



SpecXpert

Manual

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Introduction

- **SpecXpert** places all components in user-selected Intergraph Smart 3D piping specifications and reports errors via Smart 3D to-do list entries and additional reports.
- **SpecXpert** recreates bulkload files (Microsoft Excel format) for **Smart 3D** from the **Smart 3D** database.

 In the current iteration of SpecXpert, only existing catalogue parts are tested. SpecXpert does NOT provide detailed information about what went wrong during placement, just that placement was not successful. To find the exact reason for why an error occurred, the complete spec would be needed for analysis.

 Warning: if custom naming rules are installed on the plant, SpecXpert might face some problems during placement, if the naming rules either slow down the placement of components or the resulting name cannot be created by the rule due to e.g. missing system names.

Ideally the SpecXpert placement test is run after problems with the spec that could be detected with the Intergraph Verify Consistency Check were already fixed.

Here are some hints on how to interpret the **SpecXpert** test results:

To-do-list entries for automatically placed parts

Standard placement behaviour:

- End components (like end caps or blind flanges) are placed at the end of a branch
- All in-line parts are placed where the end preparations of the part are compatible with the pipe or mating flanges.
- Parts with non-compatible end preparations are placed at the end of a branch.
- For all placed parts, to-do-list entries are created by **Smart 3D** whenever something goes wrong during placement.
- **SpecXpert** does not create the to-do-list entries. It only summarizes them in the provided reports.
- The same to-do-list entries would be created if the part was placed manually **under the same conditions**.
- Under different conditions it might be possible to place the part without an error.
- Depending on the conditions the part may be OK.

Reasons for to-do-list entries

There are many reasons for to-do-list-entries being created within Smart 3D, and SpecXpert does not provide analysis for the possible causes. It only lists all parts that caused problems. An expert in writing pipe specs needs to check these parts under the placement conditions the part was intended for. In many cases the complete spec has to be considered and reviewed to identify and rectify the problem.

Some common reasons for to-do-list entries are:

- Non-compatible end preparations
- Missing or broken symbol DLL

- Missing generic data
- Missing mating flange (selection basis = 5)

It should be noted that analysis and rectification of problems with the pipe specs is not covered with **SpecXpert** and nor is this service covered under the maintenance agreement for the product. CAXperts can offer an analysis service for any problematic parts, but this would be charged for separately. If there is a desire to use this service, please contact CAXperts to request a pricing proposal.

Installation

Requirements:

- Supported operating systems:
 - Microsoft Windows XP
 - Microsoft Windows Server 2003
 - Microsoft Windows Vista
 - Microsoft Windows 7 or later
- Intergraph Smart 3D 2011 or later
- Microsoft Office 2003 or later

Administrator rights are required on each computer to install CAXperts **SpecXpert**. "Run as" is not supported.

Uninstall

To uninstall the software, select **Control panel** from the start menu. Then on

- Windows 7: in large or small icon view, click **Programs and features**. If you're using category view, under **Programs**, click **Uninstall a program**.
- Windows Vista: in classic view, double-click **Programs and features**. In control panel home view, under **Programs**, click **Uninstall a program**.
- Windows XP/2000: (Double) click the **Add or remove programs** icon.

Select the program you want to remove, and click Uninstall/Remove. Alternatively, right-click the program and select **Uninstall**.

Setup command line (for administrators)

The following command line options are supported by the installer:

/S:<<optional ini file>>

Allow an install to be run in silent mode. As a result, no screens or dialogs will be shown.

This command line option also has an optional INI file that can be passed containing session variable values. For example:

```
"C:\output\setup.exe" "/S:C:\setupvars.ini"
```

This will cause the session variables in the INI file to be used for the setup. The INI file should be in the format:

```
[SetupValues]
```

%AppFolder%=C:\Program Files\MyProduct

/U:<<XML config file>>

This command line option must be used when calling the uninstall program from the command line. This command also has an optional XML file that can be passed containing session variable values. For example:

```
"C:\Program Files\MyProduct\uninstall.exe" "/U:C:\Program Files\MyProduct\irunin.xml"
```

Licence

You need a license for the following functionalities in UniversalPlantViewer:

- Saving **sketches**
- Using the **API module**
- Using **CentralisedCommenting**

CAXperts software supports two types of licences:

Site licence (local)

Domain based licences are restricted to machines within a 5 miles (8 kilometres) radius at a specific geographic location (building) for which the licence key file was issued for. There is no limitation regarding the number of users or machines.

CAXperts will need your **Current domain name** to issue a licence file (.lic).

The licence file has to be stored on a local or network location accessible by the machine running the CAXperts product; a licence server is not required.

The location of the licence file should be defined on every machine with the CAXperts product installed, which can be done

- Either by setting the environment variable
CAXPERTS_LICENSE_FILE=C:\Program Files (x86)\CAXperts\Licensing\
- Or by setting the registry key
HKEY_CURRENT_USER\Software\FLEXlm License
Manager\CAXPERTS_LICENSE_FILE=C:\Program Files (x86)\CAXperts\Licensing\

Multiple licence key file locations should be separated by semicolons (";").



If the licence key file location is not defined, "C:\Program Files (x86)\CAXperts\Licensing\" is used

The licence key file may be renamed (including the extension). The CAXperts product will check the content of all files in the licence folder(s) for valid keys.

Changes to the key path (in the environment variable or registry key) are read during the next start of the CAXperts product.

Floating (server) licence

Floating licences require a FlexNET server (lmadmin or lmgrd) accessible by the machine running the CAXperts product. The licence key file is typically located on the FlexNET server machine. The licence key file defines the maximum number of seats which can be used at the same time.



Every running instance of the CAXperts software product will require one seat, no matter if the application is running multiple times on the same or different machine(s).

New instances can only be started as long as seats are available and the FlexNET server is accessible.

