depending on whether the target contains component names, loop names or both. You will have to complete the definitions in one or both dialog boxes depending on whether the target table(s) contains one or both naming conventions.

The current naming conventions are those that the Domain Administrator previously defined in the Administration module.

In the procedure that follows, the **Define Tag Name Structure** dialog box is used as an example.

➢ To define links for naming conventions

1. If required, do the following to instruct the Import utility to put leading zeros in front of the numeric part of the loop / tag name (for example, to have the Tag **108-FT 0001** instead of **108-FT 1)** for the loops or tags in all the available import links:

   a) On the **File** menu, click **Preferences**.

   b) In the **Import** dialog box, click the **Tag/Loop** tab.

   c) Select **Insert leading zeros for numeric values** and click **OK**.

2. In the **Link Explorer**, select the required links that include loop or tag data.

3. Click  to open the **Link Properties** dialog box and click the **Tag/Loop** tab.

4. Do the following.

   a) Clear **Define the naming conventions in the link**.

   b) If required, select **Redefine the naming conventions**.

   c) If required, select **Replace null string with space** to instruct the Import utility to translate any null strings in your source data into spaces.

   d) Click **OK**.

Tip

- It is advisable to select the **Replace null string with space** check box if you are not sure if any source fields are null or not.

5. Do one of the following:
   - Click  to open the links.
   - Click  to import data using the links.
6. In the **Define Tag Name Structure** dialog box, select the name of the source table from the **Source Table Column List** data window.

Tip

- You can search for a source name in the **Source Table Column List** by pressing the key corresponding to the first letter of the source name. (Make sure you highlight one of the rows in the **Source Table Column List** data window first.)

7. Drag the selected source name to the **Name Convention** window (the target) and drop it in the appropriate **Source Name** row.

Note

- You should ensure that your source data configured correctly if the loop or tag names are likely to be of variable length (see Configuring Source Data for Variable Length Fields for details).

8. In the **Start** column of the **Name Convention** data window, enter the starting location of the string within the naming convention.

Note

- If you click **Cancel** in the **Define Tag Name Structure** dialog box or in the **Define Loop Name Structure** dialog box without completing the tag or loop definition, an appropriate message will be displayed, after which you will return to the **Link Explorer**.

9. Select **Enable any source name for prefix** to allow you to enter any value for the prefix or clear the check box to restrict the prefix to a fixed value based on the current plant hierarchy item.

   Note

   - If you are importing data for both loops and tag numbers, you must select or clear this option for both the loop and tag name structures.

10. Click **View Source** to view the source table. (See Viewing the Source Data to learn more about viewing the source data.)

11. Click **OK** to proceed with the import setup process.

Configuring Source Data for Variable Length Fields

Where the source field is likely to vary in length and it is only a sub-string of that particular field, you should create a separate field in the source data for each of the parts (PREFIX, MEASURED VARIABLE, FUNCTION TYPE, and so forth).

For example, the source table may contain the following tags (the instrument type is indicated in **bold** type):

108**FT**100

108**ICP**100

108**FT**100

108**ILP**100

In this case the field in bold type varies in length. Therefore, you need to create a separate field for each of the parts of the instrument type, for example:

108	**FT**	100
108	**ICP**	100
108	**FT**	100
108	**ILP**	100

If you have defined a fixed-name string as a prefix, you do not have to link source data to this part of the naming convention. The Import utility will create this part automatically during the import process.

Primary Keys and Primary Values

Each SmartPlant Instrumentation table contains a **Primary Value** field which is the same as the **Primary Key** field used as a prime key when accessing the table data. The difference between the **Primary Key** field and the **Primary Value** field is that you can only access the latter, whereas the **Primary Key** field is an internal database key used by SmartPlant Instrumentation only.

Example:

The COMPONENT table contains a **Primary Key**, CMPNT_ID, which is an internal SmartPlant Instrumentation database key, and a **Primary Value**, CMPNT_NAME, which contains the tag number. Both fields provide prime access to the COMPONENT Table but you can use tags (for example, the **Primary Value**) only while working in SmartPlant Instrumentation.

If you import data into a target **table**, you can:

- Allow the Import utility to generate automatically the **Primary Value** field according to the naming conventions that you will enter; to do this you will need to manually define both tag and loop appropriate naming conventions. This way, the **Primary Value** field will contain the value: Computed which means that its contents have been predetermined by the Import utility, based on the naming conventions you entered.
- Use the naming conventions in the link; this way you will need to manually create the **Primary Value** field contents and naming conventions by specifying the appropriate field parts (for example, PREFIX, SUFFIX). This way, you define the value of all required target fields either by typing in the appropriate value in the required target field, or by selecting the appropriate source field and linking it to the required target field.

Note

- If you select to import data into a target **table** you **must** define the links of all **Primary Value** fields. If you have selected to import data into a target **module**, you do not need to define the links to all the target tables **Primary Value** fields in the target module, as it is possible to import data into only some of the target tables.

At this stage you can also:

- Make a more precise selection by selecting the required source and target rows which will be processed during the import process.
- Select the reference tables you want to import.
- Save the current link to be used in future import sessions.
- View the source rows.
- Perform a test run to evaluate the import process results.
- Carry out the import process.

After you map all the required source and target fields you can make a more precise selection. You do this by selecting the source and target rows to be inserted updated or deleted during the import process.

When you finish defining the mapping between the target and the source fields, you will come to the end of the import setup process at which point you will be able to carry out the actual import of data.

Opening Import Links

After selecting the required import links in the **Link Explorer**, you can open the links to view or modify the mapping before importing data.

➢ To open import links

1. In the **Link Explorer**, select the required groups or links in the **Link list**.
2. Do one of the following:
   - On the **Actions** menu, click **Open Link**.
   - Click  .
3. In the **Import Link** window, make changes to the link mapping as required.

Mapping Source and Target Data

After creating the import links and defining the required parameters, the next stage is to map the source and target fields. Depending on whether the link is used to import data into a module or a table, you define the link mapping in the appropriate **Import Link** window. The fields that you need to map depend on the target data type.

➢ To define the import mapping

1. In the **Import Link** window **Source Name** column, do one of the following:

   - Click the required line in the **Target** data window **Source Name** column and then select one or more fields in turn from the **Source** data window.
   - Drag one or more selected fields from the **Source** data window to the required line in the **Target** data window **Source Name** column.

     The selected field names appear in the appropriate **Source Name** data field (in the **Target** part of the window). Note, that whenever you drag a new source field to the **Source Name** data field, a **+** sign is automatically added **before** the added field.

     For example:

     CMPNT_NAME **+** FUNC_DESC **+** FUNC_TYPE...
   - Type known source field names.
   - Enter a fixed string (for example, a formula) instead of linking source data. The fixed string must be enclosed in single quotes (**'**') if it is not numeric.

   Note

   - You can use formulas and arithmetic functions in the **Source Name** column (see Using Formulas and Arithmetic Functions in Import Links for details).

2. Modify the fields, if required, as follows:

   - Transfer a sub-string of a source field value by adding the starting character and the length of string parameters both between brackets. For example, **cab_name (3,2)** indicating that you want to transfer **two** characters from the **cab_name** field starting from the **third** character.
   - Add an '**&**' symbol before the field value to instruct Import to trim any leading and / or trailing spaces in the source data.
   - Add a '**+**' sign followed by a '**#**' sign to indicate the end of the current line so that the rest of the values appear on the next line (...**+#**).

- Type **@PROC_FUNC_NAME** to use the predefined process function macro. You can use this macro only if you have defined the required process function in the **Source** tab folder of the **Link Properties** dialog box and selected the **Apply** check box (see Associating Source Tags with Instrument Types). This macro will be entered in to the **Source Name** column automatically whenever the target table has the PROC_FUNC_NAME field.

Note

- The process function macro must appear on its own in the **Source Name** column – it cannot be used with formulas or other strings.

- If the total length of the **Source Name** data field is longer than the target field length (in the **Length** data field of the **Target** data window), a scissors symbol ( ) appears to the left of the **Source Name** data field.

- The target Primary Value field and the target Foreign Key naming conventions are represented by special templates which describe different parts of the naming convention.

- **For Example**:

- **AAA-FFFF-9999\S**

- **AAA-EBBB-9999\S**, and so forth.

Note

- In a naming convention template:

- Each letter stands for a single character/digit, for example, **AAA** stands for a three character part.

- Each group of repeating letters stands for a different segment/part of the naming convention, for example, **EBBBB** describes two segments/parts, where the **E** part contains one character part and **BBBB** describes a four character part.

- Separators appear as selected for the target domain, for example, **-** (hyphen), \ (backslash), and so forth.

Note

- The naming convention template depends on the naming conventions and the standard defined for the target domain in the Administration module.

3. After defining all required settings in the **Import Link (table)** or **Import Link (module)** window, do one of the following:

   - Click  to start an import test run which helps you evaluate the import results without saving data to the target table/module (see Testing the Import Process).
   - Click  to start the import process (see the following procedure).
   - Click  to save the current link settings in the Import utility. You can use the saved link in other import sessions.

 **Note**

- In the **Target** data window, the names of the target fields appear in the following colors:
- **Red** — Primary Value field (**must be defined**)
- **Blue** — Foreign Key field
- **Black** — Regular field in the specific target table
- **Magenta** — A field defined as 'NOT NULL' and which is defined in the **Table Definition** dialog box as 'NOT DEFAULT'.

 **Caution**

- When importing data to a target **module**, you don't need to define the **Primary Key** or **Primary Value** links. However, if you wish to import any part of a table, its supporting table, or its reference tables, you **must** define that table's **Primary Key** and **Primary Value** links.

Using Formulas and Arithmetic Functions in Import Links

When defining an import link, as an alternative to using individual source fields dragged from the left area of the dialog box, you can also link together several source fields in the **Source Name** column and use them as a single source. For example, the source used for the drawing name is dwg + equip which is a combination of the drawing ID and equipment ID (the '+' character is entered automatically if you select both sources by dragging them to the same field).

