AVEVA

CONTINUAL PROGRESSION

# AVEVA Plant suite

## Version 12.1

### User Bulletin

www.aveva.com

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# Revision History

| Date | Description |
|---|---|
| September 2011<br>(21/09/2011 12:00:00) | Initial release of 12.1.1 |

# 1 Introduction

## 1.1 About this software release

AVEVA Plant Suite 12.1 is a major update from 12.0; PDMS and many of the associated products have been enhanced.

PDMS 12.1, along with many of the other products in the AVEVA Plant portfolio, is supplied on a DVD-R, which self-installs using standard Microsoft installation procedures. The full software suite is usually loaded onto individual PCs running Windows, with the license server and file loaded onto a networked Windows server.

## 1.2 About this manual

This manual gives an overview of changes since the previous major release: PDMS 12.0. It is aimed primarily at users upgrading from that release; those upgrading from earlier releases of PDMS should also read the PDMS 12.0 User Bulletin, preferably the edition issued with Service Pack 6.

This bulletin also covers many of the associated products supplied on the same DVD-R. These products fall into 3 families – Engineer, Design and Manage – and these groupings within the Plant portfolio are reflected in this document. Those aspects that are common between most of the products are generally covered in the first part of the document.

## 1.3 Software distribution and installation

Please note that this release requires FlexMan 5 and an appropriate license; it will not work with earlier versions.

For further details of FlexMan License Server releases, please see:
http://support.aveva.com/services/products/flex/index.asp or, for the 64-bit version,
http://support.aveva.com/services/products/flex/flex_releases.asp

There is a combined installer for PDMS and many of the associated products listed below. This can be configured by using the check boxes to install a selection of products in one operation. **Control Panel > Add or Remove Programs** may subsequently be used to add or remove the individual products at a later date. Installations using **setup.exe** will by default install to C:\. The individual .msi files will by default use the drive with most free space. For more details, please see the Installation Guide.

Setup.exe will now record the installations in log files that can be found in the user's TEMP directory. This can be found using the environment variable TEMP (Normally referenced as %TEMP%).

### 1.3.1 Products installed by the main AVEVA Plant (PDMS) installer

The following AVEVA Plant products are installed with PDMS:

#### Always installed:

PDMS, Laser Model Interface, Query, Diagrams, Schematic Model Manager, Mechanical Equipment Interface, Cable Design, together with supporting software such as *Microsoft's .NET Framework, Visual Studio 2008 runtime components, Infragistics User Interface components etc.*

#### Optional:

Global (Client), Schematic 3D Integrator, Multi Discipline Supports, Area Based ADP, Nuclear Applications, Interfaces (ExPLANT-A, ExPLANT-I)

Sample data ('Models') and Manuals

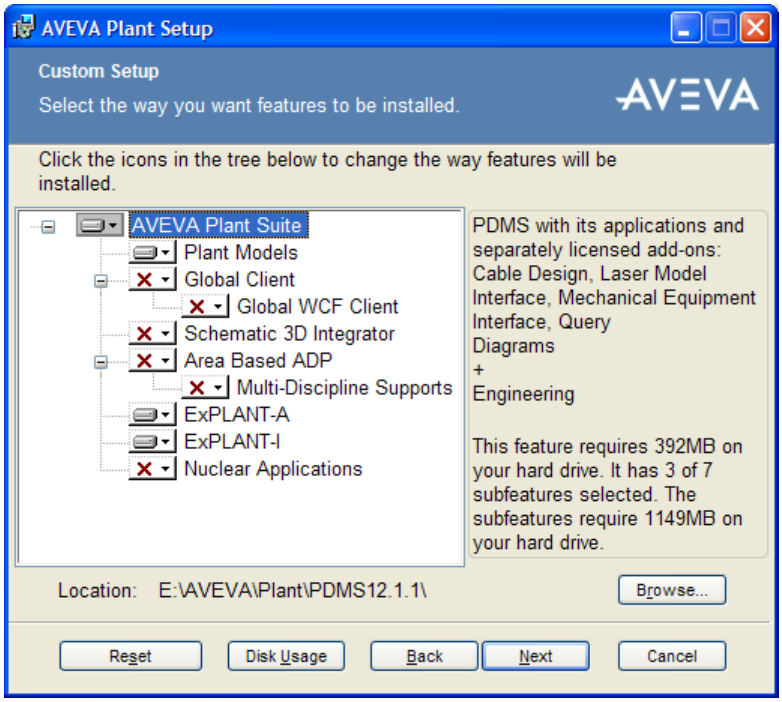
### 1.3.2 Products installed by separate installers

Global Server, SQL-Direct, OpenSteel, P&ID, ImPLANT-I, ImPLANT-STL, PML Publisher

### 1.3.3 Overview of installation process

AVEVA Plant Installers use standard Microsoft Installer (MSI) technology, which facilitates silent installations through standard MSI means. Target location or ROOTDRIVE can be specified by use of the **Browse** button when running each installer. Please note that the use of folders with names including a space, such as "C:\Program Files" is not recommended at PDMS 12.1. Please see section 1.3.4 below if this is important to you.

By default, installations performed using setup.exe will be loaded on C:\ and will stop with an error if there is no C: drive. The default location may be changed by use of the **Browse…** button. Alternatively, the .msi file (e.g. PDMS12.1.1 Plant12.11.msi) can be run directly; this will by default use the writable local drive that has the largest free space. For more details of the latter, see http://msdn.microsoft.com/en-us/library/aa371372(VS.85).aspx.




The main AVEVA Plant Installer includes options to install many of the associated products, although, for various reasons, some products use a separate installer. This means that a selection of products can easily be installed together. This includes the AVEVA Global client option, which enables the use of PDMS or other Plant products with Global. However, there is a separate installer for Global server, which is usually installed on a separate machine, such as a server, which does not necessarily have PDMS installed.

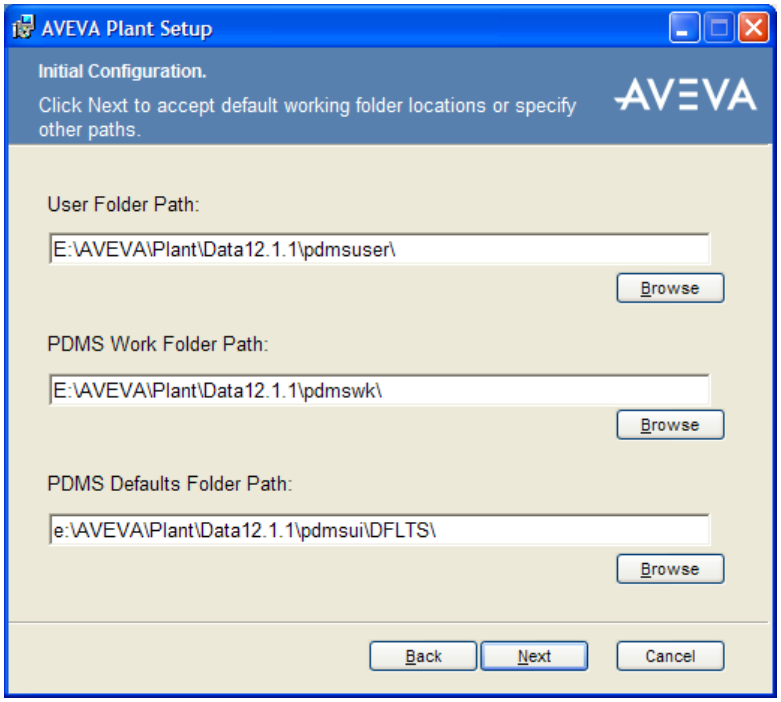
There are options to install batch files and shortcuts on the desktop and/or in the start menu for direct entry to popular modules. Please note that there is no 'thin client' installation option as this is no longer supported.

Existing installations should be changed, repaired or removed using **Add or Remove Programs** from the Control Panel. This process will prompt for the original DVD if required. This ensures that a consistent product set, as tested by AVEVA, will be deployed.

Fix releases (patches) will use a standard updating process, which also checks, and if necessary 'heals', the existing installation. There is therefore no prompt for location, as the system already has this information. Fix releases may also be removed using **Add or Remove Programs**. Fix releases are applied to all products installed together, not to the individual products. The use of the latest fix release is recommended: this includes any previous fixes to those products.

It is important that any files, including configuration files or sample data, that need to be updated by users are accessible for read, write etc. so it is strongly recommended that they are not installed with the software.

This is particularly important when installing in Program Files at Windows 7 due to the introduction of User Account Control (UAC) which brings new security restrictions. In particular, this makes it important to ensure that files that need to be written are accessible by users without Administrator privileges. This applies to folders specified by environment variables such as PDMSWK and PDMSUSER. The Plant Suite installer has been revised to allow the separate definition of suitable folders, with different defaults:




For full details of the installation options and procedure, and the hardware and software requirements, please refer to the *PDMS & Associated Products Installation Guide*.

### 1.3.4 Installation in folders with embedded spaces

AVEVA does not recommend this – as noted in the Installation Guide. However, it is recognised that it may be desirable to install in C:\Program Files\AVEVA\... or similar, in order to comply with common practice. Changes have been made at PDMS 12.1 to make this easier.

From PDMS 12.0, it is possible to use spaces in filenames, using the filename command atom (enclosed in quotes) rather than the ordinary PDMS name (starts with / and ends with <space>). However, spaces have also been used as delimiters in search paths – between the folder names. Changes are required to the setting of the environment variables in order to allow spaces in the file or folder names.

Without Spaces, an environment variable might be defined thus:

```
set pmllib=c:\usersappware\pmllib c:\aveva\plant\pdms12.1.1\pmllib
```

With spaces, a semicolon (;) delimiter should be used:

```
set pmllib=c:\users appware\pmllib;c:\program files\aveva\plant\pdms12.1.1\pmllib
```

Note that the ';' must still be used even if there is no search path, if the file paths contain spaces:

```
set pmllib=%~df1\pmllib;
```

Changes have been to the standard AVEVA applications (appware) to ensure that it works in both cases. This work includes problems caused if the PDMSUSER folder is defined with spaces in the directory path.

AVEVA Global daemon should work when installed in C:\Program Files provided that PDMSEXE is defined in this way, for example:

```
Set PDMSEXE=C:\Program Files\AVEVA\GlobalServer12.1.1;
```

#### Batch file changes

The PDMS 12.1 installers have been changed to make it simpler to handle spaces in installation folders, by using semicolon (;) delimiters rather than spaces. Changes have been made to environment variables, including those set by **evars.bat**:

- Folder paths now end with a backslash (\)
- All paths are the old DOS 8.3 format compliant, except for %pdmsexe%
- %pdmsexe% is terminated with a backslash and a semi-colon (\;)

This applies to both pre-assigned environment variables and those assigned by evars.bat.

Customers who start PDMS using their own procedures may need to make similar adjustments when using folders with spaces in their names. The following batch files, or equivalent, may need to be considered: **pdms.bat, evars.bat, projectCreation.bat, bpm.bat, diagrams.bat, engineering.bat, make.bat, singleds.bat, multids.bat**

Note: the project creation file runs the evars.bat file. If one file uses ';' separators for PMLLIB, all called files must do the same. You cannot have a mixture of ';' separators and space separators.

**AVEVA Multi-Discipline Supports (MDS) and Area-Based Automatic Drawing Production**

Similar changes have been to the batch files supplied with MDS & ABA, notably mdsevars.bat.

### AVEVA Marine

Please note that the same work is less well advanced for AVEVA Marine, so this is not yet supported.

## 1.3.5 Projects in folders with embedded spaces

AVEVA Plant 12.1 will not fully support projects with spaces in their pathnames as Global and some utilities such as the project MAKE program and Standalone DICE do not yet handle them. Work is in hand to remove these limitations but no definite release date is yet set.

# 1.4 AVEVA Plant portfolio

## 1.4.1 AVEVA Plant Version 12.1

Most of the Plant Design products were updated and re-branded at Version 12.0 to simplify the question of compatibility. This practice continues at version 12.1; all Version 12.1 products are designed to work together and in some cases they may also work with earlier versions.

The Plant Portfolio is now divided into 3 groups of products named after the major activities: Engineer, Design, Manage. Many of the Engineer and Design products are built upon a common set of applications of the AVEVA Design Platform, which includes the database technology and administrative applications.

## 1.4.2 AVEVA Plant Engineer Products

These schematic and engineering products create schematics, diagrams, datasheets, engineering lists and indexes.

| | |
|---|---|
| AVEVA Engineering | Manages engineering data in an environment shared with the main AVEVA Plant Design tools. Its main modules are:<br>• Tags, which manages information associated with tagged items, coordinating data from schematics and engineering products, with the option of viewing the corresponding data in the design products.<br>• Schematic Model Manager, which provides unrivalled features for the consolidation of all P&ID data for a project, independently of the P&ID authoring tool. |
| AVEVA Instrumentation | Four integrated program modules support the entire Instrumentation and Control system lifecycle – from engineering and design, through installation, maintenance and modification. AVEVA Instrumentation may be integrated with AVEVA Plant or AVEVA Marine, or used as a stand-alone application. |
| AVEVA Electrical | A new product for Electrical Engineering, based on the proven technology used in AVEVA Instrumentation. AVEVA Electrical may be integrated with AVEVA Plant or AVEVA Marine, or used as a stand-alone application. |
| AVEVA Diagrams | Used for creating P&IDs and HVAC diagrams. It saves both the diagram and the engineering objects in the model database. |
| AVEVA P&ID | Stores intelligent engineering data with the graphics in an AutoCAD drawing while the designer draws and annotates P&IDs. These intelligent P&IDs, containing tagged items, quantities and connectivity data, can be loaded into the AVEVA schematic model via Schematic Model Manager, or synchronised with VPE Workbench. Supports different engineering standards, individual company working methods, and complex projects containing many hundreds of P&IDs. |
| AVEVA VPE Workbench | An integrated engineering database which manages the evolving engineering descriptions of all tagged items in a plant. |
| AVEVA Schematic 3D Integrator | Integrated Schematic / 3D environment allows customers to build their 3D model in a controlled manner, directly from information on a P&ID, enabling consistency checks between the Schematic and 3D models. |

### 1.4.3 AVEVA Plant Design Products

These products focus on the layout and detail design of the plant; they create 3D models and produce all associated deliverables.

AVEVA PDMS is the major AVEVA Plant Design product: it includes engineering applications for design of piping and equipment, structural, ducting, cable trays and supports, including drafting. AVEVA Schematic 3D Integrator adds tight integration with the AVEVA Plant Engineer schematic and engineering data. It should be noted that PDMS can read data from an AVEVA Marine Outfitting database but cannot read or write Hull data.

The main add-on applications and interfaces are:

| | |
|---|---|
| AVEVA Multi-Discipline Supports (MDS) | PDMS application for the design of all kinds of supports, from a complicated framework with integral hangers to a simple U-bolt. A standard catalogue of pads, sliding shoes, straps and clips etc. enables the design of consistent, reliable and fully detailed hanger and support designs in the shortest possible time. Automated production of fully dimensioned manufacturing drawings complete with data for fabrication and erection of the support, including Material Take Offs and cut lengths. |
| AVEVA Nuclear Applications | AVEVA Nuclear Concrete Design: PDMS application for the design of complex concrete structures for nuclear power plant.<br>AVEVA Nuclear Room Manager: PDMS application for managing nuclear power plant design by Room, Volume or Area.<br>AVEVA Nuclear Concrete Quantities: Calculation of the concrete volumes, formwork surface areas and slab usable surface areas. |
| AVEVA Laser Model Interface (LMI) | Brings as-built 3D model data into the PDMS Design environment by interfacing with point cloud data from laser scanning systems. |
| AVEVA Area-based Automatic Drawing Production (ABA ADP) | Automated production of volumetric drawings using templates, thus simplifying drawing update after changes to the PDMS model. Ensures that up-to-date drawings are always available for maintenance work etc. |
| AVEVA Isometric Automatic Drawing Production (Iso ADP) | Automates the production of fully annotated drawings of PDMS HVAC and Cable Tray, including a bill of materials. |
| AVEVA OpenSteel | Allows import and export of files in Structural Detailing Neutral Format (SDNF) format to and from PDMS. Used for transferring data to and from 3D steel detailing packages such as Tekla, Graitec and AceCad. |
| AVEVA Mechanical Equipment Interface – import and export | These interfaces import and export geometric models direct to and from PDMS equipment models using the standard STEP AP203 format; other PDMS elements may also be exported in the same format. |
| AVEVA ImPLANT-I | Converts MicroStation 3D geometric model (.DGN) files for input to PDMS or REVIEW; can also translate associated Design Review (.DRV) files for use in AVEVA Review. |
| AVEVA ImPLANT-STL | Converts stereo-lithography (.STL) files from mechanical CAD systems for input to PDMS. |
| AVEVA ExPLANT-A | Exports 3D geometric models from PDMS to an AutoCAD interchange (.DXF) file, which can be used to import 3D geometric models into AutoCAD or other suitable CAD systems. |
| AVEVA ExPLANT-I | Exports 3D geometric models from PDMS to a binary MicroStation (.DGN) file, which can be used to import these models into MicroStation or other systems such as Intergraph's PDS. ExPLANT-I can also create associated attributes files in a variety of text formats, including HTML. |
| AVEVA Pipe Stress Interface | Two-way interface for data exchange between PDMS and the CAESAR II or TRIFLEX pipe stress systems. Piping designers and stress engineers can exchange design and stress information. |

### 1.4.4 AVEVA Plant Manage Products

These products assist the management of the plant design process. They enable global work share, clash management and design review.

| | |
|---|---|
| AVEVA Global | Allows project data to be synchronised between remote sites. |
| AVEVA Review | 3D visualisation of large complex plant models, including walk-through, animation, and high-quality photo-realistic images. |
| AVEVA ReviewShare | Collaboration tool that provides a method of tracking and responding to comments and incorporates web-based access to a central 3D model. |
| AVEVA Clash Manager | Provides comprehensive identification, recording, trend analysis and management of the resolution of design clashes through an approval mechanism. |
| AVEVA Model Management products | Manages clash information, object status and deliverable production. Comprises AVEVA Model Object Manager, AVEVA Clash Manager, AVEVA Connectivity Manager and AVEVA Deliverable Manager. Clash Manager is also available as a stand-alone product. |
| AVEVA PML Publisher | Allows encryption of PML scripts, thereby enabling the use but not the modification of users' PDMS applications. |
| AVEVA SQL-Direct | Enables SQL queries on PDMS data, thereby simplifying integration of PDMS data into Office applications such as Excel. |
| AVEVA QUERY | Allows PDMS applications written in PML to access ODBC databases, to read or write their data and use it in PDMS applications. |

## 1.5 AVEVA Plant version 12.1.1

The first general release of version 12.1 is 12.1.1 for release in September 2011.