The location of the licence server must be defined on every machine with the CAXperts product installed, which can be done

- Either by setting the environment variable
CAXPERTS_LICENSE_FILE=@YourServerName
- Or by setting the registry key
HKEY_CURRENT_USER\Software\FLEXlm License
Manager\CAXPERTS_LICENSE_FILE=@YourServerName

Every computer name must be preceded by the @ symbol. Multiple licence server locations should be separated by semicolons (“;”).

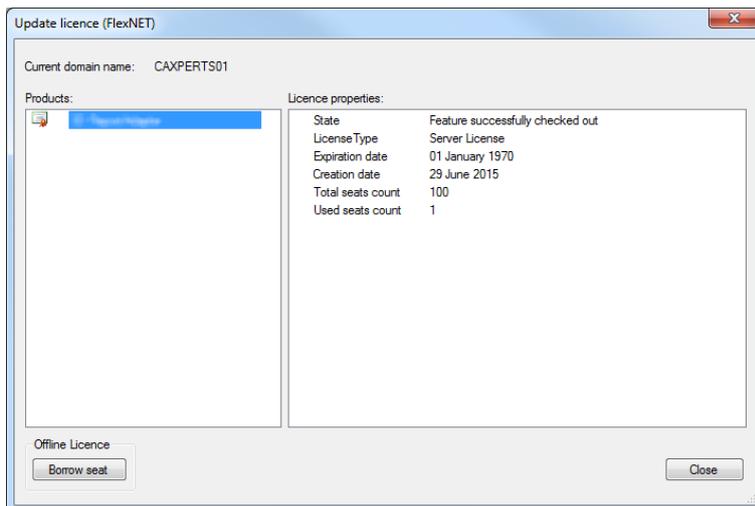
YourServerName is the Windows computer name of the machine running lmadm (FlexNET server). If lmadm is running on a non-default port, the port number should be defined like this: port@YourServerName.



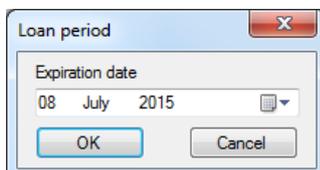
Changes to the server path (in the environment variable or registry key) are read during the next start of the CAXperts product.

Borrowed licences

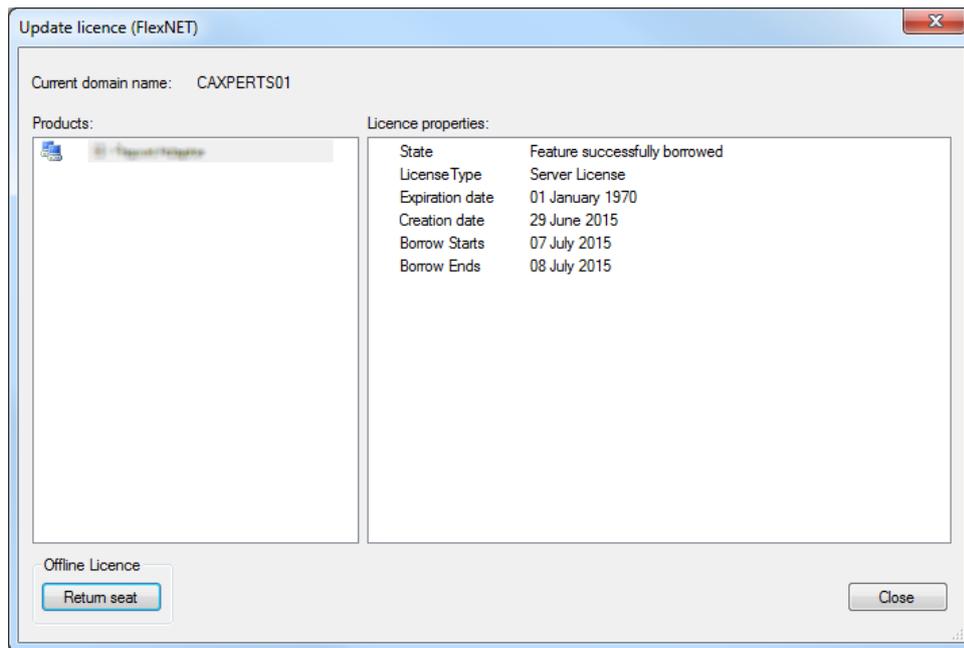
Licence seats can be borrowed for a period of time from the server and saved to the local machine. Once the seat has been borrowed the CAXperts application can be used without any connection to the FlexNET server.



To borrow a licence seat press the **Borrow seat** button, define the loan period (up to 7 days) and press OK. When the borrowed seat expires it gets automatically returned back to the FlexNET server.



The seat can be returned earlier by pressing the **Return borrowed seat** button.



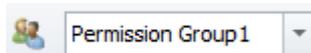
 Without a valid licence file the software will run in demo mode.