The source can be composed of several different functions using the arithmetic operators (+, -, /, *) in addition to the string operators. The following conventions apply:

- Arithmetic operators are treated as such only in fields whose type is number.
- Each arithmetic operator is preceded by the '!' character, for example:

  ```
  param1 !+ param2 !- param3
  ```

  (If the values are: param1 = 2, param2 = 10, and param3 = 5, the result of the above formula will be 7.)
- Constants must be enclosed within single quotes, for example:

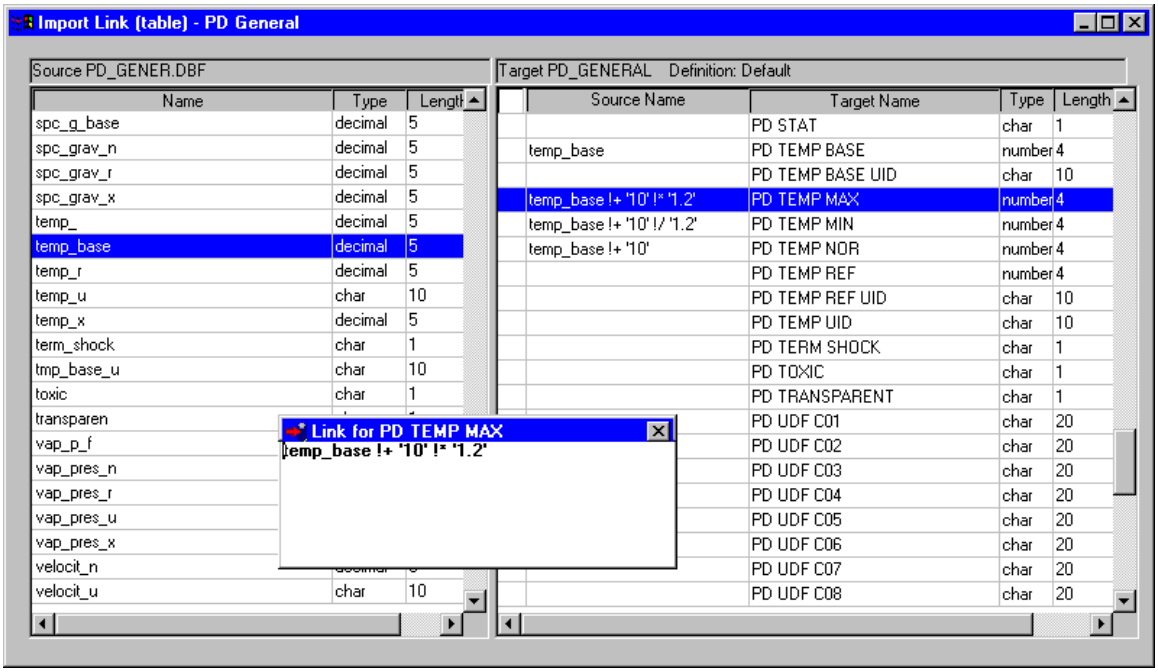
  ```
  param1 !+ '2' !* '5'
  ```

  (Since the operations are performed from left to right, if the value of param1 is 2, the result of the above formula will be 20.)

In the following example, the fluid temperatures are calculated using the base temperatures in the following formulas:

- Normal temperature = Base temperature + 10
- Minimum temperature = (Base temperature + 10) / 1.2
- Maximum temperature = (Base temperature + 10) * 1.2

The syntax used by the **Source Name** field is entered as follows:



Working with Reference Tables

This option enables you to specify that the Import utility will insert new data into selected reference tables when required. The Import utility will insert new reference data into the target reference tables during the import process whenever data exists in the source table but it is missing in the target table

Note

- This option is available only if you have selected **Insert data into Reference Tables** in the **Link Properties** dialog box (for details, see Setting the Properties for a Link).

➢ To select the reference tables

1. In the **Import Link** window, click **Ref. Tables**.
2. In the **Reference Table List** dialog box, do one of the following:
   - Select the appropriate reference tables for which you want the Import utility to insert new data during the import process when required.
   - Clear the selected reference tables for which you want the Import utility to reject all new source data.
3. Click **OK**.

Note

- If you click  in the **Import Link** window without having selected a reference table in the **Reference Table List** dialog box, the Import utility will insert by default a new row into the appropriate reference table whenever possible.

Importing Data

Testing the Import Process

You can run a test of the import process according to the parameters you have set in the **Import Link** window. The test run will check the import process without carrying out the actual import of data (for example, without inserting, updating or deleting rows of the SmartPlant Instrumentation database).

Testing the import process can be useful when testing a single link before carrying out a large batch operation. A test run is carried out slightly faster than the actual import operation. It can give you an idea how the actual import will be carried out depending on your computer hardware and load of the imported data. It can also give you an indication on the rejected row(s) and allows you to fix the problem prior to a batch operation.

Note

- You can perform a test run of a sub-set of the selected source and target data by applying the appropriate filtering condition to the data (see Filtering the Source Data) and / or partially linking the source and target fields (see Mapping Source and Target Data).

➢ **To test the import process**

- With the **Import Link (table)** or **Import Link (module)** window open, click  to start checking the import process.

Note

- It is recommended that you define a log file, if you have not yet done so.

The **Import Progress Test** dialog box opens, where you can view the expected import process results.

Note

- The test results will be inaccurate when:
- Importing data in a group of links of which some links are related as in the example: cable, cable set, and wire.
- Importing one or more source tables containing multiple prime values.

Executing the Import of Data

After you finish defining the links between the source and target fields you come to the end of the import setup process. Now you can execute the import of data.

Caution

- The import process is irreversible: once you carry out the import process, you cannot undo the changes Import made to the target database. We therefore recommend that you use the **Test** feature to check the import process before carrying out the actual data transfer.

At this stage the **Import Link** window is open and contains all the appropriate definitions.

➢ To execute the import of data

- In the **Import Link** window, click  .

The **Import Progress** dialog box opens, displaying the following information:

Field	Description
Source Table Rows: Total / Current	The total number of rows and number of rows currently imported in the currently selected source table.
Target Table Rows	The number of rows of the current table that have already been processed by the Import utility during the current import session, according to their status (Inserted, Updated, Deleted, or Rejected).
Tables / Rows in current table (progress bars)	The percentage of data which has already been processed (for a **module** import link) for the entire module and for the table currently being processed.
Progress bar	The percentage of data which has already been processed (for a **table** import link).
Cancel	Stop the import process during execution.
Report	View the report on rejected rows. This button is available only if any rejected rows occurred and if you selected the **Rejected data report** check box in the **Link Properties** dialog box. This option allows you also to generate a hard copy of the current report. (This button becomes active only after the import process was stopped or was completed.)
Information	View the import process information: the target table name and the row count before and after import. (This button becomes active only after the import process was stopped or was completed.)

Comparing Import Data

Rinning the Comparison List

After you have run an import session on a set of data at least once, you can run subsequent sessions by comparing the new rows to be imported with previously imported rows. You can do this from the **Import Comparison List** dialog box as well as from the **Comparison** tab in the **Link Properties** dialog box. You can also start transferring data after you have selected specific rows that you want to import from the source to the target. For details of the import comparison criteria and how to modify them, see Setting the Import Comparison Criteria.)

➢ To run the comparison list

1. Do one of the following:

   - In the **Import Link** window for a table or module, click  .
   - Specify the deviation options in the **Parameters Settings** dialog box **Comparison** tab. This method applies only if you started this import session using a saved link.

2. In the **Import Comparison List** dialog box, under **Show**, click **All** to display all the data rows.

    **Note**

   - If you have already defined a source filter condition in this session (in the **Link Properties** dialog box), only the source rows which comply with this condition will be displayed in the **Import Comparison List** dialog box. See Filtering the Source Data for details.

3. Select the required data rows to be processed for import by doing one of the following:

   - Select the check box in the **Select** column for each row you want to include.
   - In the **Select rows** section, click the **All** radio button to select all the rows.
   - In the **Select rows** section, select one or more of the check boxes to include all the rows where the mode corresponds to the selection.

4. Select **Re-open the Comparison List**.

Note

- Rows where data was changed are highlighted in light blue.

5. Click **Test** to check the import process without actually saving data to the target table.
6. Modify the link mapping, if required, to correct any errors.
7. Click **Run** to import the data.

Setting the Import Comparison Criteria

You can control the way in which the Import utility regards the source and the target rows as identical during the import process. This is important, because when the Import utility encounters identical source and target rows, it can overwrite the target row or leave it intact, depending on the **Comparison** options which you select in the **Link Properties** dialog box. You can therefore control the import process result by selecting the appropriate import comparison criteria.

In SmartPlant Instrumentation, the database is organized in tables, for example: CABLE, COMPONENT, CONTROL_VALVE, and so forth. These tables contain data arranged in **columns** which represent various data entities, for example, tags, cables, panels, and so forth.

For example:

The COMPONENT table contains all the tag data together with the appropriate links to other tables, which utilize tags, such as: COMPONENT_MFR (Manufacturer table), COMPONENT_MOD (Component Model table), and so forth.

Every SmartPlant Instrumentation table contains any of the following columns or fields:

Primary Key - This field is found in **every table** and is used only by SmartPlant Instrumentation to access the corresponding table. The Primary Key field is usually denoted by an '_ID' suffix.

For example:

The COMPONENTS table primary key is CMPNT_ID. This means that each row in the COMPONENT table has a different value in the CPMNT_ID field.

Primary Value - This field type is found in **every table** and is used by the user to access tables. The **Primary Value** field can contain one or more of sub-fields which together form the **Primary Value** field.

For example:

The COMPONENTS table **Primary Value** field is CMPNT_NAME. This means that each row in the COMPONENT table has a different value in the CPMNT_NAME field.

Foreign Key - This field is found only in **some tables** and is used as a reference field to another table called a reference table. The **Foreign Key** field contains the value of the reference table primary value, thus linking the specific target table with the reference table.

For example:

The CPMNT_MFR foreign key in the COMPONENTS (tags) table contains the COMPONENT_MFR (Manufacturers) table value for the **Primary Value** field. This way the CPMNT_MFR **Foreign Key** field links the COMPONENT table to the COMPONENT_MFR table. This allows SmartPlant Instrumentation to obtain the required tag's Manufacturer data from the Manufacturer table.

Regular Field - This field is found in most tables and contains the appropriate table data such as Color, Item price, Remarks, Specifications, and so forth.

You can use **one or more** columns in each table as fields of the **Primary Key** or **Primary Value** fields of this table. Both fields provide access to the SmartPlant Instrumentation database but only the **Primary Value** field is accessible to you (the **Primary Key** field is for SmartPlant Instrumentation internal use only). The values of the **Primary Value** field of each table is unique in this table.

When comparing rows, the Import utility treats source and target rows as identical **only if the source Primary Value and the target Primary Value fields contain the same value**.

For example:

If the COMPONENT table in both source and target rows contains the same values in the **Primary Value** fields, both rows are considered as identical.

When the Import utility encounters identical source and target rows it can either replace the contents of the target row with the source row contents or leave this target row intact, depending on the import process settings.

You can select the appropriate **Primary Value** field of every table in the database. This way you can create a different comparison criteria for each table.

You can also create a link to other tables by defining the appropriate **Foreign Key** fields. This way the Import utility imports additional reference data during the import process, depending on the selection you make in the **Source** tab (in the **Link Properties** dialog box).

Caution

- Changing the settings in the **Table Definition** dialog box alters the relations between the tables. We therefore recommend you do not change these settings unless absolutely necessary and unless you are familiar with the SmartPlant Instrumentation database structure.

You can perform the following actions:

- Modify the target table primary value and foreign key column definitions.
- Clear the current definition of columns of the tables.
- Save the changes that you make to the table structure in an existing structure definition or create a new definition.

Modifying the Column Definitions

Use this procedure to modify the column definitions in the target database.

➢ **To modify the column definitions**

1. Do one of the following:

   - On the **Service** menu, click **Target Table Definition**.
   - With the **Link Properties** dialog box open, click **Target Definition**.

   Note

   - If you open the **Table Definition** dialog box by clicking **Target Definition** in the **Link Properties** dialog box, you will not be able to modify the definition of tables other than the one you selected in the **Import Link Source and Target Definitions** dialog box.

2. In the **Table Definition** dialog box, under **Table List**, highlight the table whose column definitions you want to modify.

   The appropriate option button (beneath the **Table List** section) becomes automatically active. This option button indicates the level of the table in the target domain (for example, project, plant, area, or unit level).