This release includes extensive updates to the handling of local language and units of measure, as well as many other enhancements listed in this document. A new reporting add-in (see section 4.6) also provides a new method of publishing data to *AVEVA NET*.

New products at version 12.1 include 2 new Plant Engineer products:

- AVEVA Engineering (based on PDMS technology)
- AVEVA Electrical (based on AVEVA Instrumentation technology)

*AVEVA Engineering* incorporates *Schematic Model Manager*; it also includes a new TAGS module and a new Engineering Database.

*AVEVA Electrical* and *AVEVA Instrumentation* are supplied separately from the main AVEVA Plant DVD; their release may be at a later date.

*AVEVA Isometric ADP* (Automated Drawing Production) has been extensively updated and is now available for use with PDMS 12.1.

*AVEVA Final Designer* has been withdrawn. Extensive improvements have been made to the export of AutoCAD format (DXF, DWG) drawings from PDMS Draft.

*AVEVA SQL-Direct* has not been updated but works with PDMS 12.1.

*AVEVA Pipe Stress Interface* is not available with the initial release of PDMS 12.1.

# 2 AVEVA Plant portfolio updates at 12.1

## 2.1 General

These changes apply to PDMS and many of the other products based on the AVEVA Design Platform.

### 2.1.1 Improved local language – Unicode encoding

A major internal change at PDMS 12.1 is that the system uses the Unicode standard for text storage and manipulation, rather than the various specific and somewhat proprietary methods that are used in PDMS 12.0 and earlier releases. This standard covers all common world languages – and special characters – and will make it much easier to provide support for additional character sets in future. It makes text handling more robust and makes it much easier to relax some of the previous restrictions, particularly to the use of Asian 16-bit character sets. For example, these may now be viewed in the 3D views. Inputs and outputs may be in Unicode or local standards.

### 2.1.2 Units of measure – extended range of conversions

PDMS has always provided conversions for distance and (pipe) bore measurements, to cater for the use of both Metric and Imperial (English) units. This has allowed users to work with feet and inch input & output, but with database storage always in millimetres. Area and volume units have been derived from the length units. Other physical quantities have been handled as purely numeric and have had no conversions applied to them.

PDMS 12.1 extends these facilities to a much wider range of measures, and includes built-in definitions and conversion factors for a wide variety of units of measure, with standardised storage and efficient conversion.

These extensions are needed to provide for the much wider range of data now being handled, particularly for plant engineering and schematic data. These data now include Distance, Bore, Area, Volume, Angle, Weight, Temperature, Density, Pressure, Force, Voltage, Current, Impedance, and many others.

Please note that this does mean that the behaviour of some real attributes is different; users' PML applications that check or manipulate these values will need to be reviewed. Some guidance is available in section 16.5.

### 2.1.3 Performance

Various application diagnostics have been improved to facilitate the gathering of performance data. Using this information, system performance has been improved in a number of key areas, including:

- Faster start up with an option to enter any module directly rather than via Monitor
- GML Performance improvements for Mechanical Equipment Interface
- Indexing by Type – an index (Dabacon table) to return all elements of a given type
- Improved Dabacon performance, including changes to its memory 'buffer', more efficient claim/release and reading/writing more than one page (record) at a time – see also section 3.7.1

Work in this important area is on-going.

### 2.1.4 Database accuracy

The accuracy of large numbers, notably coordinates, was increased for PDMS 12.0. Coordinates should now be accurate up to the limit of the spatial map (100 km) – but design graphics can show some 'glitches' close to this limit. The limit in PDMS 12.0 of 21 km for Isodraft has been relaxed for this release – see section 12.3.

### 2.1.5 Application update and consistency

There are many enhancements to the user interface aimed at improving its ease of use and also its consistency between the various different functions and disciplines. Improvements include the ability to save 3D views, enhancements to piping functions including sloping lines, an enhanced Clasher GUI, improved hole creation.

Changes have also been made to improve the way that the system works on Windows 7, with a variety of different locales.

## 2.2 PDMS 12.1

Many enhancements detailed in chapters 9 to 12, including the following:

### 2.2.1 Design

- Many improvements, notably to model editing, sloping pipelines, hole management and change highlighting
- A new standard model library and a much enhanced clash detection utility

### 2.2.2 Drawing Production

#### Draft

- Extended line styles and hatch patterns
- Improved export to CAD formats: DXF, DWG, DGN
- An updated *Isometric ADP* add-on application

#### Isodraft

Improvements to Piping isometrics include TrueType fonts, new output file formats and production of pipe spool (PSPOOL) isometrics.

## 2.3 Other Plant Design Products

### 2.3.1 Multi-Discipline Supports (MDS)

Integration with new Cable Tray features.

### 2.3.2 Global

Earlier releases of AVEVA Global used Remote Procedure Call (RPC) for communication between locations. A new option to use Windows Communication Foundation (WCF) in its place was introduced with PDMS 12.0.SP6.6. Global can now use the wide variety of security configuration options provided by WCF, providing improved daemon security and robustness.

Global can now (optionally) propagate Linked documents which are marked appropriately. These documents must be defined using a file URL, and any folders used must already exist.

## 2.4 Plant Engineer Products

### 2.4.1 Engineering

A new AVEVA Engineering product has been introduced together with the release of AVEVA Plant 12.1. This new product includes a new Tags module as well as a new Dabacon database type designed and optimized for Engineering data. For more information, please see the “AVEVA Engineering” and “Administration” sections.

The Engineering product also includes the Schematic Model Manager module, which is no longer sold as a separate product.

### 2.4.2 Schematics

These products include Diagrams and Schematic 3D Integrator, each of which includes a number of enhancements in the 12.1 release and are installed with the main Plant suite. Please refer to the "AVEVA Schematic 3D Integrator" and "AVEVA Diagrams" headings respectively.

AVEVA P&ID is also a member of Plant Engineer family, but is separately installed and has a separate set of release notes. AVEVA P&ID is fully integrated with PDMS and can save data directly to the schematic model database. A new release, AVEVA P&ID 12.1, will be released around the same time as PDMS 12.1. For details of the enhancements included, please refer to the Product Release Letter http://downloads.aveva.com/90188/d90188.pdf and the User Guide included with the product.

## 2.5 Sample Model data

An installer option for the Plant suite installs a variety of standard 'model' projects, including Master (MAS) and Sample (SAM). The old Imperial (IMP) project is no longer supplied; instead there is an Imperial MDB /IMPSAMPLE in the SAM project.

A file (for example, SAM_Project_description.pdf) is included in each project folder giving brief details of the purpose and data included in that project. The MAS project provides example component data and specifications ("Component Data"). All data in the projects is provided as sample data only and should be verified for production use.

Major changes for 12.1 include:

- Improved Project_description PDF files
- Conversion of all databases to Unicode (the new default)
- Addition of OpenSteel test data to BAS project
- Many corrections to the various catalogues and specs, including improved bolting
- Piping catalogue amended for sloping pipe development
- Addition of 7 segment bends and many improvements to HVAC catalogue
- Addition of weights (in Kg) to ANSI catalogues & specs
- Addition of flat bar to the steel catalogue
- New Vantrunk catalogue; update Oglaend catalogue
- Additional information for Isometric ADP
- Additional information for Diagrams, Tags, Instrumentation and Electrical

A complete list of all changes logged is included in section 17.2.1.

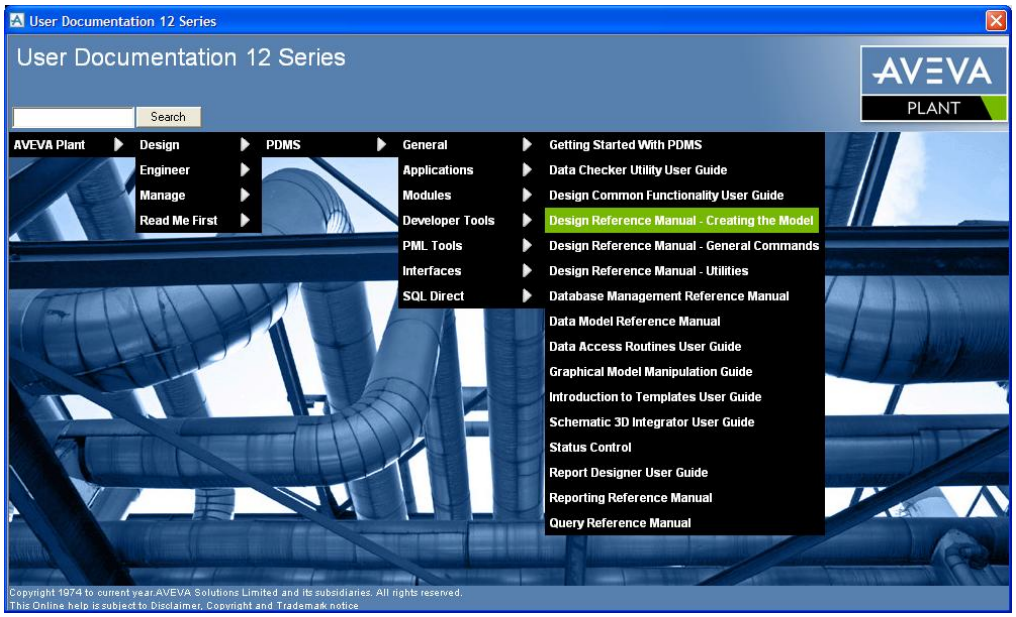
## 2.6 Documentation

A great many changes have been made to the documentation set for PDMS 12.1, with all manuals updated.

Notable improvements to the documentation set include:

- A new *12.0 to 12.1 Upgrade* manual
- A *Global WCF Configuration Guide* (introduced with Global WCF at 12.0.SP6.6)
- Manuals for new functions and products: Report Designer, Tags, Isometric ADP
- Major update for *Lexicon* manual
- A new section on Event Driven Graphics in the *Software Customisation Reference Manual*

A new index page gives access to the online help system, which may also be accessed direct from the system using <F1> as usual.




It should be noted that the PDF manuals are no longer supplied separately but may be obtained from the on-line help by clicking Printable version on entry to any manual.

# 2.7 Operating environment

PDMS 12.1 is supported on Windows XP Service Pack 3 (32-bit) and Windows 7 (both 32- and 64-bit versions). Projects are usually installed on a server – both Windows Server 2003 & 2008 R2 are supported.

## 2.7.1 PC hardware configuration

A minimum of 4 GB of memory is recommended for this release, especially when installed on Windows 7. PDMS 12.0 will operate with less, but system performance will be compromised. A screen resolution of *at least* 1280x1024 is recommended, though most users now use either two such screens or a wide-screen (1920x1200) display. For details, please refer to the *Systems Requirements Manual*.

## 2.7.2 Microsoft Windows

### Desktop

PDMS 12.1 is supported for use on Microsoft Windows XP Professional, Service Pack (SP) 3 or on Windows 7 (Business and Enterprise editions) Service Pack 1, with appropriate patches.

A single 32-bit version of the PDMS system is available; this is supported on both 32- and 64-bit versions of Windows 7. It is no longer supported on Windows 2000; indeed Microsoft no longer offers support for Windows 2000 or Windows XP SP2.

Please note that User Account Control (UAC) introduces new security restrictions at Windows 7 (and Vista). In particular, this makes it important to ensure that files that need to be written are accessible by users without Administrator privileges. This applies to folders specified by environment variables such as PDMSWK and PDMSUSER, which are no longer installed by default with the program executables.

## 2.7.3 Microsoft Internet Explorer

Internet Explorer is required for the on-line help system; version 7 or 8 is recommended as version 9 does not currently work correctly. See section 17.1.1.

## 2.7.4 Microsoft .NET Framework

PDMS 12.1 requires Microsoft's .NET Framework 3.5, which is supplied on the DVD and installed if required. It should be noted that installation of version 3.5 brings with it several of the earlier versions, on

which it depends. It is also possible to install additional versions in order to support older applications such as PDMS 11.6, which requires .NET 1.1.

The updated version of .NET used for PDMS 12.0.SP6 onwards may prevent .NET add-ins running if deployed on a network. This will not usually cause an issue for PDMS, for which AVEVA recommends a local installation on each machine, but might cause problems for customers running their own add-ins.

.NET security can cause issues when running PDMS across the network where the add-in assemblies reside on a different machine to the .NET runtime. The default security level for the local intranet is not set to Full Trust, which means that programs may not be able to access resources on the local machine. To overcome this, the intranet security may be set to Full Trust, though this means that any .NET assembly may run. Alternatively, Full Trust may be given to a specified group of strongly named assemblies.

Trust levels may be set using the Microsoft Code Access Security Policy tool `caspol`. For details, please see http://msdn.microsoft.com/en-us/library/cb6t8dtz(v=VS.90).aspx.

### Serialization

Please note that serialized settings (of the user interface configuration) are now saved in the following location on Windows XP:

```
C:\Documents and Settings\<username>\Local Settings\Application Data\Aveva\
```

and on Windows 7:

```
C:\users\<username>\Appdata\Local\AVEVA\
```

## 2.7.5 Microsoft Office & fonts

AVEVA Plant 12.1 is supported with Office 2007 and Office 2010. The use of the 32-bit version of Office, including Visio, is recommended on both 32- and 64-bit Windows as issues have been encountered with the 64-bit version.

### Excel interoperability

Import of data into a grid control requires an optional component from Microsoft Office. This is not supplied with PDMS but is an installation option for Microsoft Office. Please ensure that ".NET Programmability Support" under Advanced customization of applications" is enabled when Office is installed.

This will install the Microsoft Microsoft.Office.Interop.Excel.dll. If this assembly is not enabled, invoking the Excel import facility will not work.

### Screen font for GUI

The PDMS user interface (version 11.6 onwards) requires the use of the Arial Unicode MS font, which is supplied with Microsoft Office (version 2000 onwards) and is usually installed automatically when using Windows XP or later.

For further information, please refer to http://office.microsoft.com/enus/help/HP052558401033.aspx. If this font is not installed, some of the text in the PDMS user interface may become illegible.

The layout of some GUI forms may also be adversely affected if the screen font size is not set to the smallest size, which is usually default. This setting is accessed from the Control Panel and is referred to as "Normal" in Windows XP or "Smaller" (100%) in Windows 7.

## 2.7.6 Graphics cards

Due to the rapidly changing availability of hardware-accelerated OpenGL graphics cards, an up-to-date list of supported cards is not included in the documentation released with PDMS. The AVEVA Product Support website (accessible from http://www.aveva.com) – IT Configuration section,– contains a list of tested and supported graphics cards.

### 2.7.7 Environment variables

PDMS and some of the other products rely on the use of environment variables for various aspects of configuration, notably the location of folders for project databases and user workspace.

There are points to bear in mind for both of these when setting up a user's environment:

- Write access is required for folders such as PDMSWK and PDMSUSER: see section 2.7.2.
- An environment variable such as SAMDFLTS, which can be set to point to an empty folder if there is no variation from PDMSDFLTS, is required to reference a folder for storing configuration details for each project. This is now used in several circumstances, including the start-up of MDS, Schematic 3D Integrator or any Engineering / Schematic product.

The installer will now use different default locations for the program files and some of these data folders. Additional dialogs enable the user to control these better.

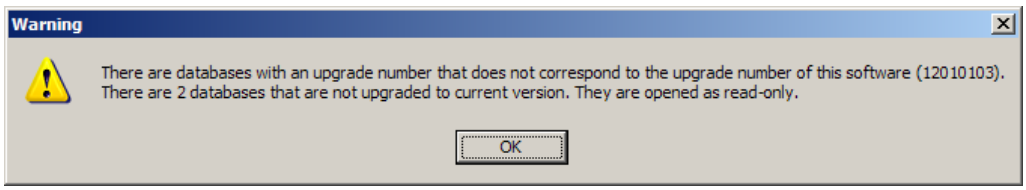
## 2.8 Upgrading from earlier releases

### 2.8.1 Upgrade overview

A number of the enhancements made at PDMS 12.1 *require* an upgrade to the database. Each of these individual changes is referred to as a Part Upgrade. In normal use, the whole project will be upgraded to the latest version, though each part upgrade are in general designed to be 'optional', in that the 12.1 software can work with a database that has not been upgraded and the software will degrade gracefully – that is, the software will continue to work, although some new functions may not be available.

This means that it is possible for customers to continue to work with Foreign DBs, which may be shared with 12.0 or earlier projects and which have not been upgraded, included in their projects. An example would be a Corporate Catalogue DB used for 12.0 and multiple projects.

Databases which have not been upgraded will however be read-only. The following warning will appear when opening an MDB from a project that has not been upgraded:




This warning (or similar) indicates that the project needs to be upgraded to the latest version in order to allow write access.

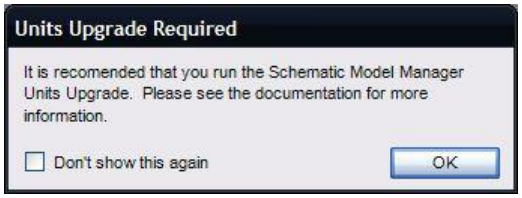
All the Part Upgrades will be run by a DBUPGRADE command, which converts a PDMS 12.0 project to 12.1. This is initiated from Admin using the following commands in the Command Pane (or TTY mode):

```
lock
dbupgrade project to latest
unlock
```

This procedure may also be used with Global projects if some additional precautions are taken. A brief summary is given below – further details are given in the *12.0 to 12.1 Upgrade* manual.

*Earlier projects should first be upgraded to PDMS 12.0.*

Schematic Model Manager has its own units handling at PDMS 12.0. It also has its own upgrade mechanism, which is separately documented; the software will advise if it is necessary to run this:



### 2.8.2 DBUpgrade command

The Upgrade procedure is invoked from Admin; it controls the upgrade process and runs each Part Upgrade in the appropriate order. Upgrades relevant to PDMS that are covered by this process are:

- UKEYs (now include database number to avoid duplicates)
- Performance of 'finding' database elements (index by type)
- Module Definitions – new TAGS module (and renamed Marine Drafting module)
- Character handling (Unicode representation for names, text etc)
- Line widths in Draft (widths of thin, medium and thick lines now stored in system database)

The upgrade process puts an upgrade number in the databases, indicating the level to which they have been upgraded. This makes it easy to detect, on opening, whether a database has or has not been upgraded. This upgrade number will also be used by the Reconfigure process.