Usage

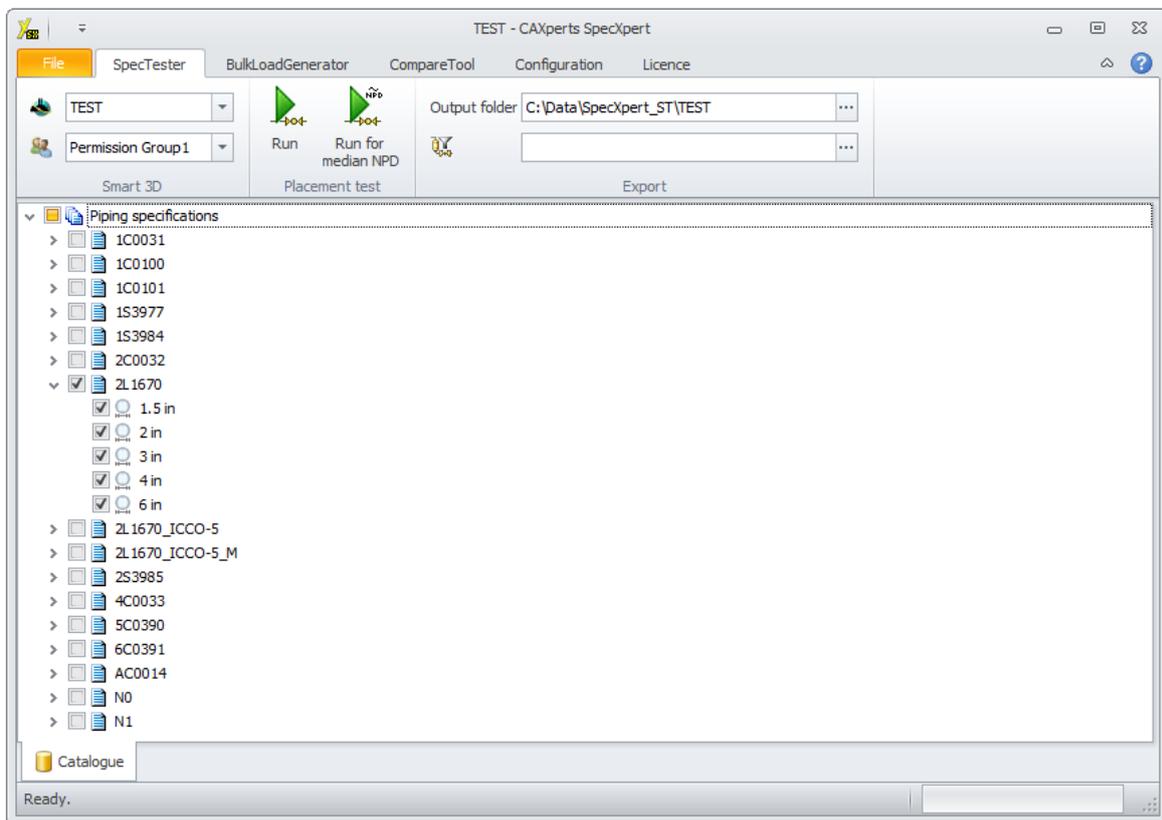
When you run the software, the main window will show a dropdown list of available plants on your current Smart 3D site.



After selecting a plant from this list, please **select a permission group that is allowed to place piping components**.



SpecXpert will list the piping specifications of this plant:



Test specifications

Check the checkboxes of the specifications (and nominal piping diameters) that you wish to test.



If you want to exclude certain parts from the test, add them to an Excel exclusion list (sheet name: Excluded) and select the Excel file in Additional Requirements (📁). Example files are included in the templates folder of SpecXpert. Wildcards are currently not possible (i.e. all columns have to be filled).

If the schedule thicknesses are calculated according to P/T conditions using the ThicknessDataRule during the placement (e.g. 1C0031, NPD26-NPD36, FirstSizeSchedule =ASME B31.3) it is possible to define user defined values for P/T pairs. The pipeline name created by SpecXpert contains the parameter of P/T. Add the pairs of P/T in sheet UserDefined-DesignPTPipeRun and select the Excel file in Additional Requirements (📁). Example files are included in the templates folder of SpecXpert.

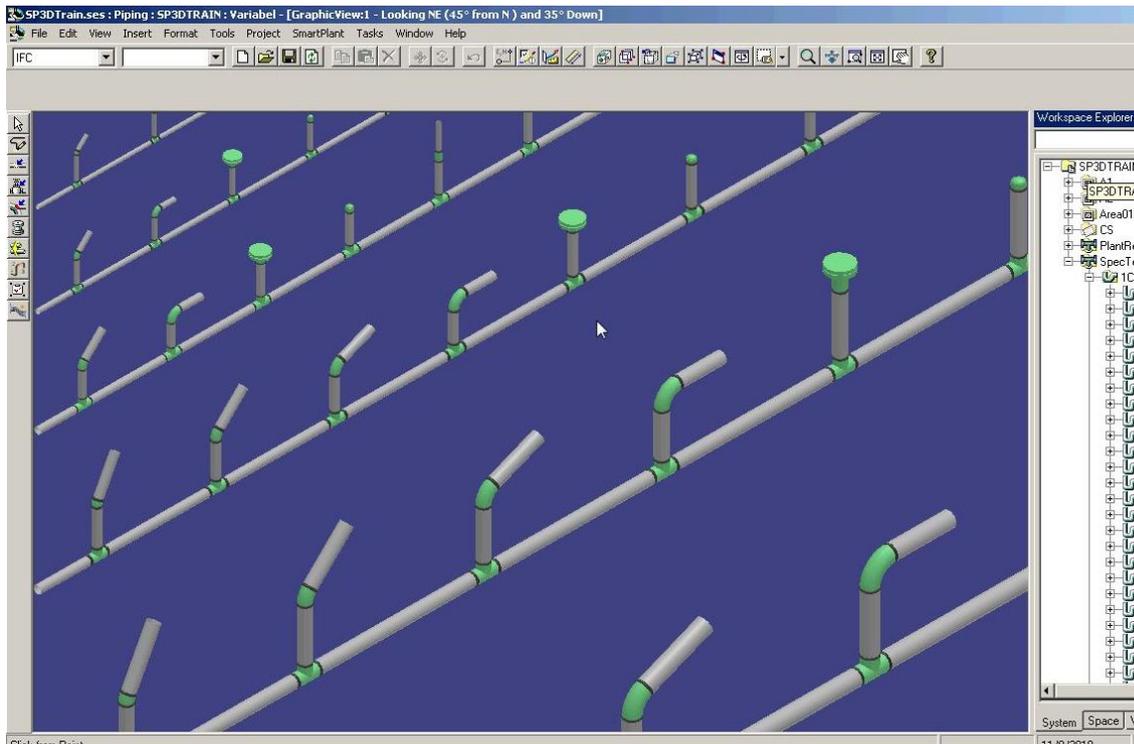
In the **Output folder** field you can enter manually, or use the "..." button to select, an output path and filename for the resultant report database.