   Note

   - Table Definition Note

3. Click **Definition**.

4. In the **Definition Names** dialog box, do one of the following:

   - In the **Description** data window, select an existing definition.
   - Click **Insert** to add a new definition in the **Description** data window and type the new definition name.

Note

- For certain tables with several available existing definitions, you must select a definition that is appropriate for the type of association of the entities that you are going to import. For example, when importing panel-strip data, you might have some panels with direct connections to strips, and other panels that include other entitles above the strip, such as a panel-rack-apparatus-strip association. In this case, you would create several links, each with an appropriate definition for the desired association.

5. Click **OK** to return to the **Table Definition** dialog box.

6. In the **Column Definition** section:

   a) Select **Visible** for each table column you want to display in the **Import Link** window.

   b) Select **Default** for each table column to apply the default value (space, zero or asterisk) in the case where the field is empty during the import process.

Caution

- For some columns (for example, primary key columns) the Import utility automatically clears the **Visible** column check box. We recommend you do not make these columns visible to avoid import failure.

Note

- Column Definition Colors

7. To set the type of the column selected under **Key Definition**, do one of the following:

   - Click **Primary key** to use this column as a primary key.
   - Click **Foreign key** to use this column as a foreign key, then double-click  to close the **Foreign Key List** window (see the following step for more details).
   - Accept the given default values.

Note

- Column Status Note

8. To modify the definition of a foreign key, with the **Foreign Key List** window open, drag the required foreign key from **Foreign Key List** to **Key Definition** in the **Table Definition** dialog box.

Note

- Key Note

9. To link the selected column to a reference table:

   a) From the **Reference Table** list, select the appropriate reference table.

   b) From the **Reference Column** list, select the appropriate **primary value** field.

Note

- The **Reference Column** field value can be one of the following:
- A field name in the current table, if the current key is **not** a foreign key.
- A field name in the reference table specified in the **Reference Table** field, if the current key is a foreign key.

   c) From the **Reference Key** list, do one of the following:

      - Accept the given default values (recommended).
      - Select the appropriate reference key if required.

Caution

- Key Caution

10. To determine the way the current key will be numbered in the target database (note that this is an internal value which is not accessible to you), do one of the following:

- Select the **Local** check box to follow the previous-level numbering to make the currently defined column address unique in the target database.
- Clear the **Local** check box to follow the global numbering in SmartPlant Instrumentation.

Note

- Numbering System Note

11. To modify the definition of the additional column of the current table:

    a) Drag the appropriate columns from **Column Definition** to **Key Definition**.

    b) Specify the fields that the Import utility will create during the import process before generating a selected target field by selecting **Define parameters for Level Key**. This way the Import utility will create the field(s) specified in the Level Key data field (in the **Column Definition** data window) before creating the corresponding field in the **Column Name** data field.

    c) In the **Column Definition** data window, click  to view the **Level Key** column.

    d) In the **Level Key** data field, do one of the following:

    - Type the name(s) of the field(s) to be created by the Import utility during the import process before creating the corresponding field in the 'Column Name' data field.
    - Clear **Define parameters for Level Key** to discard the fields specified in the **Level Key** data field.

     **Note**

    - Key Level Note

12. Repeat steps 1 through 11 in this procedure for each column.

13. Click **OK**.

14. At the prompt, click **Yes** to confirm the changes and clear the **Key Definition** data window.

     **Tip**

    - You can select another table and skip the changes you made to the current table as follows:
        - In the **Table List** data window, select another table.
        - Click **Definition** and then click **No** in the message dialog box.

15. Click **Save** to save your selection of table keys.

16. At the prompt to confirm the new definitions, do one of the following:

    - Click **Yes** to open the **Definition Names** dialog box and save the new definition.

    - Click **No** to return to the **Table Definition** dialog box and modify your definitions.

17. Repeat steps 1 through 16 of this procedure for each required table.

18. Click **Close** to close the **Table Definition** dialog box and return to the **Link Explorer**.

Modifying the Column Definitions - Table Definitions Note

Every SmartPlant Instrumentation table is defined at a specific plant hierarchy item level. This means that the value of the primary value field of that table is unique on the specified level.

For example:

The primary value field of the COMPONENT table is CMPNT_NAME. If you define the COMPONENT table on the <unit> level, then the CMPNT_NAME field will become unique on the <unit> level. This means in the <unit> level there cannot be more than one row with a particular value in the CMPNT_NAME field.

Modifying the Column Definitions - Column Colors Note

- The columns appear under **Column Definition** in four possible colors:
    - **Red** — Primary Value field (must be defined)
    - **Blue** — Foreign Key field
    - **Black** — Regular field in the specific target table
    - **Magenta** — Reference Field which is defined as a regular field (for example, not used to get linked data)
- In SmartPlant Instrumentation, each column has a numeric address which is used in the SmartPlant Instrumentation database to access the information in that column. In the **Table Definition** dialog box you can determine that the column address will be unique either in the target database (for example, locally) or in SmartPlant Instrumentation.

Modifying the Column Definitions - Column Status Note

You can use the column status radio button also to change the target column type (for example, from **char** to **number** and vice versa). This is required if the source column and the target column are of different types (for example, one column is defined as **char** and the other is defined as **number**). In this case you can change the column type of the target table into **char** by defining it as a foreign key or change the column type into **number** by deleting this column key definition (see Deleting the Column Key Definitions to learn how to delete the column key definition).

Modifying the Column Definitions - Key Note

A primary key and a foreign key may contain more than one column (field).

For example:

The CABLE Table primary key can contain both CABLE_ID and CABLE_NUM columns. Each key is numbered in the table. If a key contains more than one column, each column is numbered in the key.

For example:

If CABLE_ID and CABLE_NUM are the fields comprising the CABLE table primary key, then each field has a serial number within the CABLE table primary key (for example, 1 and 2).

Modifying the Column Definitions - Key Caution

Selecting a value for the **Reference Key** field is **not** required if the current Key is a **not** a Foreign Key.

When the current key is a foreign key, two situations are possible:

- The **Reference Table Primary Value** field is the same as the one specified in the **Reference Column** field; in this case the **Reference Column** field is usually left empty and the corresponding column title is displayed in regular text, for example, Reference Key.
- The **Reference Table Primary Key** is other than the one specified in the **Reference Column** field; in this case the 'Reference Column' column title is displayed in bold text, for example, **Reference Key**.

Modifying the Column Definitions - Numbering System Note

The software uses three numbering systems:

- A global numbering system: this way the selected key number originates from a general number list that applies to the entire system.
- A local numbering system: this way the selected key is numbered within a table or an object (for example, Panel, Cable, and so forth). **For example**:
  - The PANEL_STRIP table **Primary Value** field consists of two sub-fields:
  - PANEL_NAME that originates from the PANEL Table and is numbered globally.
  - STRIP_NAME which is numbered locally.

  This means that in every new panel, the strip numbering restarts from 1, whereas the panel numbering continues the global numbering which exists in SmartPlant Instrumentation.
- A local revision numbering system: this is a local numbering method which starts from zero instead of from one.

Modifying the Column Definitions - Key Level Note

The key level operation is designated for tables which contain strip data (STRIP_CONFIG, STRIP_MFR, and so forth).

You can specify what fields the Import utility creates during the import process prior to generating a selected target field. You do this by activating the level key option and specifying the required target field(s) to create prior to generating the selected target field.

For example:

The Strip Manufacturer Models (STRIP_MFR_MOD) table **Primary Key** field contains two columns or sub-fields: STRIP_MFR_ID and STRIP_MOD_NAME.

To generate the STRIP_MOD_NAME field, the Import utility will create the STRIP_MFR_ID and the STRIP_MOD_ID fields prior to generating the STRIP_MOD_NAME field.

If you select **Define parameters for Level Key**, the Import utility will automatically create the fields which you specify in the **Level Key** field (in the **Column Definition** data window) prior to generating the corresponding field in the **Column Name** data field.

Deleting the Column Key Definitions

Use this procedure to delete existing column key definitions.

➢ To delete column key definitions

1. With the **Table Definition** dialog box open, select the required table in the **Table List** data window.
2. Click **Definition**.
3. In the **Definition Names** dialog box, under **Description**, select the required definition.
4. Do one of the following:
   - Click **Delete** to delete the required definition.
   - Click **OK** to display the columns of the selected table in the **Table List** data window.

   The appropriate columns appear in the **Column Definition** section. The comparison definition also appears under **Key Definition**.
5. Click **Delete Key** to delete **all** the key definitions of the selected table.
6. At the prompt, click **Yes** to confirm the deletion
7. Click **Save** to save your selection of table keys in the Import utility.
8. At the prompt, click **Yes** to save the changes you performed.
9. Repeat steps 1 through 8 of this procedure for every required table.
10. Click **Close** to close the **Table Definition** dialog box and return to the **Link Explorer**.

Viewing the Source and Target Rows

You can view the source and target rows according to the selection you made, or per process (for example, rows that will be inserted, rows that will be deleted, and so forth).

➢ To view the source and target rows

1. Under **Show**, do one of the following:
   - Click **All** to view all target rows.
   - Click **Selected** to view only the selected target rows. Selecting this option displays only the rows you have previously selected.
   - Click **by Mode** to view the displayed rows according to their import mode.
2. Under **Import mode**, do one or more of the following:
   - Select **Inserted** to select all the source rows whose status is Insert (for example, the letter 'I' appears in the **Mode** column).
   - Select **Updated** to select all source and target rows whose the status is Update (for example, the letter 'U' appears in the **Mode** column).
   - Select **Deleted** to select all source rows whose status is Delete (for example, the letter 'D' appears in the **Mode** column).
   - Select **Refreshed** to select all source and target rows whose status is Refresh (for example, the letter 'R' appears in the **Mode** column).

   Note

   - You can select more than one import mode by which the data in the data window will be displayed. This way you show the source and target data by more than one import mode.

3. Click **Display** to display rows according to the filtering options selected under **Show**.

Filtering the Displayed Target Rows

You can filter the target rows displayed in the **Import Comparison List** dialog box. Note that filtering the target rows this way will not affect the target rows currently selected to be included in the import process.

➢ To filter the displayed target rows

- At the bottom of the **Import Comparison List** dialog box, click **Filter** to open the **Import Target Filter** dialog box.

  The source fields available in this data window are only the ones currently displayed in the **Import Comparison List** dialog box. These are the same fields that you linked in the **Import Link** window.

Printing the Import Comparison List

This option enables you to preview and print out the source and target rows displayed in the **Import Comparison List** dialog box.

➢ To preview and print out the source and target rows

- At the bottom of the **Import Comparison List** dialog box, click **Report**.

  A preview window opens, where you can view and print out the displayed data.

Viewing the Source Data

Overview

This feature enables you to view the contents of the source table or database file that you selected when entering the Import utility. You can access this feature from the following locations in the Import utility:

- **Import Link Source and Target Definitions** dialog box (after you select the source data)
- **Import Source Filter** dialog box
- **Import Link** window

➢ To view the source data

- Do one of the following to display the **Source Data** window:
  - In the **Import Link** window, click  .
  - In the **Import Link Source and Target Definitions** dialog box or the **Import Source Filter** dialog box, click **View Source**.

You can perform the following actions:

- Display selected fields of the source data.
- Sort the displayed source data.
- Filter the displayed source data.
- Display the number of rows in the source data.