### 2.8.3 Database Version Control

The upgrade version number is used to verify that the versions of the database and the software that accesses them are compatible. During application start-up, databases are checked against the software; access may be restricted according to the following table:

| | *Database Upgrade Version* | | |
|---|---|---|---|
| | **Pre 12.1** | **12.1.1** | **Future (e.g. 12.2)** |
| *Software Version* | *Max Open Mode* | | |
| **Pre 12.1** | **R/W** | **X** | **X** |
| **12.1.1** | **R** | **R/W** | **X** |
| **Future (e.g. 12.2)** | **R** | **R** | **R/W** |

This control ensures that AVEVA software that opens a database is compatible with the contents of that database and thereby prevents accidental data corruption. It also ensures that data intended for use with one software version is not modified by a newer, incompatible software version.

X indicates 'no access'; however, versions earlier than 12.1 do not make this check, so cannot detect a database upgraded to 12.1 or later.

### 2.8.4 Global

It is recommended that the whole project, excluding Foreign databases, should be upgraded at once. However it is recognised that this needs to be achieved in stages, and different locations and databases can be upgraded independently of each other.

It is not necessary to disable automatic update events. Global can continue to work as normal during the upgrade procedure.

Databases can only be upgraded at their primary location. Project upgrade will ignore secondary databases including databases which are undergoing re-location, as well as extract hierarchies which contain secondary extracts.

All extracts of any database must be upgraded as a group. It is not possible to upgrade a single master or extract independent of the remainder of the extract hierarchy. In a Global project, this requires the extracts to be relocated to the primary location of the master.

In ADMIN, the Upgrade Status query (Q UPGRADE STATUS) provides additional information on secondary databases and those which own secondary extracts.

Global cannot upgrade extract hierarchies which contain working extracts at more than one location, and it is not possible to relocate working extracts. It is recommended that these should be deleted before upgrade (after data has been flushed). If all working extracts are at a single location, this location should be used to upgrade the master and its extracts.

### 2.8.5 The Upgrade Process

The upgrade process will be undertaken by System Administrators responsible for the project at all locations. When upgrading multiple projects, many System Administrators will need to co-ordinate. The upgrade process will upgrade one project at a time. Customers will need to give careful consideration to the order of upgrade for the various projects.

The projects will need to be locked for the duration of the upgrade, with all Users out of the system.

The upgrade process will be:-

1. Ensure all users have exited from project
2. Lock project at all locations (upgrade will check for this (see below)
3. Disable Automatic update events if required. (Recommended but not essential)
4. Expunge all users in the system at the local location
5. Flush data from Working extracts – these will not be considered; in Global projects they should be deleted
6. Check project using DICE (Integrity Checker)
7. [If DICE reveals issues, address them, then re-run DICE]
   *Administrator may want to unlock project while DICE issues are being addressed, but will need to exclude all users and Lock project again before final DICE check*
8. [After clean DICE check]
9. Back-up project at all locations
10. Temporarily relocate all non-Foreign DBs to their master's Primary location
11. Check for No Transient Databases
12. **Upgrade the project at each location**
13. **Optionally** Merge Sessions
14. **Optionally** Reconfigure for Unicode
15. DICE check project
16. Relocate extracts back to their original locations
17. Perform non-framework upgrades if applicable
18. Unlock the project

### 2.8.6 Locking the Project

The project as a whole cannot be locked, only individual locations; however, it is possible to lock all online locations from the HUB through Global. To do this run the following command from the HUB:

```
LOCK AT <location>
```

The HUB can be locked without the need for a daemon command using the command:

```
LOCK
```

It is possible to confirm whether locations are locked by evaluating the return result from:

```
QUERY LOCK AT <location>
```

The Hub can also unlock satellite projects:

```
UNLOCK AT <location>)
```

### 2.8.7 Extract Hierarchies

It should not be necessary to change the extract hierarchy, nor to consolidate data within extract hierarchies. Therefore the System Administrator should not need to FLUSH, ISSUE, DROP data between extracts (working extracts are an exception to this – see below). Nor should they need to delete any extract families to leave only Masters. However all extracts will need to be relocated to a single location, although this does not need to be the HUB.

#### Working Extracts

Working Extracts cannot be propagated as they are specific to a single location. See note in section 2.8.4.

#### Offline Locations

Global supports Offline locations without a Global connection. Offline locations do not support distributed Extracts but can support stand-alone extract families.

It will not be possible to co-ordinate the upgrade from another location if Offline locations are used. The Offline satellite databases (and standalone extract families) will need to be upgraded there, and data transferred to the hub in the normal way.

## 2.8.8 International characters (Unicode)

New text files, including Datal files, will be output by default in UTF-8 with a BOM, unless the CADC_LANG_NEW environment variable is set. Datal files written from earlier versions will not be UTF-8 but will be read according to the CADC_LANG environment variable or Latin-1 if unset. If this is incorrect, this could cause encoding problems causing the file to be misread. For further information, please see sections 4.1 and 16.1.

New databases created at PDMS 12.1 will by default use the Unicode character set for textual attributes and names – see section 3.1. However, no upgrade is required for older databases: they will be handled according to the project character set as defined in Admin (PROJECT CHARSET or PROJECT MBCHARSET commands). They will also be converted according to this setting if they are reconfigured so it is important that it is set correctly!

In cases where an extended range of characters is needed, Reconfigure may be used to convert a 'legacy' database to a Unicode encoded database.

In the following example legacy DICT databases (used to hold UDA and UDET names) are reconfigured to be Unicode encoded, using Admin 12.1.

```
FROM DB MASTER/DICT
TO FILE /c:\DICT1 /c:\DICT2
RCFCOPY ALL
RECONFIG SESSIONS

FROM FILE /c:\DICT1 /c:\DICT2
TO DB MASTER/DICT
RECONFIG
```

Doing it this way means that no deletion and recreation (or copy) is required for the DB, and therefore neither is re-adding to the MDB structures required. Using RECONFIG SESSIONS in the FROM phase of the reconfigure operation will preserve both the sessions and references.

### Summary

Locally Encoded (Legacy) Databases:

- can be opened for read access in both PDMS 12.1 and earlier versions of PDMS
- can be opened for write access in both PDMS 12.1 and non-Unicode versions of PDMS, but the range of characters which may be used is restricted to the set defined by the project settings
- require that the project settings are correct so that characters can be interpreted correctly
- can be reconfigured to a Unicode encoded database

Unicode Encoded Databases:

- cannot be opened for read or write access in versions of PDMS prior to 12.1
- can store the full range of Unicode characters available in PDMS 12.1

## 2.8.9 Units of measure

Distance and bore units are handled in much the same way as before and should need no conversion. Other attributes will now be converted to and stored in appropriate units. The table in section 4.2.1 shows the database units which are used; they are thought to be the most commonly used unit. Where a database has stored all quantities of a dimension in the appropriate unit, the new functions can be used without upgrade.

Attributes other than distances and bores have the UNIT field set for the first time; in previous versions of PDMS, they were until now stored as values with no specified unit, other than by use and convention - they could change from application to application, and project to project. This approach is not compatible with automated conversion so the storage units must be defined. For compatibility, it is possible to set the units to NUMERIC which will disable Units conversion for that physical dimension. Disabling a specific dimension in this way means that no advantage will be gained from the introduction of that dimension.

Previous versions of Schematic Model Manager had special units support for Angle, Area, Pressure, Temperature, Volume and Weight values that could be included in the ISO15926 format import file. Units UDAs were provided as mandatory UDAs and were attributes on each Diagram element (SCDIAG). The chosen units for these dimensioned quantities could be set in the Project Options form in Schematic Model Manager. In 12.1, the new units capabilities mean that the special units support in Schematic Model Manager is no longer required. Data imported in 12.1 will be stored in the appropriate units consistent with

the data read from the ISO15926 import file. The upgrade process for projects moving to 12.1 includes a part upgrade for Schematic Model Manager dimensioned data.

Please note that the CATA database elements MSET, MTYP, ATLI, USEC and UDEF are no longer used; they will be removed from the database in due course.

### 2.8.10 Schematics functions

Projects that are upgraded from PDMS 12.0 or earlier need a suitable module definition in order to use the new Engineering functions in the new Tags product (see above).

The data will need some reconfiguring:

- Integrator links world (CYMWRL) has been moved to Reference database
- Shape upgrades in Diagrams – automatic when opening a diagram in write mode
- Systems moved to Reference Design database

## 2.9 Compatibility

### 2.9.1 AutoCAD

This release of AutoDRAFT supports AutoCAD releases 2007, 2008, 2009 and 2010. Note that AutoDRAFT no longer supports AutoCAD 2006 for languages other than English.

### 2.9.2 Final Designer

Final Designer is no longer supplied with PDMS; the latest version supports only AutoCAD 2006 and works with PDMS 11.6 or 12.0 on Windows XP only.

Extensive improvements have been made to the Configurable DXF, DWG and DGN output capabilities of Draft to provide an alternative means of producing well-structured CAD deliverables.

### 2.9.3 Data Access Routines (DARs)

Any customer programs using PDMS Data Access Routines (DARs) will need to be recompiled and relinked with the PDMS 12.1 libraries. Please note that text attributes are now returned in the Unicode UTF-8 format, regardless of whether the database is in 'legacy' or Unicode format. In previous versions of PDMS, they were returned in 'internal' format. This change:

- is of importance mostly to customers using character sets other than Latin-1, though any accented characters not in the basic Latin (ASCII) set will also be affected.
- gives a more standard, and hence more useful, format for most customers but may be converted to 'internal' format (or other supported format) using the 'Transc' utility – see section 16.1.2

## 2.10 Notice of change in support status

The support status for all full releases of PDMS is shown on the AVEVA web-site. The release of PDMS 12.1 will trigger a change of status for PDMS 11.6 to 'Limited' in 2012, after a transition period of 6 months. At the same time, versions of PDMS 12.0 prior to SP6 will change to 'Inactive'.

## 2.11 Future considerations

### 2.11.1 Access platforms, Stairs and Ladders (ASL)

The new application for Access platforms, Stairs and Ladders (ASL) is being improved to provide an excellent tool for stairs (single flight in the first release), ladders and hand-railing. Its facilities for modelling access platforms have been removed and will be covered by a simpler approach using the new Standard Model Library.

The new application will therefore be known as ***Stairs, Ladders and Hand-railing***.

The old Access platforms, Stairs and Ladders application (from PDMS 11.6) is still available, though it will be removed at a future release. It is available, hidden, at PDMS 12 and can be reactivated by a simple edit

to the PML file `PDMSUI/des/addins/access`. This file is all commented out; activate all the code lines after the header and ensure that the application is shown on the menu:

```
showOnMenu: TRUE
```

### 2.11.2 Hangers & Supports (H&S)

The recommended application for Pipe Hangers & Supports is the Multi-Discipline Supports (MDS) add-on product. The old Hangers & Supports application will be removed at a future release but is available, hidden, at PDMS 12.1. It can be reactivated by a simple edit to the PML file `PDMSUI/des/addins/supp`:

This file is all commented out; activate all the code lines after the header and ensure that the application is shown on the menu:

```
showOnMenu: TRUE
```

### 2.11.3 PDMS Plotfiles

The PDMS plotfile format has served its users well over the years but has remained unchanged for many years. Its scope is quite limited and it cannot cope with some of the more complex documents we now wish to produce. In particular, it cannot handle text that uses TrueType fonts.

It was decided that it was more sensible to adopt one or more standard formats rather than extend the plot file. Any existing programs using the plotfile would in any case have to be radically changed.

PDMS 12 can output Adobe's PDF, the Windows enhanced meta-file (EMF) and a variety of bit-map formats such as TIFF. Ii is anticipated that the use of plotfiles in PDMS will largely be replaced by the EMF and its use for output by PDF. The EMF is an integral part of Windows and its printing system; its use will have the effect of opening PDMS to the use of EMF from other sources, for some purposes. The full details have yet to be assessed and will be announced in due course.

***It is proposed to drop the plotfile option at the next major release of PDMS.***

# 3 Database changes

## 3.1 New Database types

### 3.1.1 Engineering Database

The new ENGI database holds engineering data that does not normally appear on the schematics drawings. It therefore holds more detailed information necessary to fully specify the engineering equipment in a plant. For example, a schematic diagram might show a pump, its name and its major connections – and perhaps a little more. The engineering database will include electrical data (for the motor, loading calculations etc), process data (the process conditions), mechanical data etc.

These data may be owned and controlled by several different discipline engineers. This database will make it easy to work with lists of equipment and other tagged items. Using a separate database makes it simpler for the schematics and the engineering data to be compiled in parallel – and later checked for consistency by using the new Compare/Update utility.

While the Schematics database is optimized for P&ID data structures and is based on a hierarchical connectivity model similar to the 3D data model, the Engineering database is instead designed to be used for managing tagged items and keeping list type data. This also includes the option of using the new Distributed Attributes mechanism to achieve parallel and concurrent access to discipline specific data.

The Duplicate Names mechanism allows items in an Engineering database to have the same name as items in the Schematics and Design databases. See section 3.4" Duplicate names" for more information.

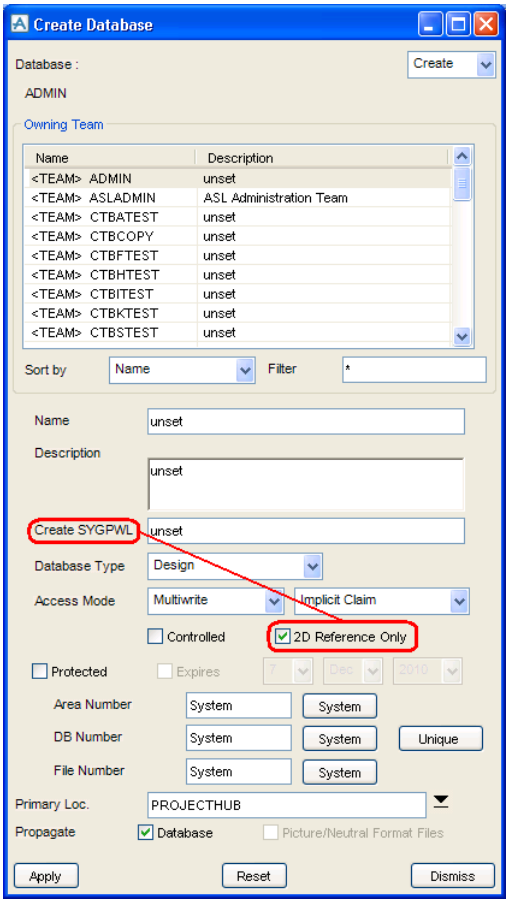
### 3.1.2 Design Reference database

This is a restricted Design database, used mainly for administrative purposes – it cannot include any SITE (or HULL) data. Its main use is for storing information about Systems and Areas for use in Engineering and Schematics applications. It is therefore useful for users who are licensed only for 2D applications.

It is created by setting a flag on the database when it is created; this is the only way to create it and the flag cannot be removed at a later date.

Points to note about Design Reference databases:

- Engineering or Schematics users can use them
- They cannot be the default DB in an MDB
- They cannot include SITEs; this also prevents the creation of elements below SITEs
- They can include Schematic-3D link elements, making link information available in Schematics products when their users do not have access to normal DESI databases



## 3.2 Access to databases

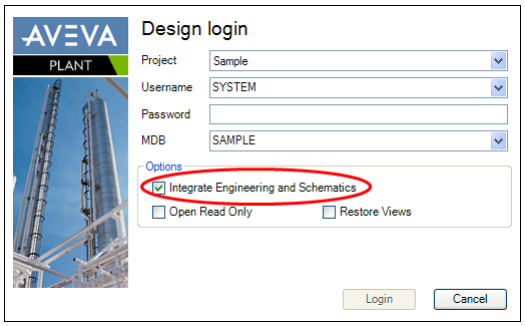
The complete list of database types, apart from 'system' types, is now:

- Administrative: DICTIONARY, NSEQUENCE
- Parts catalogue and material properties: CATALOGUE, PROPERTIES
- 3D Design and Drafting: DESIGN & DESIGN Reference, DRAFT (PADD), ISODRAFT
- Schematics and Engineering: DESIGN Reference, SCHEMATIC, ENGINEERING

In addition, MANUFACTURING and NSEQUENCE database types are primarily used by the Marine products.

Access to the various types of database depends on the product and module being used as well as a user's access as determined by his team membership and any Data Access Controls in use. In summary:

- All AVEVA Plant products have full read/write access to the administrative and catalogue data in the DICTIONARY, CATALOGUE, NSEQUENCE and PROPERTIES databases.
- PDMS users can read & write 3D (DESIGN, DRAFT and ISODRAFT) databases; those who need to access Schematic or Engineering data also need a Schematic 3D Integrator license. The decision to work in "Integrated" mode is taken when a user enters PDMS and applies to the whole session.




- Diagrams users can read & write SCHEMATICS databases; they can read but not write 3D databases. Diagrams users can also read (but not write) the new ENGINEERING database (see below).
- Engineering users can read & write both Schematic and Engineering data; they can also read (but not write) 3D data.

The table below summarises this:

| Database type | Products and corresponding database access | | | |
|---|---|---|---|---|
| | PDMS (or Outfitting) | PDMS Integrated mode | Diagrams | Engineering |
| Admin (DICT, NSEQ) & Catalog (CATA, PROP) | RW | RW | RW | RW |
| 3D (DESI, PADD, ISOD) | RW | RW | RO | RO |
| SCHE | None | RO | RW | RW |
| ENGI | None | RO | RO | RW |
| *Key concept* | *Access to a product's own databases is Read-Write (RW)*<br>*Access to other products' databases is Read-only (RO)* | | | |

Existing users of Diagrams, Schematic Model Manager and Schematic 3D Integrator will require an updated license file.

# 3.3 Increase in number of databases

A larger number of databases can now be used in a project; the new limit is 250,000. New database numbers from 250,001 to 255,000 are reserved for AVEVA use, as well as those from 7,001 to 8,000.

It is now easier to avoid database number conflicts when databases are shared between projects. These conflicts may be avoided by creating DBRange elements to define the range of database numbers available for use in each of the projects. The database numbers may be between 10,000 and 250,000; these numbers may also be used explicitly in a project that does not use DBRanges.