Press the **Run** button to initiate the placement of the piping specification parts (if you use the Run for median NPD button, only the median NPD size of the selected specifications will be placed).



Please use Intergraph's "Modify Site and Schema Location" tool to change the Smart 3D site.

For larger specifications, the placement process will typically take several hours. The placed components from the selected specification(s) will resemble the following:



Each spec is placed in the "SpecXpert" piping system under a pipeline named after the specification.

Parts are placed on pipe runs according to their Nominal Piping Diameter. There is one main pipe run per NPD along with a separate pipe run per branch. The main pipe runs are vertically aligned from smallest to largest diameter.

Report output

The final outputs of SpecXpert are a Microsoft Excel (*.xlsx) file and a Microsoft Access database (*.mdb) file. These files contain several objects:

- "StatusPlacedSpecParts" sheet / table
- "ToDoList" sheet / table, presenting the erroneous parts.
- "ExtractedPipingData" sheet / table

To-do list item interpretation

When the **SpecXpert** has finished placing the parts from the selected Specs, the next task is the interpretation of the to-do list items. These can either be found by looking at the SpecXpert Report database or by using the to-do list itself inside Smart 3D. The report database presents similar errors only once making it easier to see the actual number of spec issues.

While there are numerous rules in Smart specification writing that must be followed, this section will serve as a guideline for interpreting certain classes of errors that can abnormally occur when using SpecXpert.

Please refer to the Intergraph Smart 3D trouble shooting guide for in-depth listings of all possible to-do list items.

False positives

While every effort has been made to limit the number of 'false positive' to-do list entries reported by **SpecXpert**, it is possible that under certain conditions these false errors may occur.

One example of this case is with plug or end cap components where the end preparation of the connection port is not compatible with the pipe stock. This can arise when e.g. a plug was included for use with an instrument valve with a distinct end preparation.

While **SpecXpert** can save countless hours of repetitive work, the interpretation of the results still requires the understanding and domain-knowledge of a trained spec writer.

Duplicate to-do list items

For many errors, a to-do list item will be created for each of the parts involved. For instance, if a required flange size does not exist, a "No mating flange found" item will be created for both the pipe stock feature as well as the component feature. In these situations, fixing one issue will typically resolve multiple errors.

No part found

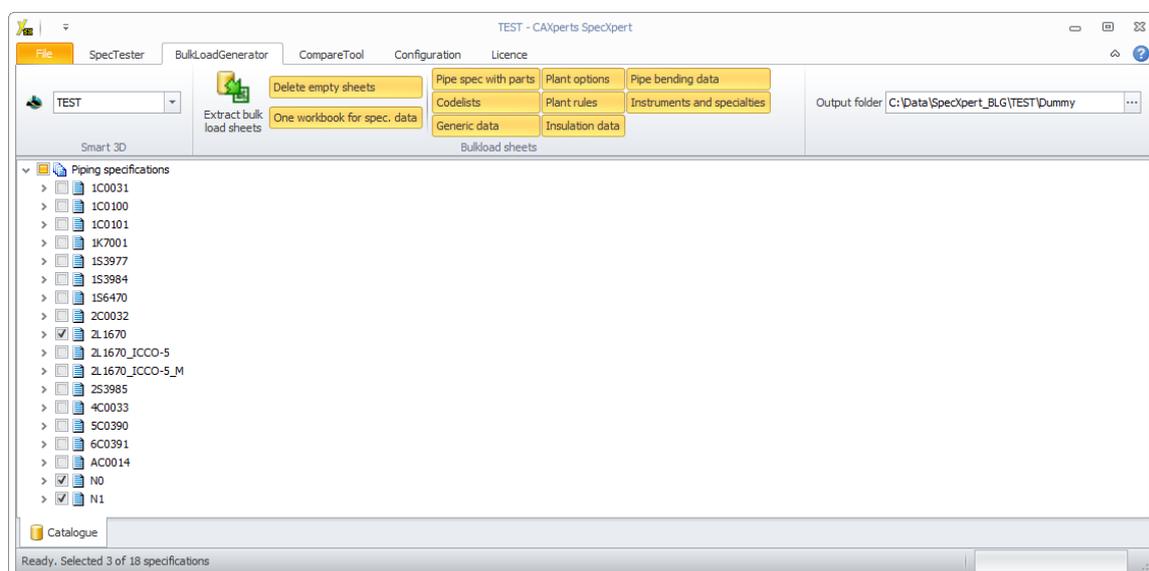
To-do list items that begin with "No Part Found in Catalog" indicate that the required part was not found in the catalogue.

This will often occur when SpecXpert attempts to place parts of a certain NPD on a pipe run whose pipe stock NPD is not included in the spec. For instance, **SpecXpert** places an outlet part with a connection port of NPD 1.5 in. The specification only consists of stock from 2 inches upwards. The branch from the outlet will indicate that "No Part Found in Catalog Data". This can be interpreted as either an error or a false positive if the part is understood to require a spec-break.

No <End Preparation> x <End Preparation> mating part found

This error indicates that the end preparation of the part is not compatible with the allowed end preparations of the pipe stock. The above "<End Preparation>" will be replaced with the name of the incompatible end preparation.

Export specifications



Check the specifications that you want to export on the treeview and selected which type of bulkload files to export from the BulkLoadGenerator tab, then press the **Extract bulkload sheets** button (to avoid empty sheets, select **Delete empty sheets**, to create only one workbook for more than one selected piping material classes, select **One workbook for spec. data**):

This process will typically take several minutes, the resulting bulkload sheets go to the folder specified in **Output folder**.