Displaying the Source Fields

The following viewing options are available:

- View all source data fields.
- View only linked source data fields.
- View only selected source data fields.

➢ To select the required viewing option

1. With the **Source Data** window open, do one of the following:

   - To view all the source data fields, on the **View** menu, click **All Fields**.
   - To view only the fields of the displayed source data which are linked to other tables or to the database, on the **View** menu, click **Linked Fields**.

   Note

   - You can view linked fields only if you have already defined the links between the source and the target fields in the **Import Link** window or if you have already used the definitions of a previously saved link.

   - To view selected source data fields, do the following:

   a) On the **View** menu, click **Display Fields**.

   b) In the **Display Source Fields** dialog box, drag the fields you want to view from **Source Fields** to **Selected Fields**.

   c) Click **OK**.

Sorting the Displayed Source Rows

You can perform an alphanumeric ascending sorting of the information displayed in the **Source Data** window according to one or more selected fields.

Note

- Sorting the source data in this dialog box does not affect the import results.

➢ To sort the displayed source rows

1. With the **Source Data** window open, on the **Sort** menu, click **Custom Set**.
2. In the **Display Source Fields** dialog box, drag the fields by which you want to sort the displayed source data from **Source Fields** to **Selected Fields**.
3. Click **OK**.

Filtering the Displayed Source Rows

You can filter the source data displayed in the **Source Data** section according to the filtering condition you defined in the **Source** tab in the **Link Properties** dialog box. To use this option, you must define a filtering condition.

➢ To filter the displayed source fields

- With the **Source Data** window open, do one of the following:
  - On the **Filter** menu, click **On** to filter the displayed source data according to the filtering condition you previously defined.
  - On the **Filter** menu, click **Off** to display the source data without filtering it.

Associating Source Data

Associating Imported Tag Numbers with the Correct Instrument Type Descriptions

The instrument type of a tag is an important part of the initial information for building a tag. This is true both when working with SmartPlant Instrumentation as an application as well as when entering tags using the Import utility. The instrument type information is designated in the function part of the instrument tag (for example, 100-FY400). Sometimes the source data lacks an instrument type description, for instance, there is an FY function type name that is an I/P Converter and also a Solenoid Valve. This option enables you to specify that each imported tag number will be associated with the correct instrument type description.

➢ To associate tag numbers with the correct instrument type descriptions

1. On the **Service** menu, click **Preliminary Function**.
2. In the **Preliminary Function** dialog box, click **OK**.
3. In the **Select ODBC Profile** dialog box, select the appropriate data source and click **OK**.

   Note

   - For this option, you can select only .dbf and .xls data file sources.

4. In the **Enter File Name** dialog box, navigate to the appropriate ODBC data source file and click **Open**.
5. In the **Define Fields** dialog box, do the following:
   a) Under **Select Fields**, click **Instrument Type Name**.
   b) In the **Source Column Name** data window, select the appropriate column you will use for the instrument type name.
6. Repeat step 5 for each item in the **Select Fields** section.
7. When done, click **OK**.

8. In the **Define Function Type** dialog box, do the following:

   a) In the **Function Type** section, select a function type name from the name column.

   b) In the **Description** column adjacent to your selection, display the list, and if more than one description is available, select the required description.

   c) Do one of the following:

   - In the **Tag Number** section, select the instrument tags you want to associate with the selected function type.
   - In the **Function Type** section, select the **All** check box to associate all the available instrument tags with the selected function type.

   d) To use the same function type name with more than one description for different instrument tags, click **Duplicate** and for the new row select the required description from the list.

Tip

- You can define additional instrument type values. To do this you need to exit the Import utility and enter the Instrument Index module. See Instrument Type: An Overview to learn how to add instrument type values.

9. Click **OK** after you finish associating all function type names and tag numbers to SmartPlant Instrumentation component function types.

Caution

- You need to associate **all** tag numbers to successfully import tags later.

Associating Additional Source Data

You can import additional data and associate it to the source table that you selected in the **Import Link Source and Target Definitions** dialog box. This way you can import data into your database from more than one source table. You do this by associating columns from other tables or database files to the source table or database file. The associated columns automatically become a part of the source data which you have selected in the **Import Link Source and Target Definitions** dialog box.

Note

- You can use associations which have been previously saved in a link. To do this you have to start the import process using a previously saved link.

➢ To associate additional data to the source table / database file

1. Select the required link and click  .
2. In the **Link Properties** dialog box, click the **Source** tab.
3. Under **Associate source tables**, click **Define**.
4. In the **Associate Source Data** dialog box, click **Add** to add a data set (for example, a table or a database file) to the **Source list** data window.
5. Repeat step 4 to add as many data sets as required.

   Note

   - It is possible to use the same table more than once as a source.

6. Highlight the required data set to associate to and under the **Association** data window, click **Select**.

   The selected data set is copied to the **Source for association** data window.

7. Expand the required data sets in each data window by double-clicking them, then drag the required item in that data set to the appropriate data set item in the **Source for association** data window.

   The association between the two data items is indicated by the appearance of an icon () to the right of each data item in the appropriate section.

   Caution

   - In SmartPlant Instrumentation, columns contain:
   - Numbers - a **num** type column
   - Characters - a **char** type column
   - You cannot associate a **num** type column with a **char** type column and vice versa.

8. Repeat step 7 to associate other data items as required.

   Note

   - You can associate several items with a single data set item, however, you cannot associate data from a data set with itself.
   - To delete an association, select the required item in the **Source for association** data window and press **Delete** on the keyboard.

9. Click **Verify** to make sure your selections are valid (this way you can check, for example, whether the associated fields are both of the same data type – numeric or alphanumeric).

   An appropriate message is displayed: if the associations are valid, the total number of rows of the source data set (including the associated data) is indicated, or else you are notified that the associations are invalid, in which case you should correct your selection in the **Source Associations** dialog box.

10. Click **Confirm**.

11. At the prompt, click **Yes** to save your associations.

    The data sets disappear from the right data window and appear at the top of the left data window.

12. To make the fields of the associated data appear in future dialog boxes, do the following:

    a) Expand the associated data sets by double-clicking them.

    b) Click **once** on every item you want to view.

    The icons appear as follows:

    - Item selected: 
    - Item not selected: 

 **Note**

- You can view the contents of an associated data item in the **Import Link** window. To be able to view the associated data, click  when available, after you select the required table (see Viewing the Source Data to learn how to view the source data).

 **Caution**

- Make sure you remove all disassociated tables from the data windows in the **Source Associations** dialog box before you click **Save**.

13. Click **Save** to save your association.

14. In the **Link Properties** dialog box, under **Source Associations**, do one of the following:

    - Select **Apply** to use your associations in the current import process.
    - Clear **Apply** to skip the defined associations.

Associating Source Tags with Instrument Types

In SmartPlant Instrumentation, the Instrument Type of a tag is abbreviated and therefore needs to be associated with a description that provides more information about that instrument type, for example, the Instrument Type **FV** description is **Flow Valve**.

Sometimes an instrument type, which is used as an acronym, may not be unique. For example, in SmartPlant Instrumentation, **FE** can stand for both **Flow Element** and **Mass Flow Sensor**.

If a source database that you import data from does not utilize instrument types or instrument type descriptions, or if the source instrument type is not associated with a process function, you need to associate the required source fields manually and define them as instrument types, instrument type descriptions, and process functions. See Instrument Index, Supporting Properties Tables to learn how to view and modify instrument type and process function data in SmartPlant Instrumentation.

Note

- The combination of the instrument type name and description provides a unique identifier for a tag's instrument type.

➢ To associate source tags with instrument types

1. In the **Link Properties** dialog box, select the **Source** tab and under **Assign Process Function**, click **Define**.

2. If this is the first time you are running the link, in the **Define Instrument Type Fields** dialog box, do the following (for more information, see Guidelines for Selecting Source Fields):

   a) From **Source**, drag the required field to **Instrument type name**.

   b) From **Source**, drag the required field to **Instrument type description**.

   c) Click **OK**.

3. In the **Process Function Mapping** dialog box, for each instrument type the left section, drag the appropriate process function from the right section to either a light-blue field (unassigned process function) or a white field (assigned process function) in the **Process function** column next to the appropriate instrument type.

   Notes

   - After the first time you run the link, some of the instrument types will already have process functions defined by default – these are displayed with a gray background, and you cannot reassign the process functions for them.

4. When done, click **OK**.

Guidelines for Selecting Source Fields

After you select the source fields to be used as instrument type name and description fields, the Import utility will refer to these fields as such. This means the source data and will be imported from the source database to SmartPlant Instrumentation with respect to the values in the source instrument type name and description fields that you selected. Therefore to carry out a successful import you need to select the fields which are most compatible with the SmartPlant Instrumentation instrument type, instrument type description, and process function conventions.

Use the data in the following table as guidelines when selecting source fields and defining them as instrument type fields and instrument type description fields:

Parameter	SmartPlant Instrumentation Conventions
Instrument Type maximum length	6 characters
Instrument Type typeface	upper-case (for example, **FY** - not - **fy** or **Fy**)
Instrument Type values	These must start with a process function letter which can be one of the following: **F** (Flow) **L** (Level) **P** (Pressure) **T** (Temperature) **A** (Analyzer) **C** (Control Valve) **R** (Relief Valve)
Instrument Type Description maximum length	40 characters

➢ To define and associate source Instrument Type and Instrument Type Description fields

1. Select the required link and click  .
2. In the **Link Properties** dialog box, click the **Source** tab.
3. Under **Assign process function**, click **Define**.

4. If no instrument type fields have been defined for the current source, then in the **Define Instrument Type Fields** dialog box, do the following:

   a) From **Source**, select the required field and drag it to **Instrument type name**.

   b) From **Source**, select the required field and drag it to **Instrument type description**.

   c) Click **OK**.

   Note

   - Source fields that exceed 6 characters will be truncated accordingly during the import process.

5. In the **Process Function Mapping** dialog box, for each instrument type the left section, drag the appropriate process function from the right section to the **Process function** column.

   Note

   - If required, you can drag several source fields to create a concatenated source data string, or use formulas.

6. To filter the instrument types displayed in the left data window, under **View the Process Function Assignments**, do one of the following:

   - Click **All** to display assigned and unassigned instrument types.
   - Click **Unassigned** to display only instrument types which are not assigned yet with process functions.
   - Click **Assigned** to display only instrument types which are assigned with process functions.

   Note

   - After the first time you run the link, some of the instrument types will already have process functions defined by default – these are displayed with a gray background, and you cannot reassign the process functions. Unassigned fields are shown with a light blue background, and assigned fields with a white background.

7. When done, click **OK** to return to the **Link Properties** dialog box.

8. Under **Assign process function**, select the **Apply** check box to use the instrument type and instrument type description source definitions for the current import session.

Moving and Deleting Data

Moving Previously Imported Data

You can specify a link that will move existing data to a different <unit> within the same domain. This option is available only for **table** links.

➢ **To move previously imported data**

1. In the **Link Properties** dialog box, click the **Import mode** tab.
2. Under **Target database update mode**, click **Move** to move the rows in the target domain to a different <unit> in the same domain.
3. Click **OK**.

Deleting Previously Imported Data

You can specify a link that will only delete data that already exists in the database. This option is available only for **table** links.