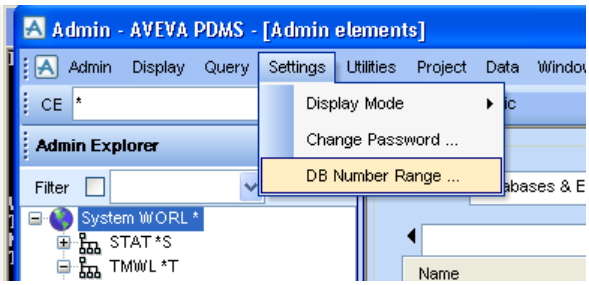
A DBRange may be created in Admin under the STAT element in the SYSTEM or GLOBAL database and defines the start DBRBEG and end DBREND of a range of numbers.

There is a new "UNIQUE" option for the CREATE DB command to allow the user to create the next database in the defined range for the project; a new pseudo-attribute NXTDBU gives the next database number within the range.

For full details, please refer to the *Administrator User Guide* and *Command Reference Manual*.

## 3.3.1 Admin GUI

To create a DB Range, a menu in the Settings pull down takes the user to a new form to set values for a DB Range. If no range already exists, this will create an unnamed DB Range and populate it with the specified values; if more than one range is required for the project, these should be created on the command line.




leads to:


A **Unique** button for **DB Number** on the Create Database form ensures creation of a database within the project's range: see picture in section 3.1.2.

# 3.4 Duplicate names

In general, AVEVA Plant products prevent the use of duplicate names within the current MDB. However, it may be desirable for Engineering or Schematics elements to use the same name as the 3D elements in the Design database. PDMS 12.0 allowed name duplication between the DESI and the SCHE databases.

It is now possible to create or rename an element in an Engineering (ENGI) database to have the same name as any element in any Schematic (SCHE), Design (DESI) or Marine Production (MANU) database in the current MDB.

Similarly it is now possible to create or rename an element in any Schematic (SCHE), Design (DESI) or Production (MANU) database to have the same name as any element in any Engineering (ENGI) database in the current MDB.

# 3.5 Flexibility of data organisation

## 3.5.1 Database views

Database views provide a way to consolidate data from elements and attributes distributed across databases in an MDB. These views are set up by an administrator using the Database Views Editor and stored in the Lexicon (DICT) database in a 'Database View World' (DBVWWL/D). Users' database views may also be saved in a local settings file.

The Editor is currently available in the Lexicon module, under **Display > Database Views Editor**, as well as in the Admin ribbon tab in the Tags module. Further information is given for Lexicon in section 6.4.3.

A Database View uses a table to define a view of the data, which may be derived from a single or multiple elements. There is a row in the Database View table for each element of a particular type that meets the criteria defined by filters. These filters use the same concept as the search grid. If the criteria cannot be expressed using attribute filters, it is also possible to define an expression for evaluation. A row is present in the table only if all the filter criteria are met.

This is a very powerful technique which can be used to derive data structures for a variety of purposes, in particular List definitions in the Engineering Tags module, as well as for the new reporting function – see section 4.6. The Excel Import/Export functions also work with Database Views, which are of particular importance in the integration of engineering, schematic and design data.

## 3.5.2 Distributed attributes

Distributed attributes enable the definition of objects that have groups of attributes distributed across databases, currently restricted to the DESIgn and new ENGIneering database types. This enables a number of new possibilities:

- Improved concurrency
  - Several users may work in parallel on an object, using different sets of data
  - Simultaneous multi-discipline updates on the same object are possible
  - Claims may be smaller, only claiming the relevant "portions" of an object
- Distribution of an object's attributes across hierarchies and databases
  - Easier distribution using Global
  - Reduced need for Global extracts
- Simplified access control
  - It may be sufficient to use database ownership (by teams)
- Data may be included or excluded by database
- Extensibility of data structures – an alternative to direct use of UDETs and UDAs

A 'binding' element is used to achieve this: it may bind any number of bound elements, but these bound elements can only bind to one binding element. The attributes defined on the bound elements are then available on the binding element for both querying and manipulation.

Details of the configuration and use of distributed attributes can be found in the *Database Management Reference Manual* and *Lexicon User Guide*.

## 3.5.3 Handling of duplicated names of UDAs and UDETs

UDA keys now take into account database number to remove the possibility of conflicts between UDA names in different databases. In previous versions, this could occur when merging data from different projects or MDBs.

A new command in Lexicon allows a user to reallocate existing UKEY values to the new format for UDAs and UDETs. They can operate on either a selection of UDAs and UDETs or all in the current MDB. The old keys are stored in the attribute OLDKEY for reference. Admin commands allow update of project data to use the new keys.

For details, please refer to the *Lexicon* and *Admin Command Reference Manuals*.

## 3.5.4 Top-level element creation in specific database

It is now simpler to ensure that top level elements are created in a specific database; a `DB` keyword and name can be added to the `NEW` command:

```
NEW element_type element_name DB database_name
```

where *element_name* is also optional; *database_name* is a full database name, i.e. *team/database*.

For example, this command will create a new SITE named /MYSITE in the MYTEAM/MYDB database:

```
NEW SITE /MYSITE DB MYTEAM/MYDB
```

# 3.6 Dynamic Groups

A PML1 collection expression, evaluated whenever the group is used, may now be used to define a selection for a GPSET. The SCOSEL attribute is used to store this selection, for example:

```
SCOSEL ALL EQUI FROM CLAIMLIST
```

More complex dynamic selections are possible, for example:

```
ALL PIPE WHERE (BORE GT 80)
ALL BRAN MEMBERS WHERE (SPREF EQ /MYSPEC) for SITE /SITE1
```

There is a performance overhead in evaluating more complex selection expressions.

# 3.7 Database performance

A number of enhancements have been made to the performance of the Dabacon database – see also section 2.1.3. Those noted here are the most visible to users.

## 3.7.1 Dabacon buffer

The Dabacon buffer is used for temporary storage of data in local memory and can therefore have a significant effect on performance. Increasing its size is likely to reduce the amount of network I/O, so in generally a larger buffer will improve performance. However if it is larger than the available memory, paging will increase, thus offsetting some of the advantages.

Previous versions of PDMS 12 have limited the buffer to between 32,000 and 51,200,000 (integers) with a default of (in general) only 12,800,000. This corresponds to a default of 50 and a maximum of 200 Mbytes; with modern PCs, most customers found it best to use the maximum value, set by use of the BUFFER command in Admin.

These values have been increased at PDMS 12.1; it may now be set to between 20 Mbytes and 1 Gbyte.

### Default buffer size

The default buffer for modules in a new project is now:

| | |
|---|---|
| Monitor | 20 MBytes |
| Admin, Specon, Propcon, Isodraft, Lexicon DARs, Toolbox | 200 Mbytes |
| Design, Draft, Paragon, Spooler Diagrams, Schematic Model Manager, Tags | 500 Mbytes |

### Specifying the Buffer Size

The buffer may be set in Admin for each module *or* by use of an environment variable for all modules.

**Buffer setting for each module in a project**

The setting for each program module is usually performed using the **modmac.mac** file during project setup. At a later date, the `ED MOD` command may be used to change its value for one or more modules.

The value may be specified in Mbytes or integers; 256000 integers means the same as 1 MByte. For example, ED MOD DESIGN 12800000 is the same as ED MOD DESIGN 50 Mbytes

**Buffer setting per user**

The Dabacon value may be set for a particular user by setting the environment variable 'PDMSBUF' before running PDMS. This sets the buffer size in **Megabytes** for use by all PDMS modules; it will be ignored if its value is greater than 1000. For example, `set PDMSBUF=500` sets it to 500 MByte.

#### Querying the amount of unused buffer

This may be queried using the command: `Q DABACON AVAIL`.

### 3.7.2 Dabacon index tables

The use of Dabacon index tables has been extended to speed up selection by type, UDET or UDA value.

## 3.8 Units of measure

This enhancement (see section 4.2) enables PDMS to store attribute data in standard units and perform conversions as appropriate. The system handles this automatically dependent on the units and also stores appropriate information with parameterised attributes to enable them to be handled.

A new dynamic UNIPAR attribute has been added to all catalogue elements with PARA attributes – namely SCOM, SPRF, JOIN and FITT – and to all design elements with DESP attributes. It is a hidden (VISI FALSE) integer array attribute (that may not be listed or queried) and holds the set of WORD unit values corresponding to the dimensions of the values in a sibling PARA or DESP attribute.

## 3.9 Unicode storage of name and text attributes

The switch to Unicode (see section 4.1) means a change to the way that text is stored in the database (DB). DBs created using 12.1 onwards will use Unicode; existing DBs will continue to work and will not be changed until reconfigured. The data (elements & attributes) from old DBs will be converted, as required, according to the character set (CHARSET) used for the project.

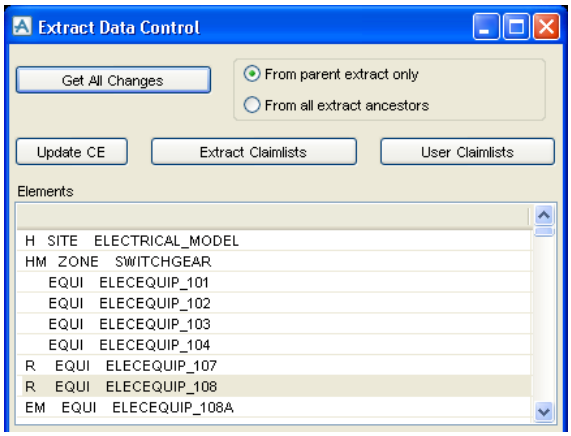
## 3.10 DRAFT Line-style world hierarchy

System line-style widths are now stored in the system database, for consistency throughout a project, and are initially set to ISO defaults: Thin=0.25mm, Medium=0.35mm, Thick=0.70mm.

## 3.11 Extract Control – Include flush capability

Enhancements have been made to Extract Control in the Design/Engineer modules Design, Diagrams and Schematic Model Manager. When working in an extract database, issuing, flushing or dropping an element that has a referencing Integrator link will automatically include the link object.

The new reference array attribute INCFLU (include flush) returns any Integrator or Status link elements that reference the current element. Flushing, issuing or dropping an element with referencing link objects will act on those link objects even if the element itself is not claimed or modified. The Extract Control form will display an "R" label on such elements.



# 4 General System Changes

## 4.1 Unicode character handling

Earlier versions of PDMS handled textual data such as element names, textual attributes and file names in a manner specific to the various supported character sets used in supported languages. This applied to most of the input, output and storage. This has now changed; all textual information in PDMS is represented as Unicode.

Unicode is a computing industry standard for the consistent encoding, representation and handling of text expressed in most of the world's writing systems. Developed in conjunction with the Universal Character Set standard and published in book form as The Unicode Standard, the latest version of Unicode consists of a repertoire of more than 109,000 characters covering 93 scripts. For more details, please see: http://en.wikipedia.org/wiki/Unicode.

Unicode can be implemented using different character encodings. The PDMS Internal Format for string data is Unicode UTF-8 format. This can handle all seven character sets supported in previous versions of PDMS – and potentially many more.

### 4.1.1 Restrictions

PDMS has been tested using the same range of languages as previous releases. No PDMS font files are available for any other language; this means that TrueType fonts must be used on drawings and that therefore it is not possible to produce plotfile output.

With that restriction, it is anticipated that many other languages will work, though there are aspects of the Unicode standard that are not yet implemented. PDMS currently handles the following correctly:

- Left to Right languages; and therefore **not**, for example, Arabic and Hebrew
- Pre-composed characters; for example, the single character á but not the combiners a + ‘ => á
- Upper and lower casing of characters, where both cases have the same number of bytes

### 4.1.2 Textual File handling

By default all sequential text files read by PDMS will be expected to be in UTF-8 format with a Byte Order Mark (BOM) present to identify them. This includes PML files, Datal files etc. Similarly by default all sequential text files written by PDMS will be in Unicode UTF-8 format with a BOM present. Further information about changing these defaults is given in section 16.1.1.

A simple command line ‘transcoder’ is also supplied; this may be used in some applications to convert files to a different encoding – see section 16.1.2.

### 4.1.3 Filenames and PML

The PDMS command processor supports Unicode characters. All PML string variables support Unicode values. You can use Unicode characters in PML variable names, PML object form and gadget names, PML method and function names. It is recommended that PML language files should either be UTF-8 format with a BOM present or else strictly ASCII (basic Latin) format. AVEVA application (appware) files are mostly ASCII at present.

Filenames and directory names can also contain foreign Unicode characters, but may cause problems in other systems so it is recommended to keep to ASCII names. This applies to some of the systems to which PDMS is interfaced, and even to some of the interfaces where PDMS makes use of third party software such as output of DXF and DGN. PML Publisher does not currently fully support Unicode filenames. AVEVA has also encountered problems using files with non-ASCII names in some development tools.

Further information is given in the PML section 16.1.

### 4.1.4 Using Forms and Menus

The default 'system font' used by PDMS Forms and Menus (F&M) is *Arial Unicode MS* which contains a large number of the world's alphabets. Internally F&M uses Unicode, but can only display the characters accessible in its current 'system font'. You will be able to copy and paste Unicode characters from and to textual fields of F&M gadgets. This includes entering characters into the PDMS command window.

### 4.1.5 Using TTY mode

You can enter Unicode characters in Teletype (TTY) mode, but the Console Window can only display the characters which exist in its currently selected font. Console fonts tend to be quite restrictive so you need to select a suitable one. In the UK you will probably be restricted to "Lucida Console" or "Consolas" which will display European characters but not Asian characters etc.

### 4.1.6 PDMS Databases

#### Unicode encoded databases

New databases created with PDMS 12.1 will, by default, store text using Unicode encoding; these may be termed "Unicode encoded Databases". In these databases, Unicode can be used for Names of UDAs, UDETs, Databases, MDBs, users, teams and date stamps.

However, there are still some restrictions:

- Names of System Attributes and Elements are ASCII only
- 'Word' type attributes continue to be restricted to A-Z
- Some other text attributes are restricted to ASCII only

In particular, the following Project oriented attributes are restricted to ASCII only, at this release:

- Filenames for databases
- LOCID remains explicitly at 3 alpha-numeric characters
- Project code remains explicitly at 3 alphabetic characters
- Project ID is limited to 8 alpha-numeric characters
- Project Number is an attribute of 17 characters (recommended to be the same as Project ID)
- Project EVAR is Project code + '000' – so is 6 alpha-numeric characters

#### Legacy Databases

Old Databases created prior to PDMS 12.1 store names, text attributes and other text strings using an encoding determined by the project settings. This determines the range of characters that may be present. These may be termed *Locally encoded* or *Legacy* databases since the project settings are set to match a specific locale (Russian, Chinese etc).

***Legacy databases*** are restricted, as before, to one of the 3 Latin/Cyrillic character sets *or* Latin 1 and one of the 4 Asian character sets. By default, the encoding is ASCII ISO8859-1 ("Latin 1").

These legacy databases do not need to be modified or upgraded to be used in PDMS 12.1. They may be opened and read from (e.g. as Foreign Databases) without restriction, since the Unicode standard encompasses all existing local encodings. They may also be written to, with the restriction that character data may only contain characters in the project-defined encoding. An attempt to write an invalid character (e.g. a name containing a Chinese character into a Russian database) will be rejected with an error.

Unicode encoded databases cannot be opened (for reading or writing) with earlier versions of PDMS. However, is also possible to create locally encoded databases if it is required that they should be accessible by previous versions of PDMS.

If you need to extend the range of characters in a legacy database, RECONFIGURE may be used to convert it to a Unicode encoded database.

DBTE is a pseudo-attribute on all element types which will return the encoding of the database containing that element; for example, 'Q DBTE' on its own will return the encoding of the database containing the current element, 'Q DBTE OF /PIPE1' will return the encoding of the database containing element /PIPE1. ENCODB is a pseudo-attribute on the database (DB) element type only, which returns the encoding of the corresponding database. In either case, the encoding is given as either 'Unicode' or 'PDMSInternal' for legacy databases.

In the case of legacy databases, the actual encoding in which text is assumed to be stored is provided by the project settings (as in previous releases, no change). It is important that a project containing any legacy database (either directly or as a foreign database) has the correct project settings to ensure that character data is interpreted correctly.

### Summary:

**Locally Encoded (Legacy) Databases**:
- can be opened for read access by both PDMS 12.1 and earlier versions of PDMS
- can be opened for write access by both PDMS 12.1 and earlier versions of PDMS, but the range of characters which may be used is restricted to the set defined by the project settings
- require that the project settings are correct so that characters can be interpreted correctly
- can be reconfigured to a Unicode encoded database

**Unicode Encoded Databases:**
- cannot be opened for read or write access in earlier versions of PDMS
- can store the full range of Unicode characters available in PDMS 12.1

## 4.1.7 Graphical output

In general PDMS graphical output (2D and 3D) allows only the use of the TrueType fonts set up in the Admin module. This will allow you to display Unicode characters which are known to those fonts. By default you get font 5 = "Arial Unicode MS" which gives a large range of character sets.

### Restrictions using Draft and Isodraft 2D views

For TrueType fonts, the TrueType font selected must have the correct character set(s) present for the language(s) you want to use. Arial Unicode MS has most, but other TrueType fonts typically have a subset. In this case, foreign and mixed language strings will work correctly.

You can of course use fonts specific to a given language for Unicode characters in that language (even if the font name itself is in a foreign character set).

It is recommended that you avoid using PDMS (Wigwam) fonts if possible. It is not, in general, possible to have mixed language strings if you use them. They are more complicated to setup, and work more like 12.0, so are limited compared with TrueType. The following restrictions, some of which were documented in previous versions of the PDMS Installation Guide, apply:

**Far Eastern languages, Russian and Hungarian (PDMS fonts)**

1. Set the environment variable `CADC_LANG`
   to Korean, Chinese, TChinese, Japanese, CP1251 (for Russian) or LATIN2

2. Enter admin and change the project to the correct language, one of:

```
PROJECT MBCHARSET JAP
PROJECT MBCHARSET KOR FILE /whgtxtd BOLD /whtgtxt
PROJECT MBCHARSET CHI
PROJECT MBCHARSET TCHIN FILE /Chineset
PROJECT CHARSET LATIN CYRILLIC
PROJECT CHARSET LATIN2                          (for central European Languages)
```

3. For Russian and Hungarian, change the appropriate font families, for example:

```
FONTFAMILY 1 LATIN CYRILLIC STYLE 1
FONTFAMILY 1 IR 885902 STYLE 1
```

Notes:

- Mixed languages are not supported for PDMS fonts; you should expect to see error 121 messages in the console window for these. Strings with such invalid characters will not be displayed on the 2-D canvas.
- If using PDMS fonts, AutoCAD will display DXF output correctly only if the correct operating system language is set (e.g. a Chinese machine for Chinese). AutoCAD also needs to be set up to access the PDMSEXE AutoCAD fonts directory, as described in the Installation Guide. (As for version 12.0.)