All options except the first option create Excel workbooks that are related to the option name. The first option **Pipe spec with parts** creates three types of workbooks:

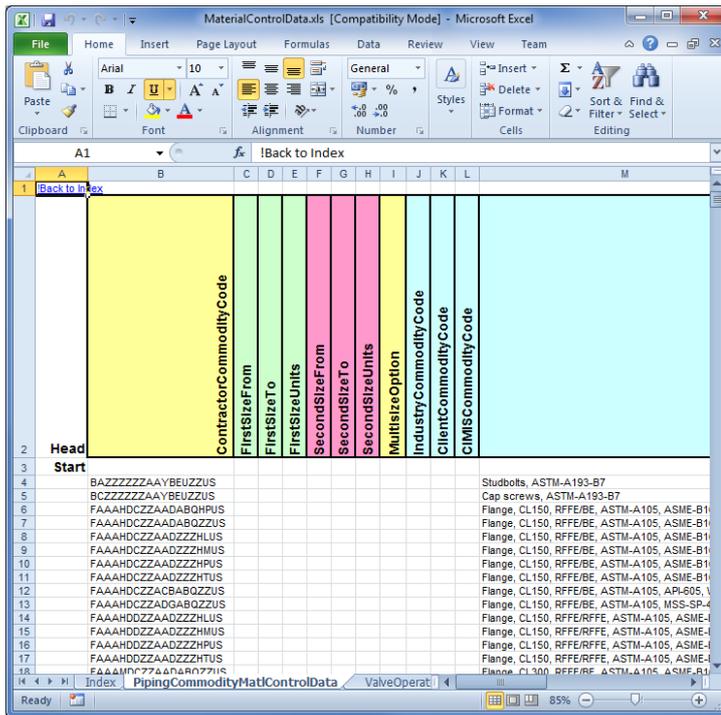
- **Specification data.** Excel workbook(s) for selected piping specification(s) with specification-dependent data sheets that include the attribute **SpecName** (e.g. "PipingCommodityFilter", "ServiceLimits", "NominalDiameters" etc.)

	SpecName	ShortCode	OptionCode	FirstSizeFrom	FirstSizeTo	FirstSizeUnits	SecondSizeFrom	SecondSizeTo	SecondSizeUnits	MultisizeOption	Comments	SelectionBasis	FluidCode	JacketedPipingBasis	MaximumTemperature	MinimumTemperature
4	1C0031	Piping		1	0.75	1.5 in										
5	1C0031	Piping		1	2	24 in										
6	1C0031	Piping		1	26	36 in										
7	1C0031	Paddle Blind		1	14	24 in										
8	1C0031	Paddle Blind		1	30	36 in										
9	1C0031	Paddle Spacer		1	14	24 in										
10	1C0031	Paddle Spacer		1	30	36 in										
11	1C0031	Spectacle Blind		1	0.75	12 in										
12	1C0031	Spectacle Blind		773	0.75	10 in										
13	1C0031	<45 Degree Direction Change		1	2	36 in										
14	1C0031	<45 Degree Direction Change		11	2	14 in										
15	1C0031	<45 Degree Direction Change		12	2	14 in										
16	1C0031	22.5 degree N-cut mitered elbow		1	2	24 in										
17	1C0031	22.5 degree N-cut mitered elbow		151	2	24 in										
18	1C0031	22.5 degree N-cut mitered elbow		153	2	24 in										
19	1C0031	22.5 degree N-cut mitered elbow		154	2	24 in										
20	1C0031	22.5 degree N-cut mitered elbow		155	2	24 in										
21	1C0031	30 Degree Long Tangent Elbow		1	2	14 in										
22	1C0031	30 Degree Long Tangent Elbow		11	2	14 in										

- **Piping catalog data.** One Excel workbook for all selected piping specifications with their part data sheets (e.g. parts, valves, operators etc.)

	IndustryCommodityCode	CommodityType	MaterialGrade	GeometricIndustryStandard	Density	GraphicalRepresentationOrNot	PurchaseLength	MinimumPipeLength	MaximumPipeLength	ManufacturingMethod	SurfacePreparation	LiningMaterial
9	PAAZB0ZZABAABHAUZZUS	PIPE			116	100	7847.21 kg/m ³					105
10	PAAZB0ZZABAABHAUZZUS	PIPE			116	100	7841.51 kg/m ³					105
11	PAAZB0ZZABAABHAUZZUS	PIPE			116	100	7841.52 kg/m ³					105
12	PAAZB0ZZABAABHAUZZUS	PIPE			116	100	7841.52 kg/m ³					105
13	PAAZB0ZZABAABHAUZZUS	PIPE			116	100	7841.52 kg/m ³					105
14	PAAZB0ZZABAABHAUZZUS	PIPE			116	100	7841.6 kg/m ³					105
15	PAAZB0ZZABAABHAUZZUS	PIPE			116	100	7829.22 kg/m ³					105
16	PAAZB0ZZABAABHAUZZUS	PIPE			116	100	7829.22 kg/m ³					105
17	PAAZB0ZZABAABHAUZZUS	PIPE			116	100	7829.22 kg/m ³					105
18	PAAZB0ZZABAABHAUZZUS	PIPE			116	100	7829.22 kg/m ³					105
19	PAAZB0ZZABAABHAUZZUS	PIPE			116	100	7844.6 kg/m ³					105

- **Material control data.** One Excel workbook for all selected piping specifications with their part-dependent data (e.g. for pipes, valves, operators etc.)



- **Symbol icons.** Symbol icons for all part classes.



It doesn't exist any information about the symbol icon name or symbol icon folder in the Smart 3D catalogue database.

The symbol icon file listed in ...\\SharedContentXYZ\\SymbolIcon folder (.gif, .bmp or .jpg) is only used during the bulkload process.