➢ **To delete previously imported data**

1. In the **Link Properties** dialog box, click the **Import mode** tab.
2. Under **Target database update mode**, click **Delete** to delete existing rows in the target domain during the import process.
3. Click **OK**.

Link Groups

Overview

You can create a group of existing links by associating individual links to a group. Grouped links are especially useful when you want to import data in batch mode, for example, automatically use the links in that group one after the other to import data. You can, however, use a single link from that group if you want to use just one link.

Creating a New Link Group

You can associate a number of existing links to a new group to import data.

➢ **To create a new group and associate links with it**

1. In the **Link Explorer**, click  .
2. Under **Link list**, type the required name in the text box next to the new link.
3. Do one of the following:
   - Click  to add a new link to the group (see New Link Creation Overview for more information).
   - Click the link group All, select the required links in the right pane (press **Ctrl** or **Shift** for multiple selections), and drag the links to the group.
   - Click any other link group, select the required links in the right pane (press **Ctrl** or **Shift** for multiple selections), and drag the links to the group.

    **Note**

   - If you select to add a link that was already associated with a group, you move it by dragging it to another group. Holding down **Ctrl** while dragging copies it to the new group. You cannot move a link out of the group All.
4. Arrange the links in the required sequence in the group by dragging each link to the link below which it is to be located. To make a link the first one in the group, drag it to the group itself.

    **Note**

   - The sequence in which the links appear in a group is very important. When executing an import session for the entire group, the links are run in the order in which they appear in the group.

Dissociating Links from a Group

You can dissociate one or more links from a group. If a link is not associated with any group, you can still locate it and run it from the All group, if required.

➢ **To dissociate links from a group**

1. In the **Link Explorer**, click the group where you want to dissociate the links.
2. Select the required links in the right pane (press **Ctrl** or **Shift** for multiple selections).
3. Click  to dissociate the links from the group.

Moving and Copying Links

You can copy and move import links between groups by means of drag-and-drop operations as well as using the keyboard.

➢ To move a link to another group

1. In the **Link Explorer**, click the group containing the links you want to move.
2. Select the required links in the right pane (press **Ctrl** or **Shift** for multiple selections).
3. On the keyboard, do the following:
   a) Press **Ctrl+X**.
   b) Select the target group.
   c) Press **Ctrl+V**.

Tip

- As an alternative method, drag the selected links to the target group.

➢ To copy a link to another group

1. In the **Link Explorer**, click the group containing the links you want to copy.
2. Select the required links in the right pane (press **Ctrl** or **Shift** for multiple selections).
3. On the keyboard, do the following:
   a) Press **Ctrl+C**.
   b) Select the target group.
   c) Press **Ctrl+V**.

Tip

- As an alternative method, drag the selected links to the target group while pressing **Ctrl**.

Deleting Links

You can delete individual links or an entire group of links if they are no longer needed.

Caution

- The deletion process is irreversible – any links you delete will be removed from **all** link groups they are associated with, including All, and will not be available for use afterwards. For this reason, you should proceed with extreme caution when deleting links.

➢ To delete links

1. In the **Link Explorer**, click the group containing the links to be deleted.
2. Do one of the following:
   - To delete the group with all of its links, leave the group highlighted.
   - To delete selected links in the group, select the required links in the right pane (press **Ctrl** or **Shift** for multiple selections).
3. Click  to delete.
4. At the prompt, click **Yes** to confirm the deletion.

Renaming Groups and Links

You can rename an existing links or link groups required.

➢ **To rename a group or a link**

1. In the **Link Explorer**, click the group or link you want to rename.
2. Click  .
3. Type the new name for the link or group as required.

 **Note**

- Since groups in the **Link list** are arranged in alphabetical order, renaming a group may result in its moving to a different position in the list.

System Codes

Overview

When importing data from a non-SmartPlant Instrumentation database that uses system or UOM (Unit of Measure) codes different from the ones used in your target SmartPlant Instrumentation database, you are required to adapt the source system and/or UOM codes to the codes used in your target SmartPlant Instrumentation database. This feature can also be used to adapt system and UOM codes of an SmartPlant Instrumentation source domain, when importing data from one SmartPlant Instrumentation domain to another.

For example:

A **source** table may contain a code (for example, **A**) which is used as a reference in another **source** table. This code may be different from the one used in your corresponding **target** SmartPlant Instrumentation database (for example, **psia**). Therefore, prior to running import, you have to make the appropriate adaptations for the system and UOM codes.

Note

- If you want to use system codes in your current import session, you must select the appropriate source system and adapt its code prior to starting the import of data (see the procedure below for details). Also note that the target code values are predefined in the system and cannot be modified. When importing process data and/or calculation data and the units of measure are not defined, the Import utility will insert default UOM values belonging to the SmartPlant Instrumentation <unit> with which the imported tag data is associated.

To adapt source system and UOM codes you need to:

- Select the source system whose codes you want to adapt (see Defining Source Systems).
- Adapt the source codes to the target codes (see Adapting Source Codes).

Using this feature you can also keep the code adaptation data in a text file (with a CDS extension) and use it in future import sessions. You can:

- Import a code file that contains adapted system codes, UOM codes or both (see Importing Codes). Note that importing codes this way **doesn't** overwrite the current code adaptations.
- Export a code file that contains adapted system codes, UOM codes or both (see Exporting Codes).
- View the currently selected source system (see Viewing the Current Source System Name).

Defining Source Systems

Before you can adapt the source codes to comply with the target codes, you need to specify the source systems whose codes you want to adapt. At this stage, you also select the current source system whose codes you want to use during the current import session.

➢ To define source systems

1. On the **System Codes** menu, click **Select Source System**.
2. In the **Source System List** dialog box, do one of the following:
   - Add a new source system (see step 3).
   - Edit an existing source system name (see step 4).
   - Delete an existing source system (see step 5).
   - Select the current source system (see step 6).
3. To add a new source system:
   a) Click **New**.
   b) Click in the highlighted line.
   c) Type the new source system name.
4. To edit an existing source system name:
   a) In the data window, highlight the source system whose name you want to modify.
   b) Click **Edit** to make the line selected in the data window.
   c) Edit the source system name as required.
5. To delete an existing source system:
   a) In the data window, highlight the source system you want to delete.
   b) Click **Delete** to delete the line selected in the data window.
6. To select the current source system, in the data window, highlight the required line and click **OK**.

Adapting Source Codes

In this stage you adapt the codes used in the source database to the codes used in your SmartPlant Instrumentation database. There are two types of codes:

- **System Codes** - codes which are not associated with units of measure.
- **UOM Codes** - codes associated with units of measure.

Note, that several source code values can be represented by a single target code value.

For example:

The source code values **AA, BB, CC, DD** can be represented by (adapted to) a single target code: **XX**.

See the following topics for a list of the codes you can adapt:

- System Codes Table
- Unit of Measure Codes Table

Note

- You can adapt system codes and UOM codes only if you selected a source system. See the previous procedure to learn how to select a source system.

➢ To adapt system codes

1. On the **System Codes** menu, click **Adapt System Codes**.
2. In the **Source System List** dialog box, select the source system whose codes you want to adapt. The available source systems are the ones you entered in the **Source System List** dialog box.
3. In the **Adapt System Codes** dialog box, under **Module**, do one of the following:
   - Click **All** to make all entity groups available.
   - Click the SmartPlant Instrumentation module whose entity groups you want to make available (**Process Data**, **Wiring**, or **Calculation**).
   - Click **Other** to make all entity groups except for Process Data, Wiring, and Calculation entity groups available.
4. From the **Code Values** list, select the entity group whose codes need adapting.

5. To set the code values, do the following:

   a) In the data window, click the **Source Code** field of the appropriate code.

The selected **Source Code** field becomes editable. (If the field color was light blue, it changes to white.)

Note

- You can only set the values of source codes where the **Source Code** field color is either light blue or white.

   b) Type the source value which corresponds to the target system code value.

   c) To clear the currently selected source system code value, click **Unused**.

   d) To specify an additional source system code value for the target system code value currently selected in the data window, click **Duplicate** and type an additional value in the **Source Code** column of the new row.

6. Repeat steps 3 through 5 for every required SmartPlant Instrumentation module.

7. Repeat steps 2 through 6 for other source systems whose codes need adapting.

8. Click **OK** to close the **Adapt System Codes** dialog box.

Adapting UOM Codes

Use this procedure to adapt UOM codes.

➢ **To adapt UOM codes**

1. On the **System Codes** menu, click **Adapt UOM Codes**.
2. In the **Adapt UOM Codes** dialog box, from the **Source System** list, select the source system whose codes you want to adapt. The available source systems are the ones you entered in the **Source System List** dialog box.
3. From the **UOM Type** list, select the UOM category whose codes need adapting.
4. To set the code values, do the following:

   a) In the data window, click the **Source UOM Code** field of the appropriate code.

   Note

   - You can only set the values of source codes where the **Source UOM Code** field color is either light blue or white.

   b) Type the source value which corresponds to the target UOM code value.

   c) Click **Unused** to clear the currently selected source UOM code value.

   d) Click **Duplicate** to specify an additional source UOM code value for the target UOM code value currently selected in the data window.

5. Repeat steps 3 and 4 for every required SmartPlant Instrumentation module.
6. Repeat steps 2 through 5 for other source UOM whose codes need adapting.
7. Do one of he following:

   - Click **OK** to save the changes you made to the current UOM code settings and close the **Adapt UOM Codes** dialog box.
   - Click **Save** to save the changes you made to the current UOM code settings and keep the **Adapt UOM Codes** dialog box open. This way you can save the portion of the work you have done so far and keep working in the **Adapt UOM Codes** dialog box.

Adapting UOM Codes - Special Characters

To type power indexes (for example, ^{2} as in cm^2) and other special characters (for example, ° as in °C), do the following:

- Run the Windows Character Map utility and select the appropriate character to copy and click the **Copy** button.
- Do one of the following:
  - Switch to Import and paste the character in the required location.
  - Hold down **Alt** and, with the Num Lock indication on, type the required character's ASCII value (a four-digit number) using the keyboard numeric keypad (see your Windows User Guide for additional information about ASCII numbering).

For example:

Type **Alt** + 178 to add: ^{2}

Type **Alt** + 179 to add: ^{3}

Type **Alt** + 186 to add: °

Type **Alt** + 181 to add: µ

Importing Codes

This feature allows you to import from the same code file (with a .cds extension) both the system codes and the UOM codes or just one of them, depending on whether these codes exist in the ASCII file you are going to use. This way you can use code adaptation settings that were previously saved in files without having to redefine the code adaptation for every case.

Note

- Importing codes from an external file **does not** overwrite existing code settings.

➢ To import codes

1. On the **System Codes** menu, click **Import Codes**.
2. In the **Import System and UOM Codes** dialog box, do one of the following:
   - Under **Select File**, type the full path and filename of the ASCII file from where you want to import the codes, if you know it.
   - Click  to navigate to the required file.
3. Under **Import Data**, click the code type you want to import: **System Codes**, **UOM Codes**, or both.

   Note

   - The code type that will be imported depends on whether the file you selected in step 1 in this procedure actually contains the code type that you select in the **Import Data** section.

4. Click **OK** to import the selected codes.

Exporting Codes

This feature allows you to export the current code settings of any selected source system(s) to a code file (with a .cds extension). You can export both the system codes and the UOM codes or just one of them. This way you can keep code adaptation settings in a file and use them in future import sessions without having to redefine the code adaptation for every case.