- Unicode strings for Asian languages will not appear correctly for MicroStation DGN v7 output, even for TrueType.

### Restrictions Using PDMS plot views

Currently PDMS (PML) Plot views only support PDMS plotfiles; they can therefore display only PDMS fonts – and not TrueType.

# 4.2 Units of measure

The inclusion of a much wider range of units means that most real attributes now have a default unit (usually in SI units) for storage and input/output. User can also set a default unit, which must be of an appropriate type, for input and output. Input via the command line or GUI also allows the user to specify an alternative unit.

This does mean some unavoidable changes to the command line so user applications using real attributes will need to be reviewed. There are also minor changes to many of the user interface forms. The new functions can also be accessed by the .NET Units interface, as detailed in the *.NET Customization manual*.

Customers who have written or adapted PML applications may need to check these. Some guidelines are given in section 16.1, and explained in more detail in the *12.0 to 12.1 Upgrade* manual.

Several of the reference manuals have been updated to reflect these changes, including:

- *Catalogue and Specifications Reference Manual*
- *Data Access Routine User Guide*
- *Database Management Reference Manual*
- *Design Reference Manual Creating The Model*
- *Design Reference Manual General Commands*
- *Lexicon Command Reference*
- *Software Customisation Guide*
- *Software Customisation Reference Manual*

## 4.2.1 Supported Dimensions and Units

In previous versions of PDMS, all dimensioned quantities other than distances or bores were output in units stored in the database, irrespective of the current units. For example all masses were assumed to be Kg.

There is a new set of commands to complement and extend the existing units functions. These commands control the units of supported dimensions, and their dependent quantities (e.g. density and pressure). For masses, the command UNITS may be followed by KG MASS, GRAM MASS, POUND MASS, TONNE MASS or TON SHORT/LONG MASS. New DISTANCE options are also provided: 'FOOT DIST' and 'METRE DIST' to output and return values in these common units.

The command which sets the distance units is:

```
{MM INCH FINCH} DISTANCE
```

The new commands use the keyword 'UNITS' to define the units to use for the various dimension types. For example:

```
UNITS MM DISTANCE
UNITS POUND MASS
```

The leading UNITS keyword is optional for MM INCH and FINCH DISTANCE but is required for all new options in the commands listed below. The command and functionality of BORE units remains unchanged.

Some units are, unusually for PDMS, case-sensitive to adhere more closely to SI conventions; strict adherence is not always possible due to syntax conflicts. This allow a distinction to be made between units such as s(econds) and S(iemens), hours and Henrys, tonnes and Teslas. This does not apply to Imperial units (IN or in, FT or ft are all valid) or to some metric units such as MM, which have been supported in previous releases.

Units that are case sensitive are (m, s, g, t, K, h, Pa, N, V, A, F, Sv, d, J, W, C, S, H, T, W, P, G) – i.e metre, second, gram, tonne, Kelvin, hour, pascal, Newton, volt, ampere, farad, sievert, day, joule, watt,

coulomb, Siemens, henry, tesla, watt, poise, gforce. SI prefixes are also case sensitive – for example, m means milli and M mega – except in their full form (e.g. MILLI and MEGA are both accepted).

The table below shows the new units of measure and the options available, as well as the old ones: BORE DIST SQDI CUDI. It gives their name (or description) recognised by the system, the assigned hash-code, the database storage units and the supported standard units for the quantity. For example, attributes of length have a hash code of DIST, are stored in mm and other standard units include inch, cm, ft, metre etc.

| Name of Dimension | HashCode /Word | Database units | other specific units | comment |
|---|---|---|---|---|
| AbsPressure | ABSP | pascal | bar atm PSI torr mmHg inHg | Pressure may be absolute or gauge |
| Acceleration | ACCL | m/s2 | gforce (gravity) | |
| Angle | ANGL | degree | radian grade arcmin arcsec | |
| Angular Frequency | ANGF | rpm | | |
| AngularMomentum | ANGM | N.m.s | | |
| Area | SQDI | mm2 | acre hectare | |
| Bore | BORE | mm | in | Range limited to mm and inch (and Finch) |
| Capacitance | CAPA | farad | | |
| Charge | CHAR | coulomb | | |
| Conductance | COND | siemens | | |
| Content | PCUD | mm-3 | | |
| Currency | CURY | USDollar | UKPound Euro | |
| Current | CURR | ampere | | |
| Density | DENS | kg/m3 | | |
| DensityMANDB | MAND | kg/mm3 | | Densities stored in MANU database |
| ElectricConductivity | CNDT | Si/m | | |
| ElectricField | EFLD | V/m2 | | |
| EMF | EMF | volt | | |
| Energy | ENER | kiloWatthour | joule BTU cal | |
| EnergyDensity | EDEN | kg/m3 | | |
| Force | FORC | newton | poundal dyne kgF lbF | |
| FoulingFactor | FFAC | m2.K/W | | |
| Frequency | FREQ | hertz | rpm | |
| GaugePressure | GAGE | pascal | bar atm PSI torr mmHg inHg | Pressure may be absolute or gauge |
| HeatCapacity | ENTR | J/m | | |
| HeatingValue | HVAL | J/m3 | | |
| HeatTransferCoeff | HTRA | W/m2/K | | |
| Impedance | IMPE | ohm | | |
| Inductance | INDU | henry | | |
| Inertia | INER | kg/m2 | | |
| KinematicViscosity | KVIS | m2/s | | |
| Length | DIST | millimetre | m in ft cm km mile yard micron thou angstrom | |
| LinearDensity | PDIS | mm-1 | | |
| MagFieldIntensity | MFIN | A/m | | |
| MagFluxDensity | MFXD | tesla | | |
| MagneticFlux | MGFX | weber | | |
| Mass | MASS | kilogram | gram tonne pound oz longTon shortTon cwt | |
| MassFlow | MFLO | kg/s | | |
| Momentum | MOME | N.s | | |
| Permeability | PMBT | H/m | | |
| Permittivity | PMTT | F/m | | |
| Power | POWE | kiloWatt | hp watt | |
| Pressure | PRES | pascal | | |
| RadiationDose | RDOS | sievert | radd rem gray | |
| Radioactivity | RADY | bequerel | curie | |

| Name of Dimension | HashCode /Word | Database units | other specific units | comment |
|---|---|---|---|---|
| Resistivity | REST | ohm/m | | |
| RotationalStiffness | STFR | N.m/rad | | |
| SpecHeatCapacity | SHCP | N/K | | |
| SpecificEnergy | SENG | J/kg | | |
| Speed | SPEE | m/s | | |
| Stiffness | STIF | N/m | | |
| SurfaceDensity | PSQD | mm-2 | | |
| Temperature | TEMP | degCelsius | degF K degRankine | |
| TemperatureGradient | TPDI | degC/mm | | |
| ThermalConductivity | TCON | W/m/K | | |
| ThermalResistance | TRES | K/W | | |
| Time | TIME | second | min hr day month week year | |
| Torque | TORQ | N.m | | |
| UnitMass | UMAS | kg/mm | | |
| ViscosityDynamic | VISC | s/Pa | | |
| Volume | CUDI | mm3 | litre ImpGallon USGallon bbl Mbbl MMbbl | |
| VolumetricFlow | VFLO | m3/s | | |
| | | | | |
| None | NONE | | | numerical real attribute |
| WORD | WORD | | | used to assign parameter dimensions etc. |
| Parameter | UNIPAR | | | used for parameter attributes |

### 4.2.2 Other UNITS commands

Three additional forms of the UNITS command for the Fundamental dimensions (i.e. those settable) are supported – UNITS DEFAULT, UNITS NUMERIC, UNITS MKS and UNITS FPS and UNITS CGS.

#### DEFAULT units

The default unit of a physical dimension is the database storage unit, which is listed in the table above.

The command `UNITS DEFAULT` formerly set the `DISTANCE` default units to mm; it now sets the units of all the dimensioned attributes to their database storage units. Individual dimensions can be set to their default selectively using the command:

```
UNITS DEFAULT dimension
```

#### DERIVED units

The command `UNITS DERIVED dimension` is valid for compound dimensions such as volume, density and pressure. It sets the current units for that dimension to be determined by the current units of its primary dimensions (most often mass and distance).

Volumes, areas, densities, temperature gradients, and numeric densities can all be set to Derived units. Only volumes can be set to specific units.

#### NUMERIC Units

All attributes that have the UNIT field set for the first time, were stored in previous versions as values with no specified unit. The units that were previously attributed to their values were determined by use and convention and could change from application to application, and project to project. This flexibility can no longer be supported as 'storage units' must be defined. Database storage units have been set to those most commonly used, but this will not be universally compatible. The UNITS NUMERIC command is introduced for compatibility:

```
UNITS NUM/ERIC dimension
```

is used to suspend unit conversions on input and output for attributes of the nominated dimension, that is:

- No conversion from the stored value will be made on output

- No unit qualifying strings will be appended to output values
- Input values with no qualifying unit strings will be stored without conversion in the database
- If input values have a unit qualifying string, a conversion factor will be applied.

This is of particular value to users who wish to continue storing and using attribute values as now, and especially when the values stored are assumed by their system to be in units that are DIFFERENT to those now being assumed by PDMS.

The system also supports `UNITS NUMERIC DISTANCE` for completeness.

When a fundamental dimension's unit is NUMERIC, all derived dimensions that use this fundamental dimension will also be treated as NUMERIC. For example, setting NUMERIC MASS will force densities and pressures to be numeric, irrespective of the currently set distance units. Derived units can have their units set to NUMERIC even if their fundamental dimensions have units set.

#### Weights and Masses

In the past, PDMS has not distinguished between weight and mass; this has now changed. Densities (mass/volume) are in Kg per cu metre and the weight of objects derived from this is in Kgf.

#### Pressures

Pressures are in Force per unit area. Pressure units are supported but whether the pressure is absolute or relative to atmospheric pressure (Gauge Pressure) is a matter for the user to determine when he sets values. No conversion is performed.

### 4.2.3 Upgrading to use new units

To take advantage of the new functions, attributes need to be set to the correct dimension. This has been done for the standard attributes. Customers will need it to do it for their UDAs and catalogue and design parameters and properties. Any data imported to a Schematic database using Schematic Model Manager will need to have the 12.1 upgrade applied.

It is not necessary to change all dimensions at the same time. For example, Lengths are already handled correctly. It is expected that angles are stored in Degrees, so they will also be handled correctly, but users will have to identify which UDAs are angles and set their UUNIT to ANGL.

This will be done for a project; the administrator also needs to determine how to handle each of the dimensions used for other attributes – volumes, densities, pressures etc. It is possible to continue as before for any by using the `NUMERIC` option. For details, please refer to the *12.0 to 12.1 Upgrade* manual. The process for each will be:

If all quantities have been stored in the new Database Units

- Set the UUNIT for any UDAs
- Any UDAs used to store the Unit values are no longer required and can be deleted
- Any customer appware managing unit conversion or display can be removed or replaced by standard functions

If all quantities have been stored in the same unit (which is not the new Database Unit)

- Set the UUNIT for any UDAs
- Output a datal file with the dimensions being set to numeric, e.g. `UNITS NUMERIC TEMPERATURE`
- Read the datal file back in with the current units set appropriately so that unqualified values are assumed to be in those units: `UNITS DEGF TEMPERATURE`
- Any UDAs used to store the Unit values are no longer required and can be deleted
- Any customer appware managing unit conversion or display can be removed or replaced by standard functions

If quantities have been stored in mixed units with a UDA recording the unit for each

- Set the UUNIT for any UDAs
- Set the dimensions to numeric, e.g. `UNITS NUMERIC TEMPERATURE`
- Output a file with the attribute values, with the value from the unit UDA appended
- Check the format of the value plus unit conforms to new input format rules

- If necessary edit the file with a text editor or script to achieve this
- Read the file back in
- Set current units as preferred, e.g. `UNITS DEGF TEMPERATURE`
- Any UDAs used to store the Unit values are no longer required and can be deleted
- Any customer appware managing unit conversion or display can be removed or replaced by standard functions

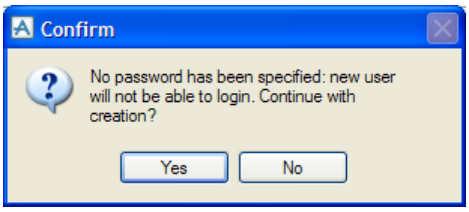
If quantities have been stored in mixed units with 'custom and practice' being the only record of the unit, which is hopefully rarely the case:

- For the short-term set the dimensions to `NUMERIC`
- Plan to move to more rigorous use of units, probably employing a combination of the techniques above

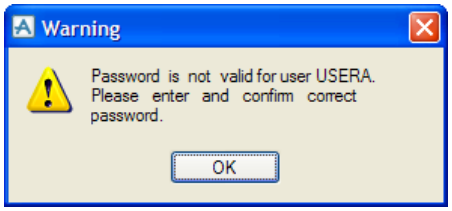
## 4.3 Enhanced password protection

Password protection was made more rigorous at PDMS 12.0.SP5. Additional checks have been at this release introduced to trap potential error conditions.

A confirmation dialog, as shown below, warns if a user is created with no password:




A warning is also given, when using the Generate Script dialog, if the password for logging in to the project is not correct. An incorrect password could cause an invalid password error when the script is later executed.




In addition to the `ConfirmID()`, method on the `SESSION` object, an analogous method has been added to the `USER` object. This method also takes a string as argument: the suggested password text with leading '/' character. It returns a boolean value that determines whether the password is correct for the specified user. Example:

```
!u = object USER(|MYUSER|)
if !u.ConfirmID( |/SESAME| ) then $*…
```

## 4.4 Status Control

A number of small improvements, which affect all constructor modules, have been made to Status Control.

**New pseudo-attributes** STVMOD and STVUSE have been added to return the status last modification date and user.

**PML2 qualified attribute queries** are now available for status data, for example:

```
!statusDefinitions[1] = /DesignStatus
!statusValues = !!ce.attribute('STVVAL', !statusDefinitions)
```

A **new command STM COMMENT** has been added to set the status comment without modifying the status value.

The **Status Change Event Methods** now take an array of objects as their first argument where previously this was a single element reference in a string. The StatusProjectHandler pml object has been modified

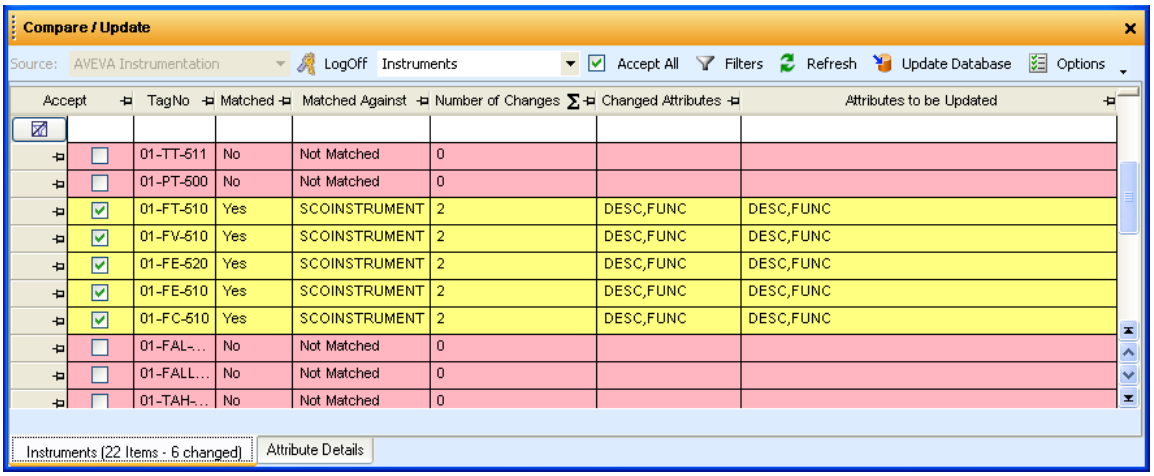
accordingly and comments show where customised code can be placed. Customised code in the StatusProjectHandler pml object must be updated into the new version. Code for a single object can generally be inserted in the do loops where indicated by comments.

The **StatusData pml object** has also been updated to better handle arrays of objects. It has additional members to hold arrays of data. The previously provided single object members have been maintained and hold the values of the first elements of each equivalent array at the end of each operation, so previously defined calling code will generally work as before. Code using the StatusData pml object will generally continue to work but must be tested, and reviewed to see if it can be made more efficient by using the array members.

For More Information, please refer to the *Status Control User Guide* sections 5.1, 5.2, 8.1, and 8.3.

# 4.5 Tag Compare / Update

The new Compare/Update add-in application can integrate data between Design, Schematic and Engineering databases, as well as data from AVEVA Instrumentation and AVEVA Electrical. It enables populations of tagged objects such as equipment and line lists to be compared, updated and linked between the data sources. Compare/Update supersedes the AVEVA Instrumentation Data Update application and is available in several Design/Engineer modules: Design, Tags, Paragon, Schematic Model Manager and Diagrams.



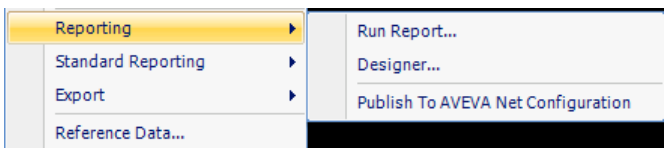

For More Information, please refer to the new *Compare/Update User Guide.*

# 4.6 Report generation

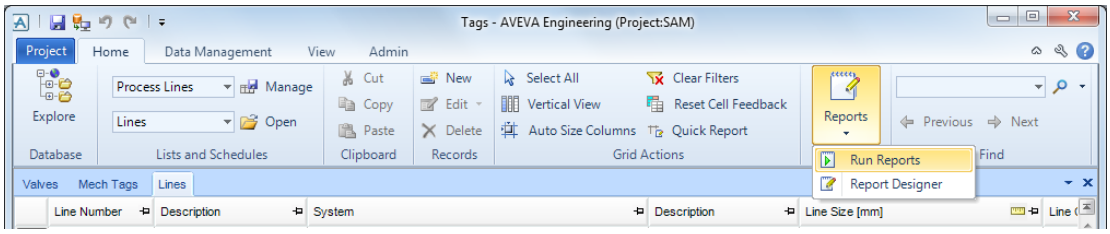
## 4.6.1 New Reporting add-in

PDMS 12.1 includes a new "Reporting" add-in, based on the reporting tool Xtrareports from DevExpress. This can produce sophisticated formatted reports in a wide variety of formats and can also send the results to AVEVA NET via the Gateway. It is available in Design, Paragon, Spooler, Draft and Isodraft, as well as in some of the Engineer family modules (Schematic Model Manager, Diagrams and TAGS.)