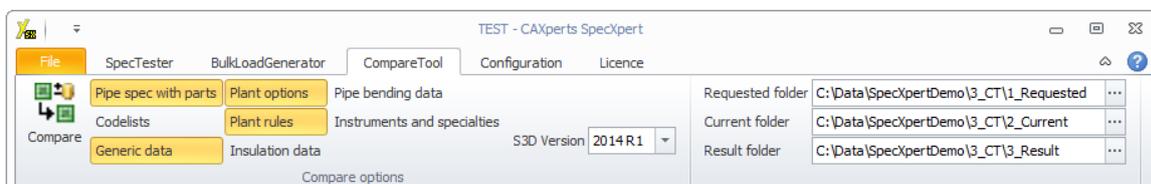
The bulkload utility takes the symbol icon file according to the name and folder in the part class sheet and saves the graphic in a BLOB (binary large object) attribute on part level in the Smart 3D catalogue, but it isn't saved any information about the original name and folder on part or part class level in the Smart 3D catalogue database.

When SpecXpert has to export the symbol icon information it extracts the graphics out of the BLOB and saves it to a GIF file in a special directory named "BulkloadGenerator". The symbol icon name is created out of the part class name and the attribute PartDataBasis. To reuse the exported data copy the "BulkloadGenerator" directory (including all .gif files) to the ...\\SharedContentXYZ\\SymbolIcon folder assigned to the Smart 3D catalogue where you want to reuse the data.

Compare specifications

SpecXpert enables the user to compare specifications against each other. Select the type of bulkload sheets to compare first (e.g. **Codelists**, **Generic data**, **Plant rules** etc.).

Ensure that the correct Smart 3D version is selected, then choose a folder with the requested files, a folder with the current files and the result folder and press **Compare**.



The exported file is formatted with the unit settings as defined in **Configure units**.



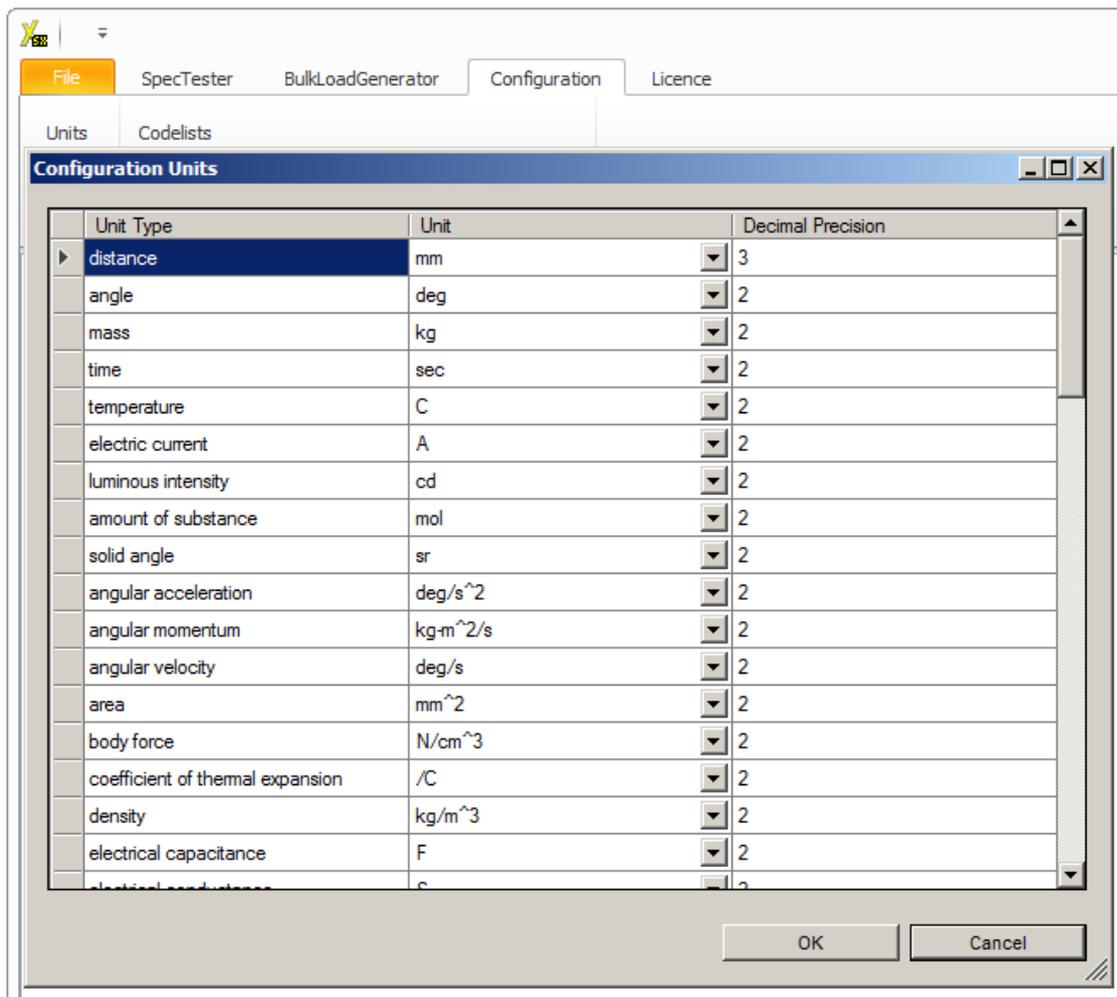
If bulkload files exist with PartClassType= PipeComponentClass, InstrumentClass or SpecialtyClass in the same folder then separate the files with different PartClassType into different folders before comparison.



Warning: All sheet names have to be unique for all files in the selected folder and have to appear in both folders to compare; otherwise they won't get compared at all.