➢ To export codes

1. On the **System Codes** menu, click **Export Codes**.
2. In the **Export System and UOM Codes** dialog box, select one or more source systems whose code settings you want to export to a file. To deselect a system, click it again.
3. Under **Export Data** click the code type you want to import: **System Codes**, **UOM Codes**, or both.
4. Click **OK**.
5. In the **Enter Export File Name** dialog box, select the file where you want to keep the codes of the system you selected in step 1 in this procedure.
6. Click **Save** to export the codes to the selected file.

Viewing the Current Source System Name

This option enables you to view the currently selected source system name.

➢ **To view the currently selected source system name**

- On the **System Codes** menu, click **Current Source System**.

  An appropriate message is displayed, showing you the current source system name.

Using Source Codes in an Import Link

After you have adapted UOM and system codes, this procedure describes how to use them in your import links.

➢ **To use source codes in an import link**

1. In the **Link Explorer**, select the link where you want to use source codes.
2. On the **Actions** menu, click **Properties**.
3. On the **Link Properties** dialog box, click the **Source** tab.
4. Select **Use system codes**.
5. Click **OK**.
6. In update mode, if prompted to use the overwrite option, click **Yes**.
7. Open the link which you want to use to import your data.
8. Define the link mapping by dragging the appropriate source names to the target window.
9. In the link, select the check boxes in the target window under the **Code** column for those link parameters for which you want to use source codes.

   Tip

   - To use all available source codes in the link, on the **Actions** menu, point to **System Codes** and click **Check All**.

Supplementary Information

Data Import Order

General Data

Order	Table Name	Table Description	Primary Value Field
1.	component_function_type	Instrument Type	cmpnt_func_type_name
			cmpnt_func_type_desc
2.	component_mfr	Manufacturer data	cmpnt_mfr_name
3.	component_location	Location data	cmpnt_loc_name
4.	equipment_type	Equipment type data	equip_type_name
5.	line_type	Line type data	line_type_name
6.	Equipment	Equipment data	equip_name
7.	Line	Line data	line_num
8.	loop_function	Loop function data	loop_func_name
9.	loop_proc	Loop measure variable	loop_proc_name
10.	loop_type	Loop type data	loop_type_name
11.	Loop	Loop data	loop_name
12.	Drawing	P&ID data	dwg_name
13.	Component	Component	cmpnt_name
14.	udf_component	Custom fields related to component	cmpnt_name
15.	spec_sheet_data	Specification data	cmpnt_form_cnum
			cmpnt_name
16.	control_valve or level_instrument or temperature	Process data	cmpnt_name

Wiring Data

Order	Table Name	Table Description	Primary Value Field
1.	Cable_type	Cable type information	Cable_type_name
2.	Cable_color	Cable color information	Cable_color_name
3.	Cable_mfr	Cable manufacturer information	Cable_mfr_name
4.	Cable_mfr_mod	Cable model information	Cable_mfr_name
			Cable_mod_name
5.	Cable	Cable information	Cable_num

Order	Table Name	Table Description	Primary Value Field
6.	Panel_type	Panel type information	Panel_type_name
7.	Panel	Panel information	Panel_name
8.	Panel_strip	Strip information	Panel_name
			strip_name
9.	Panel_strip_term	Terminal information	Panel_name
			strip_name
			term_seq
10.	Wire_Terminal	Terminal data with special function propagation	Panel_name
			strip_name
			term_seq
			Cable_num
			Cable_set_name
			set_level

Defining Tables in Excel Spreadsheets

The software is capable of processing tables originating from Excel spreadsheets, using an Office profile.

➢ To define a table in Excel

1. With your Excel worksheet open, highlight the cells that you want to define as a table.

2. Select the **Define** menu item from the **Name** sub-menu in the **Insert** menu.

3. In the **Name in workbook** data line of the **Define Name** dialog box, type the table name in **upper case**. The name you type will be assigned to the group of cells you selected in step 1 in this procedure.

   Note

   - The table name that you assign to a group of cells in an Excel spreadsheet must always be typed in **upper case**.

4. Click **OK** to return to your Excel spreadsheet.

5. Repeat steps 1 through 4 in this procedure for all required tables.

Common Error Messages

This table describes some of the most common error messages which appear in both the Import Report and the log file after an import process takes place. Also included in this table are possible causes and suggested solutions for each case.

Message	Possible Cause(s)	Suggested Solution
Empty Component Number of Tag Number	The imported Tag LOOP IDENTIFIER segment is empty.	Modify the source data. Modify the import naming conventions.
Empty Loop Number of Loop Number	The imported LOOP NUMBER segment is empty.	Modify the source data. Modify the import naming conventions.
Illegal Instrument Type of Tag Number	The imported Tag Instrument Type value does not exist in the target domain (see Note 1).	Modify the source data. Import the Instrument Type Table (COMPONENT FUNCTION TYPE) first. Clear the Validate Tag and Loop option (see Note 4).
Illegal Equipment Name of Tag Number	The imported Tag Equipment Name value does not exist in the target domain (see Notes 1, 2).	Modify the source data. Import the Equipment Table (EQUIPMENT) first (see Note 4).
Illegal Equipment Name of Loop Number	The imported Loop Equipment Name value does not exist in the target domain (see Notes 1, 2).	Modify the source data. Import the Equipment Table (EQUIPMENT) first (see Note 4).
Illegal Loop Function of Loop Number	The imported Loop FUNCTION segment value does not exist in the target domain.	Modify the source data. Import the Loop Function Table (LOOP_FUNCTION) first (see Note 4).
Illegal Measured Variable of Loop Number	The imported Loop MEASURED VARIABLE segment value does not exist in the target domain.	Modify the source data Import the Loop Function Table (LOOP_PROC) first (see Note 4).
Illegal <Unit> Number in Tag Number	The imported <unit> number is different from the target <unit> number (see Notes 1, 3).	When importing more than one plant hierarchy item, make sure the PAU option is selected in the **Link Properties** dialog box. Modify the source data. Modify the import naming conventions.
Illegal <Unit> Name in Tag Number	The imported <unit> name is different than the target <unit> name (see Notes 1, 3).	When importing more than one plant hierarchy item, make sure the PAU option is selected in the **Link Properties** dialog box. Modify the source data. Modify the import naming conventions.
Illegal Area Number in Tag Number	The imported Area number is different than the target Area number (see Notes 1, 3).	When importing more than one Plant/area, make sure the PAU option is selected in the **Link Properties** dialog box. Modify the source data. Modify the import naming conventions.

Message	Possible Cause(s)	Suggested Solution
Illegal Plant Number in Tag Number	The imported Plant number is different than the target Plant number (see Notes 1, 3).	When importing more than one Plant, make sure the PAU option is selected in the **Link Properties** dialog box. Modify the source data. Modify the import naming conventions.
The Process Function is not found	The imported Process Function Name is different than the target (note that this variable is case sensitive and that this value is usually capitalized). The Process Function Name value (in the Component Table or in the Component Function Type Table) is different than the Process Function Name value in the Process Function Table (see Notes 1, 5).	Modify the source data.
The Instrument Type is not found	In the COMPONENT Table, the CMPNT_FUNC_TYPE_ID field value contains an invalid reference to the COMPONENT_FUNCTION_TYPE Table.	Modify the link settings. Modify the source data. Clear the Validate Tag and Loop option.
The Instrument Type does not match the Tag Number	In the COMPONENT Table, the Instrument Type value in the COMPONENT_NAME field (Tag Number) is different than the value in the CMPNT_FUNC_TYPE_ID field.	Modify the link settings. Modify the source data. Clear the Validate Tag and Loop option.
The Instrument Type does not match the Process Function	The Process Function value in the Tag Number does not comply with the Process Function type (for example, Flow, Temperature, and so forth).	Modify the link settings. Modify the source data. Clear the Validate Tag and Loop option.
User has selected to reject row on data mismatch	The Import utility rejected a mismatched source row (see Note 6).	You can modify the selection you made for this link, if appropriate. See Setting General Parameters to learn more about this option.
User has selected to disallow overwrite	The Import utility has rejected a source row which is identical to an existing target row (see Note 6).	You can modify the selection you made for this link, if appropriate.
User has selected to disallow insertion	The Import utility rejected a source new row (for example, the Import utility is only updating the target data) (see Note 7).	You can modify the selection you made for this link, if appropriate.
Unique value not found	The imported table Primary Value key value does not match the value of in the table from which it is derived (see Note 8).	Make sure the table which provides the value for the Primary Value key is selected for import.
This is not a numeric value	An attempt has been made to import a non-numeric field to a numeric field.	Make sure you selected the appropriate links in the **Link Explorer**.

Message	Possible Cause(s)	Suggested Solution
Invalid data	Inappropriate symbols were used in one or more imported fields. An incorrect comparison criteria was applied in the current import process (see Note 9).	Select the Check symbols option in the **Link Properties** dialog box. See Setting General Parameters to learn more about this option. Make sure you have correct comparison criteria settings. See Setting the Import Comparison Criteria for more information about this option.
Data is empty	The Import utility has imported a Zero-ID row (see Note 10).	This message does not indicate an error.

The following notes apply to this table:

1. This message is specific for the case in which you select the Validate Tag and Loop option in the **Parameters Settings** dialog box. See Setting the Tag / Loop Parameters for more information.

2. These segments apply to the Flexible naming convention standard only.

3. By default, the target <unit> is the one you selected when you started the current Import session. If you selected during the import setup process to import data into additional <units>, the target <unit> would be any of these <units> which data will be imported into during the import process. See Importing Data into Additional Plant Hierarchy Items for further information about importing data into additional target <units>.

4. As a rule of thumb, always import reference tables before importing the tables they refer to. When importing into a module, make sure all appropriate reference tables have been selected for import. (The corresponding message in the table varies according to the relevant reference table.)

5. The **Process Function Name** field value can be one of the following (note that these values are capitalized):

   - Flow
   - Level
   - Pressure
   - Temperature
   - Analyzer
   - Control Valve
   - Relief Valve

   Caution

   - Do not select the PROCESS_FUNCTION table for import; as this may damage your target database.

6. This message is typical to the case in which you select the **Do not overwrite** option in the **Link Properties** dialog box.

7. This message is typical to the case in which you select the **Rejected mismatched data** in the **Link Properties** dialog box. See Setting General Parameters to learn how to handle mismatched data.

8. This message is typical to the case in which you import a table whose Primary Value key is derived from another table's Primary Key. In this case the table the Primary Key belongs to must also be imported.

   For example:

   The PD_GENERAL Table Primary Value key, CMPNT_ID, is derived from the COMPONENT Table. Therefore, the PD_GENERAL Table Primary Value key value must exist in the COMPONENT Table.

9. This message is reported by your SQL platform. The name of the field the problem occurred in appears in the Column Name column of the Import Report. In this case we highly recommend you refer also to the information regarding this import attempt in your Log File.

10. Most SmartPlant Instrumentation tables contain a **Zero-ID** row which is used to maintain the linkage between the tables in the database. During the import process this row is not transferred from the source data to the target data, in which case the Import utility displays an appropriate message in the Import Report.