Running existing reports should be simple. For detailed instructions on designing new reports, please see the new *Report Designer User Guide.* A chapter in that guide gives some further information about running reports – from the Search results grid and from Run Report:




In the Tags module it is available from the Home tab in the Ribbon bar:




A new PML Reporting API is documented in the *Software Customization Reference Manual*.

### 4.6.2 'Classic' Reporting

The PML based reporting tool (now known as "Standard Reporting") is still available as before:


The reporting functions are largely unchanged; however, there are some changes due to the implementation of more units handling. The effect is that:

- The units output for quantities other than distance will be the appropriate current working unit; distances will be given in mm unless "inch" is specified
- When Units Conversion is set to "Off", quantities will have their units appended. In this case, distances will be in mm with "mm" appended, for example a one inch distance will be shown as. "25.4mm". When Units Conversion is set to "Any/mm" or "Inch", the units are not appended but are show as 25.4 or 1".

Details are available, as before, in the *Reporting Reference Manual*.

## 4.7 GML Performance

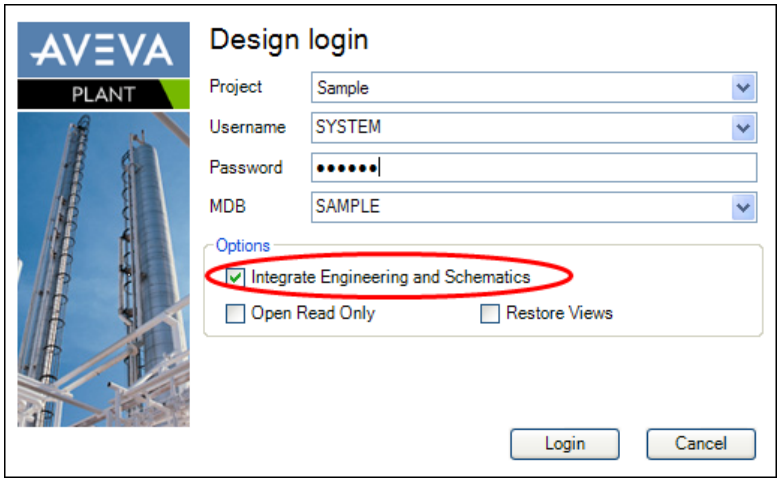
There are further improvements to the Geometric Modelling software used in PDMS, aimed particularly at speeding up the drawing of data imported using the new Mechanical Equipment Interface.

# 5 User Interface

## 5.1 Entry to system

Entry to the system has been changed to allow direct entry to any module, without the need to go via Monitor. The login form is presented with the appropriate splash screen. Desktop and Start menu shortcuts are provided for the popular options.

A new checkbox, labelled "Integrated Schematics and Engineering", determines whether or not the PDMS user will also have read access to the SCHEmatic and ENGIneering databases. This option is relevant to customers who also use one of AVEVA's 2D products, AVEVA Diagrams or AVEVA Engineering. Checking this option allows users to access to these data and is necessary in order to use the Schematic Integrator Addin during the session.




**Note**: The console window may be suppressed by using a `-noconsole` argument to the PDMS start-up script. It may also be controlled using an environment variable: if you wish to run PDMS with the console hidden, use:

```
set AVEVA_NOCONSOLE=TRUE
```

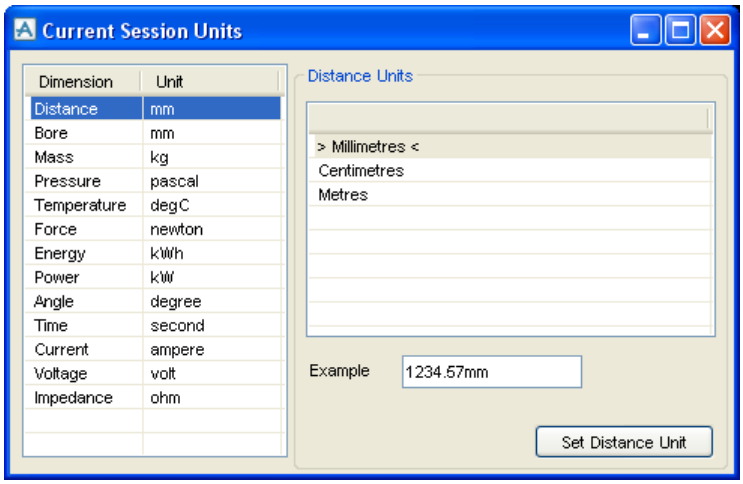
## 5.2 Units of Measure

Many values stored in PDMS now carry appropriate units of measure – see section 4.2.

Many forms throughout PDMS and Outfitting have been modified to handle new dimensions and new units for distance. Fields that display values for the new dimensions (e.g. mass, temperature, pressure) may now show units qualifiers. Quantities entered into these fields will be converted automatically to the current unit for that dimension. For example, if the current mass unit is pounds, entering 2.5kg in a field identified as a mass quantity, the value that appears in the field will be 5.51lb.

### 5.2.1 Current Session Units

The Current Session Units selection form has been modified to handle these new units:




This form is available in Design, Draft, Tags and Diagrams and is shown by selecting the menu command **Settings>Units**. It controls the current working units, and the display of units of measure for most forms. Individual fields on some forms may display values in specific units required by that application; these fields are not controlled by this form. Selecting a dimension on the dimension table shows the available units for that dimension, and allows the current units for that dimension to be changed. The current unit for each dimension is shown in the table.

When you enter dimensional data on forms, the units applied are taken from default settings. For distances and pipe bores these defaults can be set in the project catalogues, as before. This will determine whether imperial or metric distance and bore units are shown on the current units selection form. To change the default units for distances or bores, select **Settings>Units** and choose Distance or Bore dimensions on the dimension table. Dimensions other than distances and bores are not controlled by project units, so all available units are presented for a given dimension.

The Distance Units and Bore Units lists show all available units, and their optional display formats. Only metric distance and bore units are shown in a metric project; imperial units are shown for an imperial project. Some of these will be AVEVA's standard formats, others may be user-defined formats added by your system administrator. Select the required format from each list.

For each type of dimension, the Example field shows how the currently selected Units format will appear. You can enter any desired value here to check how it will be formatted: this value has no significance other than to check what it looks like in the chosen format. When a unit has been selected from the list of available units, click on the Set Unit button to change the current unit settings.

When you enter a dimension into a text-box on any form, you can always override the current default units by specifying the units which you are using. For example, if the current default distance units are millimetres and you enter a dimension of 120, this will be interpreted as 120 mm. If you enter 120 inch, this will be converted automatically to 3048 mm.

Property Type selection has been changed to allow the dimension of properties in Design and Catalogue Data Sets to be specified.

### 5.2.2 Project Default units

Administrators can use this form to set units, then copy the file to make those the default Project Units. This file will also need to be copied to remote site for Global projects..

There are Imperial and Metric versions of the units files. The Imperial / Metric switch is at MDB level, so could be varied within a project if essential. Although Users cannot switch between metric and imperial in a session they can set the bore to mm or inch regardless of this setting

A mechanism is in place to prevent Users over-riding Project Units. Users (or applications) can specify which units they are using regardless of project settings.

On Global projects, it is necessary to propagate the units settings file to all project satellites. If the “Other Data Transfer” mechanism has been implemented, project units settings files could be propagated in this way. Alternatively, It would be possible to use Global transfer of Linked documents. Once transferred, such a file would not be automatically updated, but this could be achieved using the SYNCHRONISE … LINKDOC FORCE command. See section 7.5.

Otherwise, the most practical method of propagating a project units file is simply to copy it to the appropriate project folder at each site. In practice, project units files will be configured at the beginning of a project, and are unlikely to be changed frequently during the life of a project.

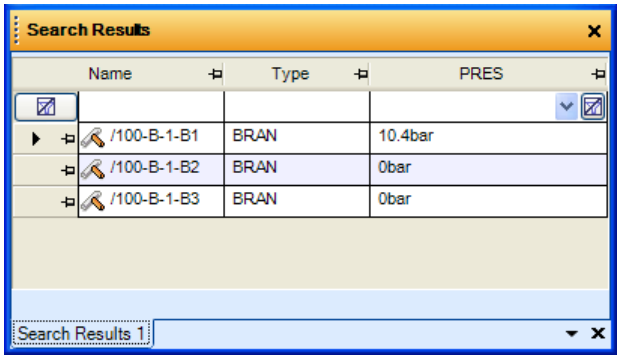
### 5.2.3 Dataset Properties

The Type field on the Design dataset properties, Catalogue dataset properties and Catalogue category forms has been extended to include the new dimensions. For example, it is possible to create a MASS property by setting property type to MASS. If this is a design parameter or catalogue parameter property, the **Modify>Properties...** form in Design will accept values in mass units, and will deal with conversion to current mass units automatically.

### 5.2.4 Decimal Separator

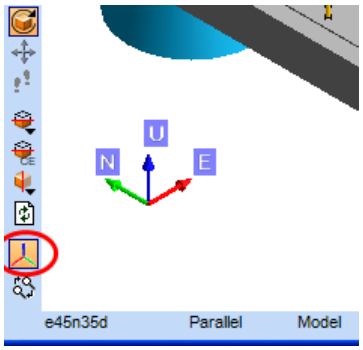
PDMS 12.1 requires command and user interface input of all numeric data using the decimal point as the separator – for example "0.4" – even when the regional settings of the machine would usually use the comma ("0,4"). This is now also used for display of real numbers in order to ensure consistency. (At 12.0.SP6 some forms were able to display the alternate format.)

For example, search results will now appear like this:




## 5.3 World axes on 3D views

A button on the 3D view borders toggles display of the World Axes:




Display of these axes may also be enabled from the **Represent** and **Graphics Settings** forms.

## 5.4 Save and restore views

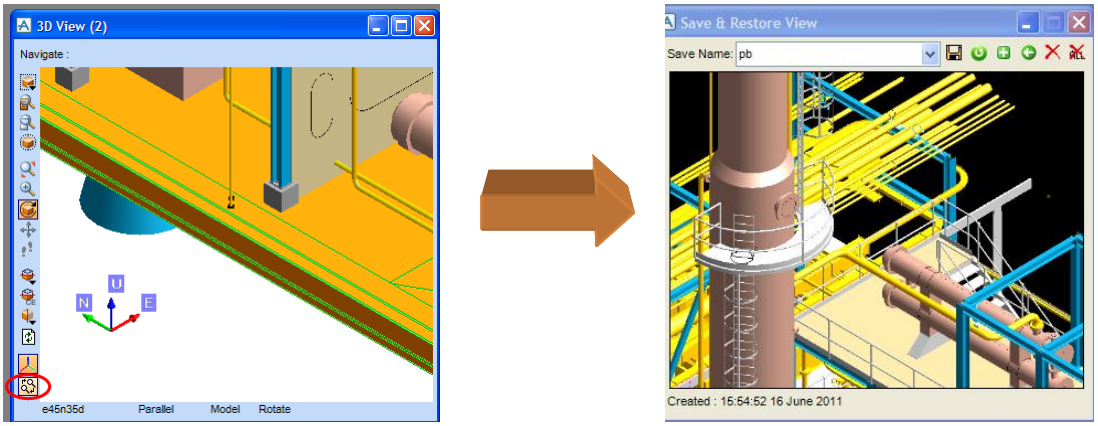
This new feature allows a user to take a snapshot of a view and save it to file. The saved view can be reinstated when required, including a new session of PDMS. A saved view consists of three elements:

- The current drawlist
- View properties (e.g. view direction)
- A snapshot picture of the view when it was saved

When selecting which view to restore, the snapshot picture is shown to help identify the correct view. Note that this snapshot is just a picture captured at the time the view was saved. Elements in that picture may have been modified or deleted since the picture was saved, so when the view may look different once it is

restored. In fact, it is possible that an empty view may appear if all elements in the drawlist have been deleted or moved outside the view area since the original view was saved.

The Save & Restore 3D Views function is accessed via a new icon on the 3D View:




The old numbered saved views are no longer available.

For details, please refer to the *Graphical Model Manipulation Guide*.

# 5.5 Grid Control

A number of enhancements have been made to the grid control. These include an enhanced column setup form, a new filter on the row filter, an auto-fit function and an ability to copy a set of grid cells and paste them into another document. In addition, Drag and Drop may be used in the grid for some operations. The Grid Control has also been enhanced to support multi-element and distributed attribute editing using Database Views.

# 5.6 Toolbar popup menu

The popup context menu displayed from the Toolbar area has a new entry **Lock the Toolbars**. This enables users to lock the position of the toolbars to prevent accidental change of layout.


# 5.7 Support for Ribbon Style GUI

The system now provides support for the Ribbon interface used in the Microsoft 'Fluent' user interface, which may be familiar from Office 2007 and 2010. This is used at 12.1 for the Engineering Tags module only, so is not described in detail here. The Ribbon style GUI can be customized in the same way as was previously possible for the XML menu based applications, such as Diagrams.

# 5.8 Application update and consistency

There are many enhancements to the user interface aimed at improving its consistency and ease of use. Some of the most significant are noted here.

## 5.8.1 PML Collections

A PML Collection with unlimited scope now collects data from the entire database; in other words, an empty scope now means ALL rather than NONE. [This means that the collection operation will take much longer, so it may be worth checking any PML functions to ensure that this is what is required.]

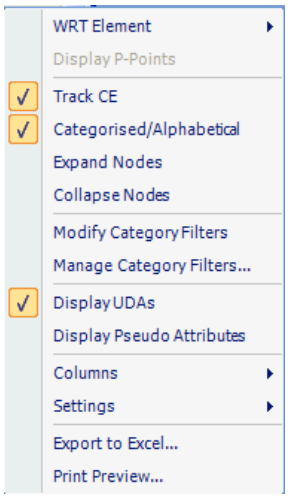
## 5.8.2 Attribute display, editing and validation

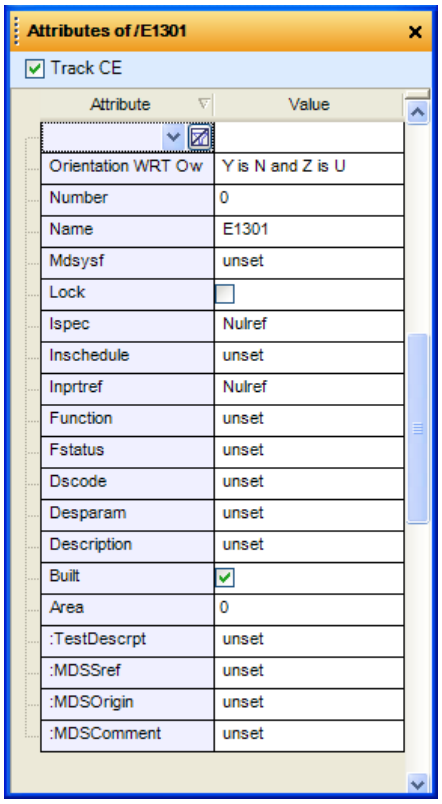
A new Attributes Utility replaces the previous Query Attributes and Attributes forms; it combines the functions of both and also enables attributes to be edited if access rights permit. Attributes that are not

editable are shown with a grey background; feedback is given for inappropriate attribute values. The form displays the attributes of the current database element either in a list or by category: see pictures below.

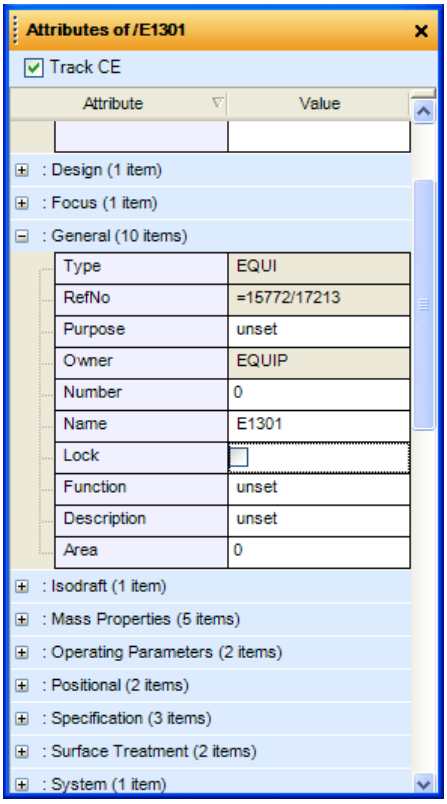
The form allows the user to edit attributes, where appropriate, and is available in all modules. It replaces the old PML Query Attributes form and the old C# Attributes form.

The popup menu provides various new functions such as an ability to set the current element to a reference attribute value. The details vary between modules and are documented in the appropriate manuals.