Units

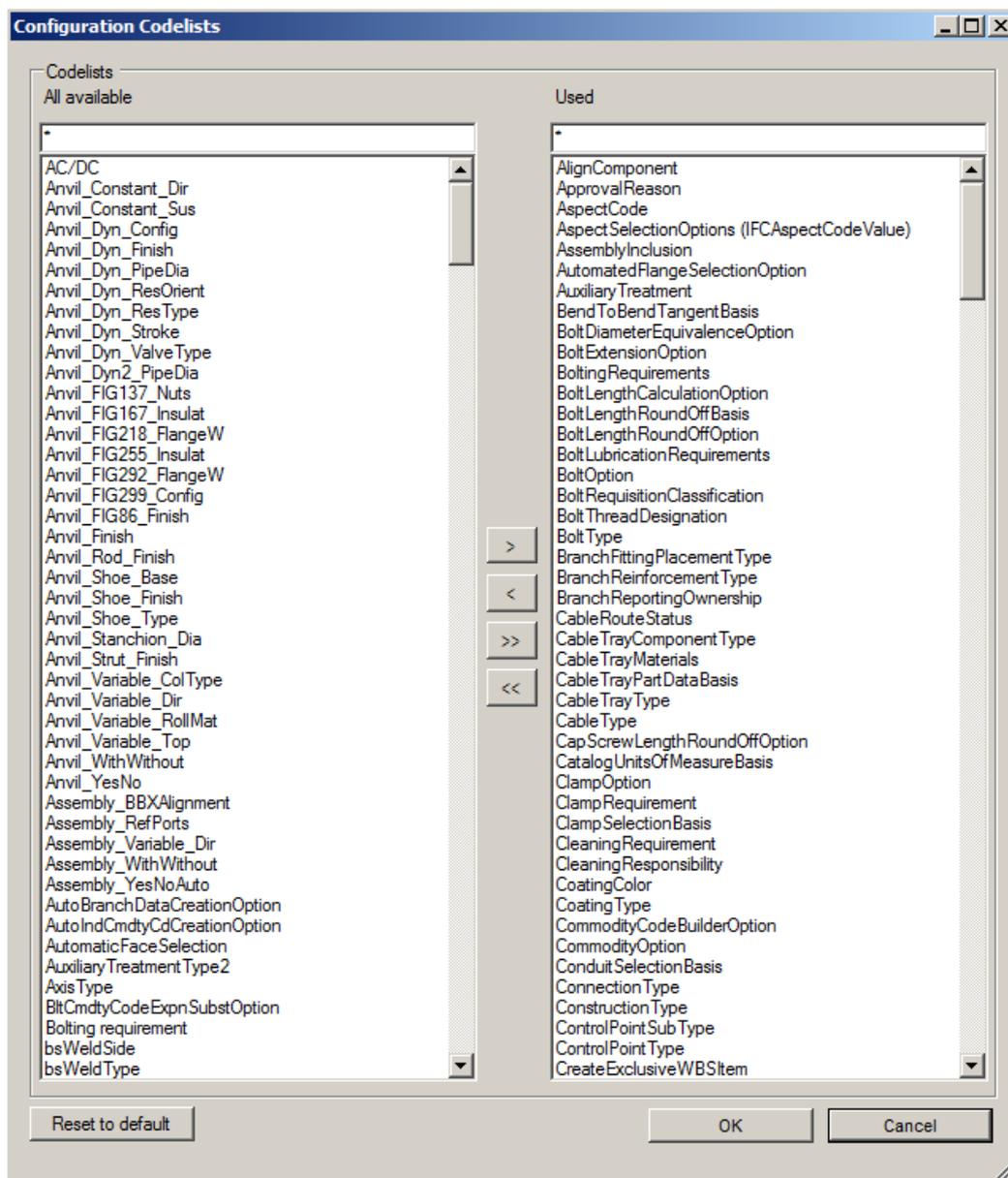
Click on **Configuration / Units** to show the **Configure units** form to define the output format of units of measure for new bulkload files.



- **Unit Type:** the quantity name of the unit
- **Unit:** the symbol of the unit (in Smart 3D notation)
- **Decimal Precision:** the number of decimal places

Codelists

Click on **Configuration / Codelists** to show the **Configure Codelists** to define the codelists which should be extracted.



All codelists which should be extracted are listed on the right side. It is possible to move “available” or “used” codelists from one side to the other side with “>”, “<”, “>>” or “<<”. The default codelists are defined by the available codelists in the bulkload files of the Smart 3D installation.

Additional attribute PartNumber

The attribute PartNumber of PipeStockClass, PipeComponentClass or ClampClass may be extracted by selecting the option **Extract attribute PartNumber additionally** in the **Configuration** menu.

Status bar

The status bar shows information about the current state of the software (e.g. progress bars). If you double click on it, the log file opens:

```

2010-10-11_100401_SpecTester.log - Notepad
File Edit Format View Help
*****
*                               CAXperts GmbH
*                               Carl-Zeiss-Ring 4
*                               D-85737 Ismaning (near Munich)
*
* Phone:                        +49 (89) 96 97 72 0
* Fax:                          +49 (89) 96 97 72 11
* URI:                          http://www.CAXperts.com
*****
* Application:                   SpecTester
* Path:                          C:\Program Files\CAXperts\SpecTester\SpecTester.exe
* Version:                       1.0.104.10280
* Date:                          10/7/2010 4:55:42 PM
* Size:                          4,958,720 Bytes
*****
Log starting at: 10/11/2010 10:04:01 AM
*****
OSFullName=Microsoft Windows XP Professional
OSPlatform=win32NT
OSVersion=5.1.2600.131072
AvailablePhysicalMemory=430,563,328 Bytes
*****
ALLUSERSPROFILE=C:\Documents and Settings\All Users

```

Templates

The resulting Access database can be configured using a template. The template file is usually located in

C:\Program Files (x86)\CAXperts\SpecXpert\Templates

Command line mode

SpecXpert also works in command line mode.

specxpert -? shows the available command line parameters.