Built-In Operators and Functions

Operator / Function	Description	Example
=	Equal to	cpmnt_mfr = 'Shell'
>	Greater than	cmpnt_num > 101
<	Less than	item_price < 100
>=	Greater or equal to	cmpnt_num >= 10
=<	Less than or equal to	item_price =< 30
<>	Not equal to	prefix <> 'AA'
AND	Include the following expression in the filter combination	(name <> '') AND (num <> 0)
OR	Accept either the previous or the following expression in the filter combination	(loop = '') OR (line = '')
NOT	Select the value opposite to the following expression	NOT (item_price = 0)
LIKE[value]	Select a similar value that is similar to the one in the '[value]' field. You can use the following wildcard characters: % - any combination of characters. _ - any single character.	cmpnt_num LIKE '%AA%'
IN	Select a value that is equal to one of those specified in the parentheses	cpmnt_num = IN (101,103)
BETWEEN	Select a value which is within the following interval	item_price BETWEEN 100 AND 500
IS NULL	Contains an undefined value	loop_name IS NULL
IS NOT NULL	Not equal to NULL	cpmnt_name IS NOT NULL

Native Database Functions

Function	Description	Example
LTRIM (<value>) dBase Sybase Adaptive Server Anywhere 7.0, Oracle, SQL Server	Remove all leading spaces in the field indicated in the parentheses	LTRIM(cmpnt_mfr) cmpnt_mfr = ‘ Shell’ ⇓ LTRIM(cmpnt_mfr)=‘Shell’
RTRIM(<value>) dBase Sybase Adaptive Server Anywhere 7.0, Oracle, SQL Server	Remove all trailing spaces in the field indicated in the parentheses	RTRIM(cmpnt_num) IS NULL cmpnt_num = ‘108-FT 100 ‘ ⇓ RTRIM(cmpnt_num)=‘108-FT 100’
SUBSTRING(<value>,<begin>,<count>) dBase Sybase Adaptive Server Anywhere 7.0 Oracle	Retrieve a part of the field indicated in the [value] data field from the [begin] position for the number of characters	SUBSTRING(cmpnt_mfr,1,4) cmpnt_mfr = ‘Shell’ ⇓ SUBSTRING(cmpnt_mfr,1,4)=‘She l’
SUBSTR(<value>,<begin>,<count>) SQL Server	indicated in the [count] field	SUBSTR (cmpnt_mfr,1,4) cmpnt_mfr = ‘Shell’ ⇓ SUBSTR(cmpnt_mfr,1,4)=‘Shel’
UCASE(<value>) dBase Sybase Adaptive Server Anywhere 7.0	The upper case format of the contents of the field	UCASE(cpmnt_name) cmpnt_name = ‘101-aa’ ⇓ UCASE(cmpnt_name)=‘101-AA’
UPPER(<value>) Sybase Adaptive Server Anywhere 7.0, Oracle, SQL Server	indicated in the [value] data field	UPPER(cpmnt_name) cmpnt_name = ‘101-aa’ ⇓ UPPER(cmpnt_name)=‘101-AA
LCASE(<value>) dBase Sybase Adaptive Server Anywhere 7.0	The lower case format of the contents of the field	LCASE(loop_name) loop_name = ‘101-AA’ ⇓ LCASE(loop_name)=‘101-aa
LOWER(<value>) Oracle, SQL Server	indicated in the [value] data field	LOWER(loop_name) loop_name = ‘101-AA’ ⇓ LOWER(loop_name)=‘101-aa

System Codes Table

Module	Entity Group	Code Description	Value
Process Data	Build-up Tendency	Free Value	
	(lower fluid)	No	N
		Yes	Y
	Coagulation Fluid	Free Value	
		No	N
		Yes	Y
	Coagulation Liquid	Free Value	
	(lower fluid)	No	N
		Yes	Y
	Colored Fluid	Free Value	
		No	N
		Yes	Y
	Colored Liquid	Free Value	
	(lower fluid)	No	N
		Yes	Y
	Corrosive Fluid	Free Value	
		No	N
		Yes	Y
	Corrosive Liquid	Free Value	
	(lower fluid)	No	N
		Yes	Y
	Erosive Fluid	Free Value	
		No	N
		Yes	Y
	Erosive Liquid	Free Value	
	(lower fluid)	No	N
		Yes	Y
	Failure Action	Close	Close
		Last	Last
		Open	Open
	Flag for Above/	Above Reference Line	A
	Below Reference	Below Reference Line	B

Module	Entity Group	Code Description	Value
	Line		
	Flag for Built-up	Absolute Pressure	A
	Back Pressure	Gage Pressure	G
Process Data	Flag for	Center	C
(continued)	Center/Tangent Line	Tangent	T
	Flag for Constant	Absolute Pressure	A
	Back Pressure	Gage Pressure	G
	Flag for Critical	Absolute Pressure	A
	Pressure	Gage Pressure	G
	Flag for Design	Absolute Pressure	A
	Pressure	Gage Pressure	G
	Flag for Elasticity	Gage Pressure	G
	Module		
	Flag for Fire/Non-	Fire case	F
	fire Case	Non-fire case	N
	Flag for Flow	Mass flow	
		@ Operating conditions	O
		@ Base conditions	B
		@ Normal conditions	N
		@ Standard conditions	S
	Flag for Flow Range	Mass flow	
		@ Operating conditions	O
		@ Base conditions	B
		@ Normal conditions	N
		@ Standard conditions	S
	Flag for Flow Trip/	Mass flow	
	Alarm	@ Operating conditions	O
		@ Base conditions	B
		@ Normal conditions	N
		@ Standard conditions	S
	Flag for Lever	Free Value	
		No	N
		Yes	Y

Module	Entity Group	Code Description	Value
	Flag for Maximum	Mass flow	
	Discharge	@ Operating conditions	O
		@ Base conditions	B
		@ Normal conditions	N
		@ Standard conditions	S
	Flag for Maximum	Absolute Pressure	A
	Pressure (Relief Valve)	Gage Pressure	G
	Flag for Maximum	Free Value	
	Pressure (Relief Valve)	Absolute Pressure	A
		Gage Pressure	G
	Flag for Pressure	Free Value	
	Range	Absolute Pressure	A
		Gage Pressure	G
Process Data	Flag for Pressure Trip/	Free Value	
(continued)	Alarm	Absolute Pressure	A
		Gage Pressure	G
	Flag for Set Pressure	Absolute Pressure	A
		Gage Pressure	G
	Flag for Variable Back	Absolute Pressure	A
	Pressure	Gage Pressure	G
	Flag to enter Density	Density to be imported	D
	or SG	Gravity to be imported	G
	Flag to enter Density	Density to be imported	D
	or SG (lower fluid)	Gravity to be imported	G
	Fluid Phase	Gas	G
		Liquid	L
		Steam	S
		Water	W
	Fluid Phase	Liquid	L
	(lower fluid)	Water	W
	Fluid Phase	Homogeneous 2-phase	H
		Non-Homogeneous 2-phase	N
		Single phase	S
	Foaming up	Free Value	

Module	Entity Group	Code Description	Value
		No	N
		Yes	Y
	Foaming up	Free Value	
	(lower fluid)	No	N
		Yes	Y
	Handwheel	Free Value	
		No	N
		Yes	Y
	Oxidizing Fluid	Free Value	
		No	N
		Yes	Y
	Pipe Material	Plain Carbon Steel (SAE 1020)	1
		Inconel X, Annealed	10
		Hanel Stellite 25 (L605)	11
		Copper (ASTM B152, B124, B133)	12
		Yellow Brass (ASTM B36, B134, B135)	13
		Alum. Bronz (ASTM B169 A)	14
		Beryllium Copper 25 (ASTM B194)	15
		Cuperonickel 30%	16
		K-Monel	17
		Nickel	18
		Pyrex Glass	19
		301 S.S.	2
Process Data		Titanium	20
(continued)		Tantalum	21
		304 S.S.	3
		310 S.S.	4
		316 S.S.	5
		330 S.S.	6
		347 S.S.	7
		Hastelloy B	8
		Hastelloy C	9

Module	Entity Group	Code Description	Value
		Material Not Listed	99
	Seat Leakage	ANSI I	ANSI I
		ANSI II	ANSI II
		ANSI III	ANSI III
		ANSI IV (standard)	ANSI IV (standard)
		ANSI V	ANSI V
		ANSI VI (TSO)	ANSI VI (TSO)
		BS6755A	BS6755A
		BS6755B	BS6755B
		BS6755C	BS6755C
		No Tight Shut-Off	No Tight Shut-Off
		Tight Shut-Off	Tight Shut-Off
	Solidifying Fluid	Free Value	
		No	N
		Yes	Y
	Solidifying Liquid	Free Value	
	(lower fluid)	No	N
		Yes	Y
	Toxic Fluid	Free Value	
		No	N
		Yes	Y
	Toxic Liquid	Free Value	
	(lower fluid)	No	N
		Yes	Y
	Transparent Fluid	Free Value	
		No	N
		Yes	Y
	Transparent Liquid	Free Value	
	(lower fluid)	No	N
		Yes	Y
Wiring	Panel Category Code	Junction Box	1
		Marshaling Rack	2
		Cabinet	3

Module	Entity Group	Code Description	Value
		Field Device	4
		DCS	5
		PLC	6
Calculation	Calc Type	ISA Standard	1
		IEC Standard	2
	Calculated Parameters	Orifice Diameter calculation	B
	(D,W,DP)	Differential Pressure calculation	D
		Flow Rate Calculation	W
	Flag for Full Scale	Mass flow	
	Flow	@ Operating conditions	O
		@ Base conditions	B
		@ Normal conditions	N
		@ Standard conditions	S
	Flag for Rupture Disk	Without Rupture Disk	0
		With Rupture Disk	1
	Flag to enter	Compressibility to be imported	C
	Compressibility or	Density to be imported	D
	Density (for Gas)		
	Flag to enter Molecular	Specific Gravity to be imported	G
	Mass or SG (for Gas)	Molecular Mass to be imported	M
	Meter Sub Type	Flange Tappings (Quarter of Circle Orifice)	11
		Corner Tappings (Quarter of Circle Orifice)	12
		Classical Venturi (as cast convergent section)	17
		Classical Venturi (machined convergent section)	18
		Classical Venturi (rough-welded sheet-iron conv)	19
		Flange Tappings (Square Edge Orifice)	2
		Universal Venturi	20
		ISO Long Radius Nozzle	23
		ASME Long Radius Nozzle	24

Module	Entity Group	Code Description	Value
		ISA 1932 Nozzle	25
		Venturi Nozzle	26
		Diametrically Opposite Flange Tappings (Eccentric Orifice)	28
		Side Flange Tappings (Eccentric Orifice)	29
		Corner Tappings (Square Edge Orifice)	3
		Diametrically Opposite Vena Contracta Tappings (Eccentric Orifice)	30
		Side Vena Contracta Tappings (Eccentric Orifice)	33
		Vena Contracta Tappings (Segmental Orifice)	34
		Radius Tappings (Square Edge Orifice)	4
		SBHO Meter Run with Corner Tappings	5
		SBHO Meter Run with Flange Tappings	6
		Pipe Tappings	7
		AGA Report 3 (Flange Tappings)	8
		AGA Report 3 (Pipe Tappings)	9
	Meter Type	Square Edge Orifice	1
		Quarter of Circle Orifice	2
		Conical Entrance Orifice	3
		Lo-Loss Tube	4
		Venturi Tube	5
		Nozzle	6
		Eccentric Orifice	7
		Segmental Orifice	8
	Orifice Material	Plain Carbon Steel (SAE 1020)	1
		Inconel X, Annealed	10
		Hanel Stellite 25 (L605)	11
		Copper (ASTM B152, B124, B133)	12