*Attributes displayed in a list*




*Attributes displayed by Category*

## 5.8.3 Auto-naming utility enhancement

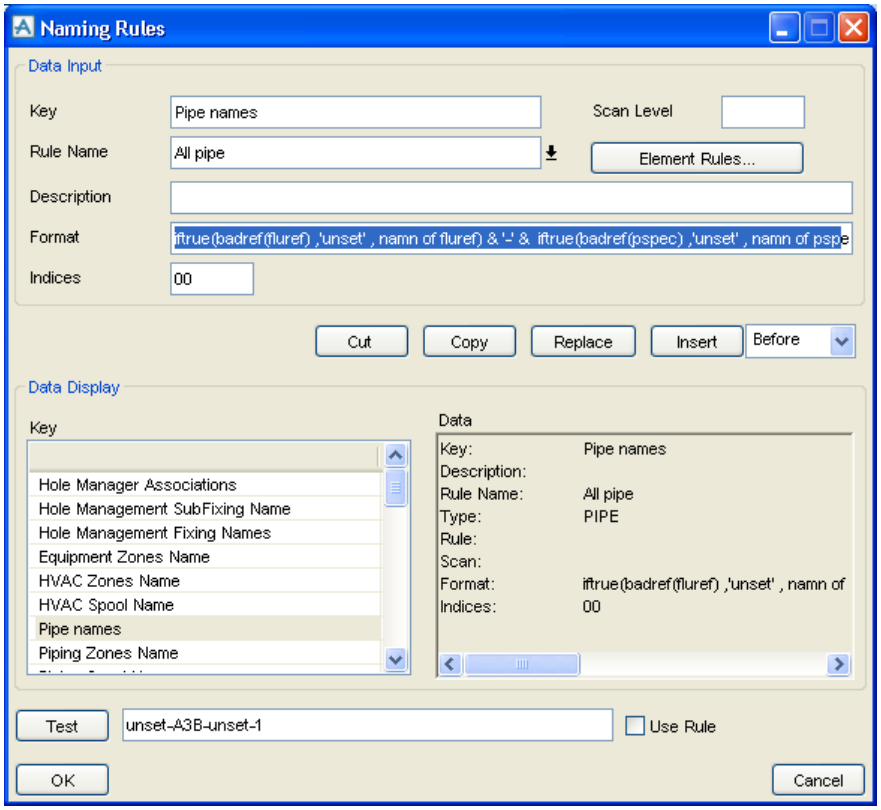
This utility has been enhanced to allow the formulation of a name to use an IFTRUE statement, which is a PML1 facility. For example, if you wish to make up a name based on attributes of a PIPE, you can use the following PML2 autonaming rule:

```
!!ce.fluref.namn & '-' & !!ce.pspec.namn & '-' & !!ce.ispec.namn & '-' & !index
```

However this rule will fail if any of the attributes (FLUREF, PSPE, ISPE) have not been set. You can now use the IFTRUE function in PML1 form to do the same by using the following rule:

```
iftrue(badref(fluref) ,'unset' , namn of fluref) & '-' &  iftrue(badref(pspec)
,'unset' , namn of pspe) & '-' &  iftrue(badref(ispe) ,'unset' , namn of ispe)
& '-' & !index
```

Please note that the whole 'Format' must be PML 1, concatenated with the '&'. It is not possible to mix PML1 and PML2 functions. The result of this rule can be seen below:

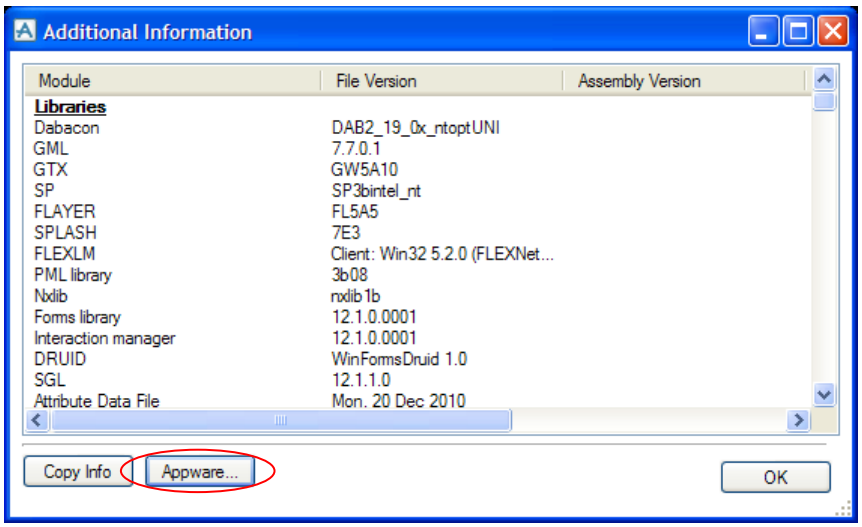



The FLUREF and ISPE have not been set but the PSPE is set to /A3B, so the resultant name is unset-A3B-unset-1.

# 5.9 Additional debug information about PML applications

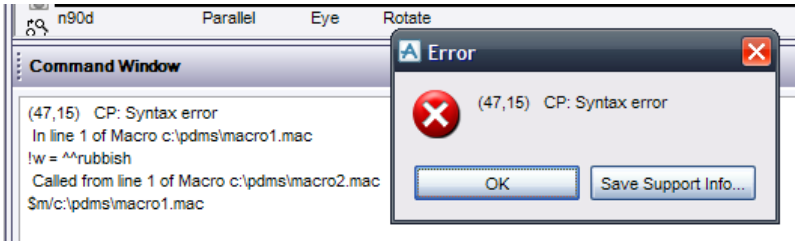
## 5.9.1 Help about

A new button has been added to the **Help About > Additional Information** dialog, with a new option to scan all Application Appware files to check if they have been changed.



### 5.9.2 PML alert

An additional button has been added to the PML alert dialog to allow extra information relevant to the alert to be saved to file. Clicking the **Save Support Info…** button will bring-up a save file dialog and allow the user to save the extended information:




## 5.10 Infragistics toolkit

PDMS 12.1 uses an updated Infragistics Netadvantage toolkit (version 10.3) for its GUI. The filenames of the Infragistics DLLs no longer include the version number, which will make future upgrades easier.

# 6 Administration

## 6.1 Engineering (ENGI) Database

The Engineering database type has been added to the list for database creation. Note that the top level database element for Engineering databases is ENGWLD.

It has also been added to the module definitions (modmac.mac) and as appropriate in the other admin and global forms for selection, sorting, allocation etc.

## 6.2 TAGS module definition

The new TAGS module has been added to the product modules defined by modmac.mac and therefore available for use.

## 6.3 GUI improvements

A number of features have been added to the GUI to improve its ease of use and make it more consistent with other modules. For example:

### 6.3.1 Import from Excel

Data for Admin elements such as users, teams etc may now be imported reliably from Excel. This has resulted in three changes in behaviour:

- Access Control Assistant (ACA) is no longer hidden during Import and Rollback operations.
- The Export and Import logging dialog no longer has a Cancel button; it is also less responsive to Window operations such as move or resize, while export or import operations are in progress.
- The Export and Import logging dialog "OK" button has been renamed "Dismiss".

For details, please refer to the *Admin User Guide*.

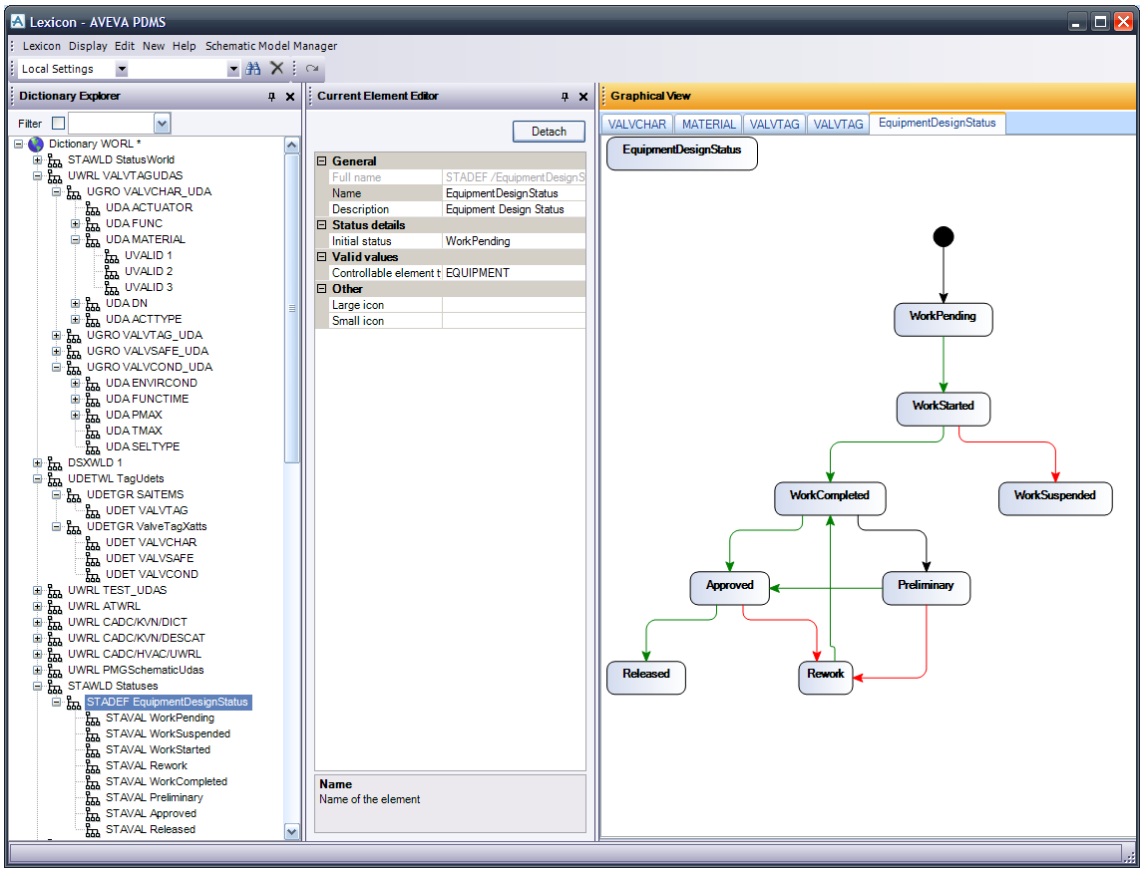
## 6.4 Lexicon

### 6.4.1 New Lexicon graphical view

A new user interface can show a graphic representation of the relationships between Lexicon data entities, using nodes and links, in the style of UML and entity relationship diagrams.

There is a series of graphical views, which are shown on separate tabbed panes in the Lexicon User Interface. There are 4 types of view, showing UDAs, UDETs, status definitions and distributed attributes. Each view tab is opened by selecting the ‘Graphical View’ menu option during a ‘right-click’ on an element of a supported type in the Lexicon explorer.

The picture below shows a screenshot of Lexicon with the new Graphical View on the right, side-by-side with the Dictionary Explorer and Current Element Editor. Individual views are associated with a single database element. To open a view, select the element of interest in the explorer and click the context menu. Each view opens in a separate tab, whose title reflects the name of the element for which it was opened.




For full details of the various different types of view, please refer to the *Lexicon User Guide.*

### 6.4.2 UDA lists of values

User-Defined Attributes (UDAs) and User System Defined Attributes (USDAs) can have a list of valid values (for text attributes) or a list of valid ranges (for numeric attributes). These lists are checked when setting the UDA to prevent the use of values outside the valid range.

A new logical attribute on UDA and USDA elements determines whether the valid values or ranges (if such exist) are optional. The default behaviour remains that the restrictions remain non-optional. If, however, this attribute is set TRUE and the UDA or USDA definition is re-compiled, it will be possible to override the restriction and set the attribute to a value outside the valid range.

To support this, a new method has been added to PML2 Attribute object and .NET public interface.

The new method `LIMITSVALIDOPTIONAL(ELEMENTTYPE)` complements the existing `LIMITS(ELEMENTTYPE)` and `VALIDVALUES(ELEMENTTYPE)` methods.

The .NET database interface class for attributes, `Aveva.Pdms.Database.DbAttribute` has a new method to determine whether the valid values or range is optional for a particular element type:

```
public abstract bool IsAllowedOptional(DbElementType type);
```

### 6.4.3 Database Views

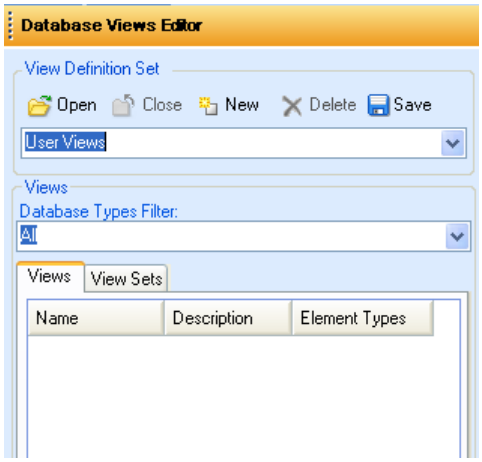
A Database View defines a table for viewing manipulating data in the database; these data may be derived from a single element or multiple elements. There is a row in the Database View table for each element that has a particular element type and meets the criteria defined by attribute filters. These Filters are similar in concept to those in the search grid. In addition, if element match criteria cannot be expressed using attribute filters, it is possible to define an expression for evaluation.

For example, a Database View could be derived from all Equipment elements in the current MDB with a description of 'Vessel'. The user also specifies the required columns; each can be a database attribute or an expression run against the equipment element. The user can also specify how to navigate to related elements, such as the owning SITE or ZONE, and derive further columns from that element. This is similar in concept to a saved search except that editable columns may be derived from several elements.

Database Views may be defined and modified in the DICTIONARY database using Lexicon to set up new elements in a new 'Database View World' (DBVWWL/D). Their definition may alternatively be stored as a local settings file (similar to saved searches) or as part of an application. This allows:

- User defined Database Views for reports, ad-hoc working etc.
- Project defined Database Views, shared via Global
- Application defined Database Views for specialist applications

The Editor is currently available in the LEXICON module, under **Display > Database Views Editor**, and in the TAGS module on the Admin tab of the ribbon bar.




Access to the full Editor is gained by selecting **Element Views** from the dropdown list in the View Definition Set area. For details, please refer to the *Tags User Guide*.

Database Views are created automatically to represent element type structures so that users don't have to define them to make element information accessible to the generic reporting tool. This means there is already a Database View for equipment elements with their attributes defined in columns.

### 6.4.4 General

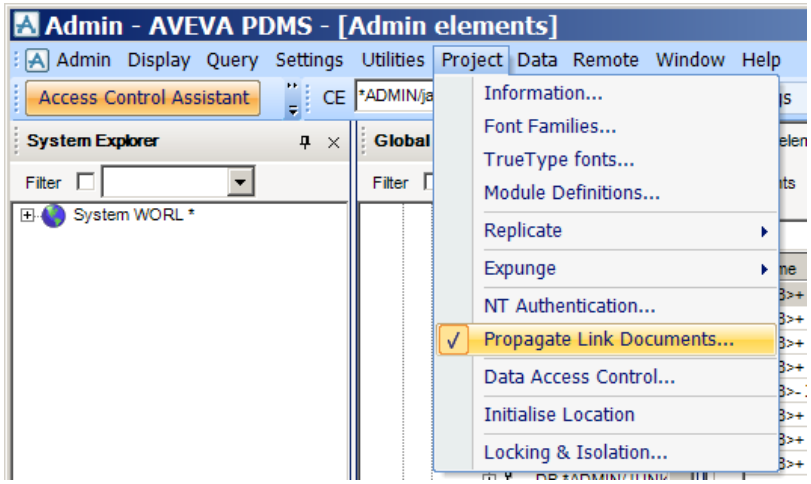
The User Interface has been changed to help with maintenance and improve consistency. In particular the following have changed:

- New menu on the menu bar
- Explorer right click menu (now consistent with other modules)
- Edit Members on the Explorer menu
- New element types, which have changed the contents of the Explorer, Current Element editor and ElementType editor.

## 6.5 Admin GUI changes for Global

### 6.5.1 Global support for Linked documents

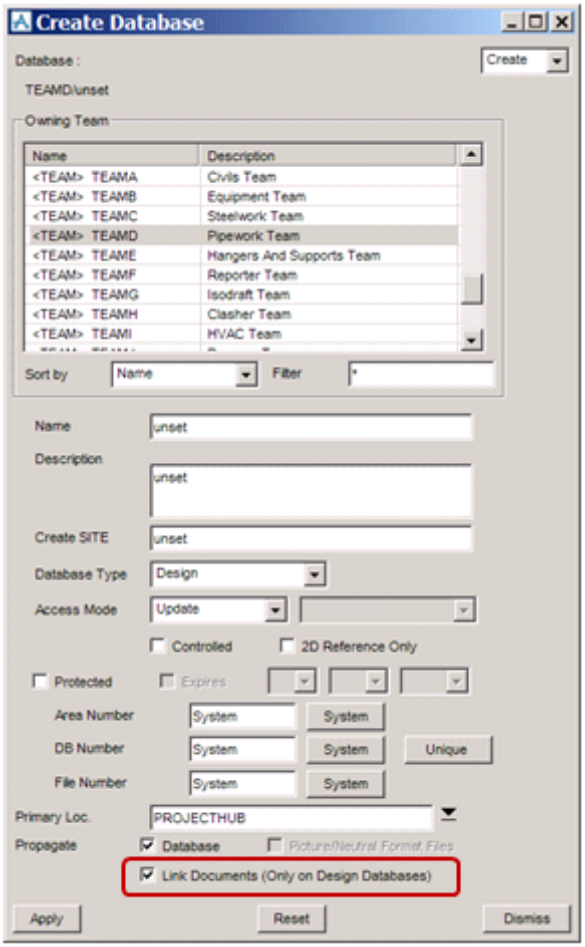
Global has been extended to include support for linked documents by propagating any document marked as *'propagating'* between two locations. By default the propagation of Linked documents is disabled. To enable the propagation of Linked Documents switch on the *'Propagate Link Documents'* setting under the *'Project'* menu in Admin:




***Note:*** *Link Documents are only available in DESI databases*

Link Document Propagation can be enabled on the command line by setting the GLINKP attribute on the GLOCWL (/*GL) element. The default is false indicating that Link propagation is disabled for the project.

To determine which documents require propagation the update process must scan applicable databases. As this has a performance impact on the overall time for updates, the administrator can select which databases to scan. By default all DESI databases will be scanned for Link documents. It is possible to disable Link Documents propagation for a single database via the CREATE/MODIFY Database form by deselecting the Link Documents tick box:

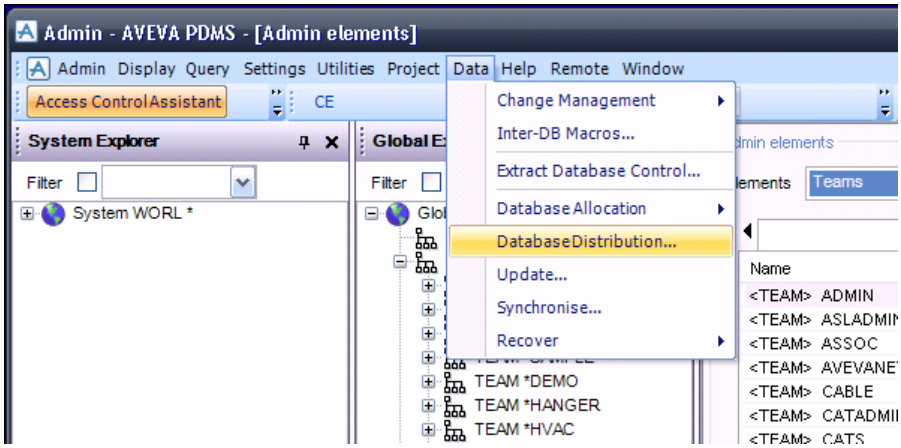



***Note:*** *The linked Document tickbox is only available for DESI databases; this option is not available for other types of databases.*

For details of the operation of this new Global function, please refer to section 7.5.