- plant:exampleplant - Smart 3D plant name.
- Alias: -p
- Required.
- permgroup:examplepermgr - Permission group for SpecTester.
- Alias: -pg
- If not defined, last used.
- Optional.
- mode:mode - Execution modes:
 - ST - SpecTester
 - BLG - BulkloadGenerator
 - CT - CompareTool
- Alias: -m
- If not defined, last used.
- Optional.
- s3dversion:version - Valid values for CompareTool (Templates):
 - 2009.1
 - 2011 SP1
 - 2011 R1
 - 2014
 - 2014 R1

2016

- Alias: -v
- If not defined, last used.
- Optional.

-output:outputpath

- Path of result/report for SpecTester, BulkloadGenerator or CompareTool.
- Alias: -out
- If not defined, last used.
- Optional.

-current:currentpath

- Directory containing current data for CompareTool.
- Alias: -curr
- If not defined, last used.
- Optional.

-requested:requestedpath

- Directory containing requested data for CompareTool.
- Alias: -requ
- If not defined, last used.
- Optional.

-addreq:filename.xls

- Additional requirements for SpecTester.
- Valid sheet names in filename.xls:
 - Excluded
 - UserDefinedDesignPTPipeRun
- Alias: -ar (old: -excl and -exclusions)
- Optional.

-config:filename.ini

- Configuration file containing all settings except parameters in command line.
- Alias: -cfg
- If not defined then configuration file of plant is used.
- Optional.

-continue

- Continue last run if SpecTester was not completed.
- Alias: -cont
- Optional.

-sheet:sheetcategory

- Sheet categories for BulkloadGenerator or CompareTool. Option can be used more than once in command line.
- Valid values:
 - SP - Pipe spec with parts
 - CL - Codelists
 - GD - Generic data
 - PO - Plant options
 - PR - Plant rules
 - ID - Insulation data
 - PB - Pipe bending data
 - IS - Instruments and specialties
- Alias: -sh
- If not defined, last used.

- spec:"name|2 in|6 in"
 - Optional.
 - Specname for SpecTester and BulkloadGenerator. NPDs for SpecTester, if defined. Option can be used more than once in command line.
 - Alias: -s
 - You can also specify a text file with a list of specs (use file extension .lst)
 - If not defined, last used.
 - Optional.
- oneworkbook:true
 - Export of specification data in one or more workbook(s).
 - Alias: -s1w
 - Valid values: true or false
 - If not defined, last used.
 - Optional.
- deleteemptysheets:true
 - If no record exists then the sheet is deleted.
 - Alias: -de
 - Valid values: true or false
 - If not defined, last used.
 - Optional.

Examples

SpecTester functionality

1)

```
"C:\Program Files\CAXperts\SpecXpert\SpecXpert.exe" -p:SP3DTrain
-pg:Piping -m:ST -out:"c:\data\st 001" -s:1C0031 -s:2L1670 -s:1S3977
```

2)

```
"C:\Program Files\CAXperts\SpecXpert\SpecXpert.exe" -p:SP3DTrain
-pg:Piping -m:ST -out:"c:\data\st 002"
-ar:"c:\data\st 002\exclude.xls" -s:"2L1670|3 in|4 in"
-s:"1S3977|4 in|8 in"
```

3)

```
"C:\Program Files\CAXperts\SpecXpert\SpecXpert.exe" -p:SP3DTrain
-pg:"Permission Group1" -m:ST -out:"c:\data\st 003"
-s:"1C0031 - Revision A" -s:"2L1670MM - Revision A"
```

BulkLoadGenerator functionality

1)

```
"C:\Program Files\CAXperts\SpecXpert\SpecXpert.exe" -p:SP3DTrain
-m:BLG -out:"c:\data\blg 001" -sh:CL -sh:GD -sh:PO -sh:PR -sh:ID
-sh:PB
```

2)

```
"C:\Program Files\CAXperts\SpecXpert\SpecXpert.exe" -p:SP3DTrain
-m:BLG -out:"c:\data\blg 002" -sh:SP -s:1C0031 -s:1S3977 -s:2L1670
```

3)

```
"C:\Program Files\CAXperts\SpecXpert\SpecXpert.exe" -p:SP3DTrain  
-m:BLG -out:"c:\data\blg 003" -sh:SP -sh:CL -sh:GD -sh:PR  
-s:"1C0031 - Revision A" -s:"1C0031 - Revision B"  
-s:"2L1670MM - Revision A"
```

4)

```
"C:\Program Files\CAXperts\SpecXpert\SpecXpert.exe" -p:SP3DTrain  
-m:BLG -out:"c:\data\blg 004" -cfg:"c:\data\blg 004\settings001.ini"  
-sh:SP -s:1S3977
```

5)

```
"C:\Program Files\CAXperts\SpecXpert\SpecXpert.exe" -p:SP3DTrain -m:BLG  
-out:"c:\data\blg 005" -sh:SP -s:"c:\data\selectedspecs.lst"
```

CompareTool functionality

1)

```
"C:\Program Files\CAXperts\SpecXpert\SpecXpert.exe" -p:SP3DTrain  
-m:CT -v:"2011 R1" -out:"c:\data\ct 001\result"  
-curr:"c:\data\ct 001\curr" -requ:"c:\data\ct 001\requ" -sh:GD
```

2)

```
"C:\Program Files\CAXperts\SpecXpert\SpecXpert.exe" -p:SP3DTrain  
-m:CT -v:2009.1 -out:"c:\data\ct 002\result"  
-curr:"c:\data\ct 002\curr" -requ:"c:\data\ct 002\requ" -sh:SP  
-sh:CL -sh:GD -sh:PO -sh:PR -sh:ID -sh:PB
```

Contact

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