Module	Entity Group	Code Description	Value
		Yellow Brass (ASTM B36, B134, B135)	13
		Alum. Bronz (ASTM B169 A)	14
		Beryllium Copper 25 (ASTM B194)	15
		Cuperonickel 30%	16
		K-Monel	17
		Nickel	18
		Pyrex Glass	19
		301 S.S.	2
		Titanium	20
		Tantalum	21
		304 S.S.	3
		310 S.S.	4
		316 S.S.	5
		330 S.S.	6
		347 S.S.	7
Calculation		Hastelloy B	8
(continued)		Hastelloy C	9
		Material Not Listed	99
	Relief Valve Style	Bellows Valve	B
		Conventional Valve	C
		Pilot-operated Valve	P
	Sizing Basis	Blocked Flow	B
	Valve Type	Signal Seat Globe	1
		Double Seat Globe	2
		Angle	3
		Ball	4
		Butterfly	5
	Well Material	Austenitic Steel	0
		Ferritic Steel	1

Unit of Measure Codes Table

Unit of Measure Type	Unit of Measure Name	Value
Area	centimeter2	cm2
	Foot2	ft2
	Inch2	in2
	Kilometer2	km2
	meter2	m2
	mile2	mile2
	millimeter2	mm2
	yard2	yd2
Capacitance	μF	μF
	nF	nF
	pF	pF
Capacitance/Length	μF/ft	μF/ft
	μF/km	μF/km
	μF/m	μF/m
	F/ft	F/ft
	F/km	F/km
	F/m	F/m
	mF/ft	mF/ft
	mF/km	mF/km
	mF/m	mF/m
	nF/ft	nF/ft
	nF/km	nF/km
	nF/m	nF/m
	pF/ft	pF/ft
	pF/km	pF/km
Capacitance/Length	pF/m	pF/m
Conductivity	μmho/cm	μmho/cm
	μS/cm	μS/cm
	mho/cm	mho/cm
	mmho/cm	mmho/cm
	mS/cm	mS/cm

Unit of Measure Type	Unit of Measure Name	Value
	S/cm	S/cm
Current	A	A
	mA	mA
Density	gram/milliliter	g/ml
	kg/cubic meter	kg/m3
	kg/liter	kg/l
	lb/cubic foot	lb/ft3
	lb/cubic inch	lb/in3
	lb/cubic yard	lb/yd3
	lb/ U.K. gallon	lb/UK gal
	lb/U.S. gallon	lb/US gal
	oz/cubic inch	oz/in3
	oz/ U.K. gallon	oz/UK gal
	lb/U.S. gallon	oz/US gal
	slug/cubic foot	slug/ft3
	ton(long)/cubic yard	tonl/yd3
	ton(short)/cubic yard	tons/yd3
Diameter and Length	1/1000 inch	MILS
	centimeter	cm
	foot	ft
	inch	in
Diameter and Length	kilometer	km
	meter	m
	mile	mile
	millimeter	mm
	yard	yd
Flow	CANADIAN gallon/day	CN gal/d
	CANADIAN gallon/hr	CN gal/h
	CANADIAN gallon/min.	CN gal/min
	CANADIAN gallon/sec.	CN gal/s
	Cubic centimeter/min	cm3/min
	cubic ft/day	ft3/d
	cubic ft/hr	ft3/h
	cubic ft/min.	ft3/min

Unit of Measure Type	Unit of Measure Name	Value
	cubic ft/sec.	ft3/s
	cubic inch/day	in3/d
	cubic inch/hr	in3/h
	cubic inch/min.	in3/min
	cubic inch/sec.	in3/s
	cubic kilofoot/day	kft3/d
	cubic kilofoot/hr	kft3/h
	Cubic kilofoot/min.	kft3/min
	cubic meter/day	m3/d
	cubic meter/hr	m3/h
	cubic meter/min.	m3/min
	cubic meter/sec.	m3/s
	grain/day	grain/d
	grain/hr	grain/h
	grain/min.	grain/min
Flow	grain/sec.	grain/s
	gram/day	g/d
	gram/hr	g/h
	gram/min.	g/min
	gram/sec.	g/s
	kg/day	kg/d
	kg/hr	kg/h
	kg/min.	kg/min
	kg/sec.	kg/s
	klb/day	klb/d
	klb/hr	klb/h
	lb/day	lb/d
	lb/hr	lb/h
	lb/min.	lb/min
	lb/sec.	lb/s
	Mega cubic foot/day	Mft3/d
	Mega cubic foot/minute	Mft3/min
	Mega cubic meter/day	Mm3/d
	Mega cubic meter/hr	Mm3/h

Unit of Measure Type	Unit of Measure Name	Value
	Mega lb/day	Mlb/d
	metric ton/day	t/d
	metric ton/hr	t/h
	metric ton/min.	t/min
	metric ton/sec.	t/s
	U.K. gallon/day	UK gal/d
	U.K. gallon/hr	UK gal/h
	U.K. gallon/min.	UK gal/min
	U.K. gallon/sec.	UK gal/s
Flow	U.K. ton/day	UK ton/d
	U.K. ton/hr	UK ton/h
	U.K. ton/min.	UK ton/min
	U.K. ton/sec.	UK ton/s
	U.S. barrel/day	US bbl/d
	U.S. barrel/hr	US bbl/h
	U.S. barrel/min.	US bbl/min
	U.S. barrel/sec.	US bbl/s
	U.S. gallon/day	US gal/d
	U.S. gallon/hr	US gal/h
	U.S. gallon/min.	US gal/min
	U.S. gallon/sec.	US gal/s
	U.S. kilobarrel/day	US kbbl/d
	U.S. kilobarrel/hr	US kbbl/h
	U.S. megabarrel/day	US mbbl/d
Force	kilogram-force	kgf
	lb-force	lbf
	newton	N
Inductance	μH	μH
	mH	mH
Inductance/Length	μH/ft	μH/ft
	μH/km	μH/km
	μH/m	μH/m
	H/ft	H/ft
	H/km	H/km

Unit of Measure Type	Unit of Measure Name	Value
	H/m	H/m
	mH/ft	mH/ft
Inductance/Length	mH/Km	mH/Km
	nH/km	nh/km
	pH/ft	pH/ft
Inductance/Resistance	H/ohm	H/ohm
	mH/ohm	mH/ohm
Latent Heat	Btu(39)/lb	Btu39/lb
	Btu(59)/lb	Btu59/lb
	Btu(60)/lb	Btu60/lb
	Btu(IT)/lb	Btu IT /lb
	Btu(M)/lb	Btu M /lb
	Btu(th)/lb	Btu th /lb
	cal(15)/g	cal15/g
	cal(20)/g	cal20/g
	cal(IT)/g	cal IT/g
	cal(M)/g	cal M /g
	cal(th)/g	cal th /g
	J/kg	J/kg
	kcal(15)/kg	kcal15/kg
	kcal(20)/kg	kcal20/kg
	kcal(IT)/kg	kcal IT /kg
	kcal(M)/kg	kcal M /kg
	kcal(th)/kg	kcal th /kg
	kJ/kg	kJ/kg
Power	mW	mW
	W	W
Pressure	atmosphere(standard)	Atm (stand)
	atmosphere(tech)	at (tech)
	bar	bar
Pressure	centimeter of Hg (0°C)	cmHg 0°C
	centimeter of water	cmH2O (4°C)
	dyne/cm2	dyn/cm2
	foot of water (39.2°C)	ftH2O

Unit of Measure Type	Unit of Measure Name	Value
	gram-force/cm2	gf/cm2
	hecto pascal	hPa
	inch of Hg(32°C)	inHg
	inch of water(60°C)	inH2O
	kg-force/cm2	kgf/cm2
	kg-force/m2	kgf/m2
	kg-force/mm2	kgf/mm2
	kilo pascal	kPa
	Ksi	Ksi
	lb-force/ft2	lbf/ft2
	lb-force/in2	lbf/in2
	mega pascal	MPa
	meter water(4°C)	mH2O 4°C
	millibar	mbar
	millimeter of Hg (0°C)	mmHg 0°C
	millimeter of water	mmH2O 4°C
	pascal (Pa)	Pa
	psi	psi
	torr (mm Hg 0°C)	Torr
Resistance	Kohm	Kohm
	ohm	ohm
Resistance/Length	kOhm/ft	kOhm/ft
	kOhm/km	kOhm/km
Resistance/Length	kOhm/m	kOhm/m
	MOhm/m	MOhm/km
	Ohm/ft	Ohm/ft
	Ohm/km	Ohm/km
	Ohm/m	Ohm/m
	statOhm/km	statOhm/km
Specific Heat	Btu(39)/(lb°F)	Btu39/lb°F
	Btu(59)/(lb°F)	Btu59/lb°F
	Btu(60)/(lb°F)	Btu60/lb°F
	Btu(IT)/(lb°F)	BtuIT / lb°F
	Btu(M)/(lb°F)	Btu M / lb°F

Unit of Measure Type	Unit of Measure Name	Value
	Btu(th)/(lb°F)	Btuth/lb°F
	cal(15)/(gK)	cal15/(gK)
	cal(20)/ (gK)	cal20/(gK)
	cal(IT)/ (gK)	calIT/(gK)
	cal(M)/ (gK)	cal M /(gK)
	cal(th)/ (gK)	calth/(gK)
	J/(kg•K)	J/(kg•K)
	kcal(15)/(kgK)	kcal15/kgK
	kcal(20)/ (kgK)	kcal20/kgK
	kcal(IT)/ (kgK)	kcal IT /kgK
	kcal(M)/ (kgK)	kcal M /kgK
	kcal(th)/ (kgK)	kcal th /kgK
	kJ/(kg•K)	kJ/(kg•K)
Temperature	Degrees Celsius °C	°C
	Degrees Fahrenheit °F	°F
	Degrees Rankin °R	°R
Temperature	Kelvin K	K
Velocity	ft/h	ft/h
	ft/min	ft/min
	ft/s	ft/s
	in/s	in/s
	km/h	km/h
	m/s	m/s
Viscosity	centipoise	cP
	centistokes	cS
	cm2/s	cm2/s
	ft2/sec.	ft2/s
	in2/sec.	in2/s
	lb/(ft•hr)	lb/(ft•h)
	lb/(ft•sec.)	lb/(ft•s)
	lb-force•sec/ft2	lbf•sec/ft2
	lb-force•sec/in2	lbf•sec/in2
	m2/sec.	m2/s
	mm2/s	mm2/s

Unit of Measure Type	Unit of Measure Name	Value
	mPa•s	mPa•s
	pascal sec.	Pa•s
	poise	P
	slug/(ft•sec.)	slug/ft•s
	stokes	St
Voltage	mV	mV
	V	V
Weight	gram	g
	kilogram	kg
Weight	metric ton	ton
	ounce	oz
	pound	lb
Weight/Length	kg/km	kg/km
	lbs/mft	lbs/mft