## 6.5.2 Database distribution form

This new form helps visualise where databases are allocated, and which location databases are primary. This form provides additional functionality to change the primary location of a series of databases. It is available from the Data menu in Admin:-



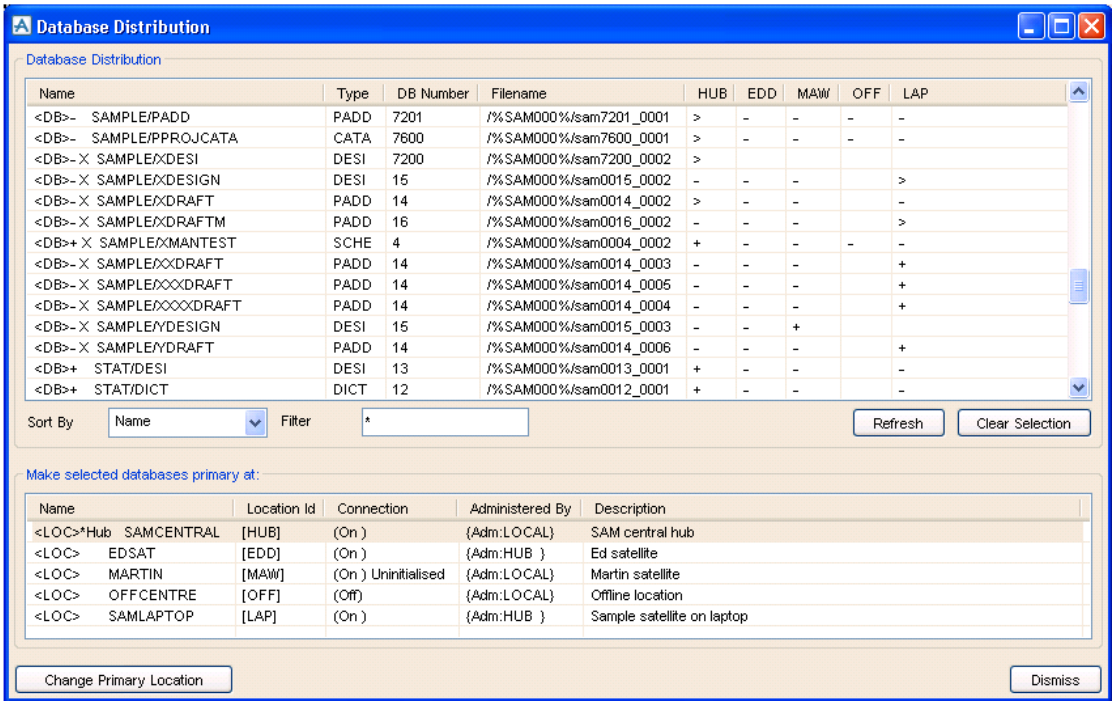

The Data Distribution form lists all Databases in the project and maps it against a matrix of locations. This uses the common symbols of:-

'+' indicates the database is primary at this location

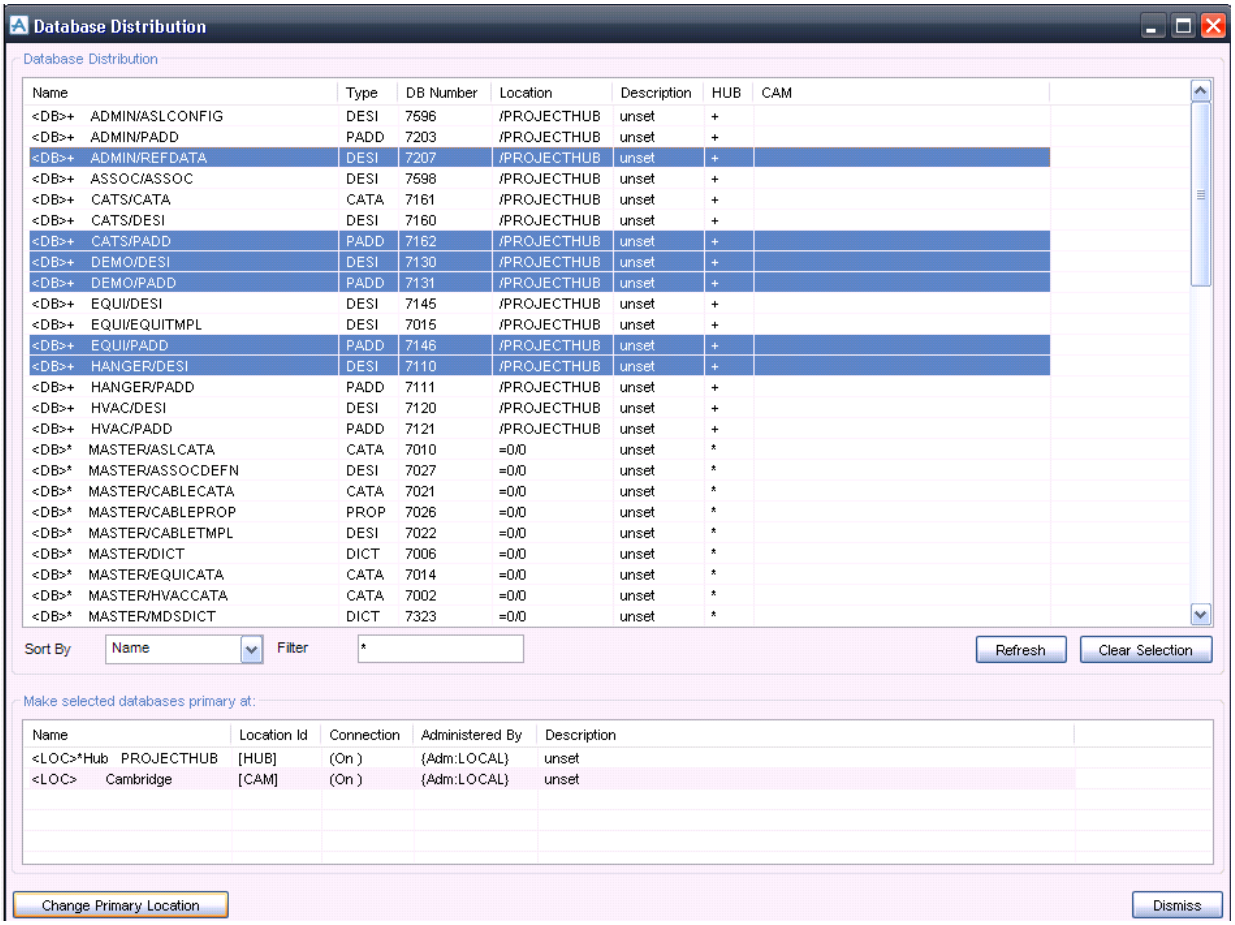
'–' indicates the database is allocated to this location but is primary elsewhere

'>' indicates the database is in transit from this location under a pending transaction

'*' indicates the database is foreign and allocated to this location




By selecting a number of databases and a location, it is possible to change all those databases to be primary to the selected location.




### 6.5.3 Creation of an event without times

The Update event form will now allow the creation of an event without times, to run scripts at the remote location. To do this, create an update event at the current location with the Frequency text box left blank, and the Transfer Scripts text boxes filled in. When an update occurs between A and B, the scripts will be run at B. The arguments will be reversed (B, A).

For details, please refer to the *AVEVA Global User Guide* Section 4.12 Creating Update Events wrt Transfer Scripts.

### 6.5.4 Remote file details in Admin

When querying remote file details at different locations to compare them, the results for the different queries are available. Each press of the Apply button appends the results to the list on the right of the form. This means you can choose different locations and see the information for selected databases together in the list.

Press the Clear button to empty the results list. Results can be stored in a file by pressing the Save Report button which will display a file browser for you to save the results into a text file.

For details, please refer to the *AVEVA Global User Guide*.

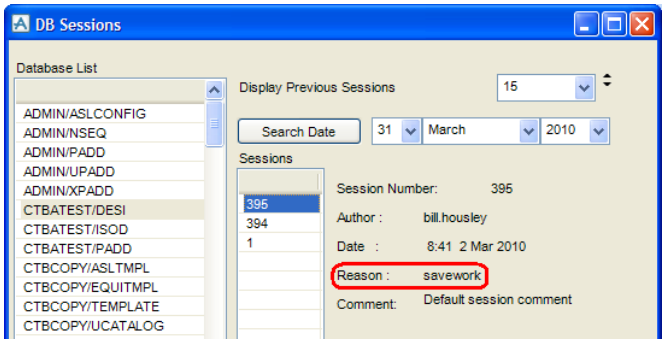
### 6.5.5 Satellite Commands filter for Transactions

The Transactions form display can now be filtered so that only Global commands are listed. Global commands are defined as those that take place via the Global daemon (i.e. not locally), For example, an Extract claim made when an owning extract database is NOT at the same location.

For details, please refer to the *AVEVA Global User Guide*.

### 6.5.6 Enhanced User Interface for Sessions

Forms that display details of a database session now also include the reason for that the session. In particular, the DB sessions form, available from **Query > Project > DB Sessions,** shows it thus:



# 7 Global

## 7.1 Global claim commands

Global Claim (to an extract) commands issued from PDMS now pass only if ALL claims succeed. This is a change as in previous versions, where the Claim command would pass even when some claims had failed.

The *Running Global Projects* manual has been updated with further details.

## 7.2 Global WCF

This option was introduced with PDMS 12.0.SP6.6 to improve the security of all Global communications. It is an alternative to the use of RPC which has been used in previous versions of Global.

It provides an interface to the Windows Communication Foundation (WCF) as an alternative to Remote Procedure Calls (RPC) for network communications. As a result, Global can now exploit the security configurations provided by WCF, which is enabled and configured by modifying values in XML configuration files.

The following security benefits are now available:

- Transport Layer
    - Apply security to either the connection (ideal for connected networks), or individual messages (ideal when sending messages over the internet)
- Bindings
    - Determine the low level protocol used, BasicHTTP (textual, unsecured), wsHTTP (textual, secured) or TCP (binary, faster, but cannot be validated)
    - Determines which ports to use for connections
- Encryption
    - WCF provides many encryption algorithms to protect data en route
- Encoding
    - Tied in with the binding, this determines how the message will be sent: text (slow), binary (fast) or Message Transmission Optimisation Mechanism (MTOM) which will send what it can in text, but will send binary data as binary (a combination of the previous two)
- Authentication
    - At the server side, the message is verified to be from a known source; at the client side, the message is sent to a known receiver. Messages can authenticate against a Windows account or via a certificate.
- Message Validation
    - Ensure that messages meet a known format by comparing against a Schema

Full details are provided in the *Global WCF Configuration Guide*. Other Global manuals have also been updated for 12.1.

## 7.3 Global WCF Service name

The Global WCF interface name has changed from that in 12.0.SP6. This affects the Global WCF client and server Configuration files. The purpose of this is to force an interface change between 12.0.SP6 and 12.1.1 as the databases are not compatible.

The name has changed from the unversioned name used in 12.0.SP6. This is reflected in the endpoint definition within the configuration files `GlobalWcfClient.config` and `admindWCF.exe.config`.

The Endpoint has changed from:

`…/GlobalWcfServiceLib/GlobalWcfService`
to:
`…/GlobalWcfServiceLib/GlobalWcfService_11_1_201011`

As a result the WSDL file is now renamed from:

`aveva.globalservice.wsdl`
to:
`aveva.globalservice.11.1.2010.11.wsdl`

The service contract is now:-

`IGlobalWcfService_11_1_201011`

The Endpoint has changed from:

`…/GlobalWcfServiceLib/GlobalWcfService`
to:
`…/GlobalWcfServiceLib/GlobalWcfService_11_1_201011`

The sample configuration files provided with Global 12.1.1 contain the new versioned names; however if you wish to carry the 12.0.SP6 WCF configuration files forward to 12.1.1 you will need to change the references above in both the `GlobalWcfClient.config` and `admindWCF.exe.config` configuration files.

## 7.4 ADUUID Attribute length

This attribute provides a UUID (Universal Unique Identifier) for the Global daemon. It is a string of hexadecimal values (for example, `92e2714e-0a85-42b0-9d6a-100905aeffc0`). Global will not work if this attribute does not contain a valid UUID.

While reviewing all text attributes for Unicode, this one has been shortened to 40 characters; the former length of 120 characters is far longer than the maximum possible value.

## 7.5 Global transfer of Linked Documents

Global has been extended to include support for linked documents by propagating any document marked as *'propagating'* between two locations. By default the propagation of Linked documents is disabled; to enable it, switch on the *'Propagate Link Documents'* setting under the *'Project'* menu in Admin – see section 6.5.1.

The DBLOC element for the Database contains the attribute NOLNKP to determine whether the database should be scanned for link documents. This defaults to False indicating that links will be propagated if enabled. To determine if a Database can support Link Documents the attribute ISLNKD can be queried. The attribute DBLNKP can be queried to determine if the update process will scan this database for link documents.

The Global update process will scan all relevant databases to determine what linked documents to propagate to the remote location. Link Documents are applied to the database through the creation if a `LNDESC` element. The scan will select all link documents that have the `LNKPRP` attribute set to `SEND`. The document is referenced via the `URL` link which must have the format `'file:///<pathname>'`; The file specified by `<pathname>` must exist at both the source and destination locations. Usually this is best achieved using an Environment variable to hide installation differences. Link Documents fully support the use of spaces in path/filenames.

The Update process only propagates documents that are not present at the remote location. It does not support documents that have changed and as a result these will not be propagated over the top of the previous version. However, it is possible to force the propagation of link documents by using the following command in Admin:-

```
SYNCHR <dbname> LINKDOC FORCE
```

**Note:** There is no UI to support this command

This method could be used to distribute the Units settings file for a Global project – see section 5.2.2. Any updates would of course need a forced update as above.

On allocation of a new database, the propagation of all link relevant documents will be forced to the remote location. Recover will force the propagation of all relevant linked documents in the direction of the recover. Therefore, if you recover a database back to the primary location, the linked documents will also be recovered back to the primary location.

> **Note:** The originating location of a document referenced by an extract hierarchy may be unclear. For this reason RECOVER and the FORCE option of SYNCHRONISE should be used with caution for extracts.

Progress and State (Success/Failure) of linked document propagation is recorded in the transaction database

## Limitations

When creating a new location with allocated databases the linked documents will not be transferred. These will require a forced Synchronisation after the location has been configured and initialised.

ALLOCATE will work with Linked documents, but location creation (with allocated database) doesn't, unless these are in standard project folders (such as INFO, ISO or REPORTs).

Offline transfer is not supported.

Linked document propagation does not guarantee consistency between files at different locations. In particular:

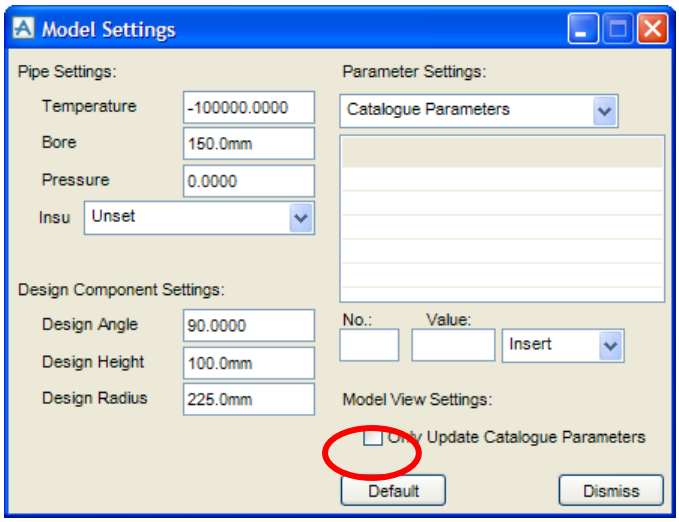
- Linked documents functionality is primarily intended for files which are part of the data model, such as PDF Plotfiles, and certain Marine files;
- Linked documents are not definitely linked to the database which references them. It is therefore difficult to track such documents once the link description is no longer available;
- Likewise linked documents may be referenced multiple times. This will be the norm for extract databases. This makes it difficult to identify the primary location of a document;
- It is possible to reference Linked documents for other data types of documents, such as Word documents and Excel spreadsheets;
- It is possible for users to change documents at the destination location; this will lead to an inconsistency between locations. The update process does not detect this;
- Behaviour for extract hierarchies may not be as expected. For this reason the FORCE option should be used with caution on databases in an extract hierarchy, since it could overwrite the wrong version of the file;
- No documents are deleted when a database is de-allocated. For this reason ALLOCATE will always overwrite any pre-existing files;
- There is a strong likelihood that 'orphan' linked documents will be left behind after databases have been merged, backtracked, de-allocated or deleted.

# 8 Catalogue & Specifications

A number of improvements have been made to the PARAGON module. The most significant are listed below:

## 8.1 Model Settings

The Model Settings form has been updated. The most significant change is to allow the alteration of catalogue parameters only.




Model settings can be altered by the Model View form as well as by the Model Settings form. In addition to changing the catalogue parameters, the Model View from may change other parameters based on a category's data set. For example, if the data set includes properties that define design parameters, those design parameters in the model settings are set to the default property values from the data set. If the 'Only Update Catalogue Parameters' box is checked, the Model View form will not update any model settings except those for catalogue parameters.

## 8.2 Parameterised detail text

The GUI will now accept Text Expressions in Detail Text fields: these must be entered as valid string expressions beginning with '(' and ending with ')'. If the expression is not specified in this way, the Detail Text field will be treated as a simple string.

For details, please see section 4.1.15 Detail and Material Text in the *Catalogues and Specifications User Guide*.

## 8.3 Copy button for structural catalogue

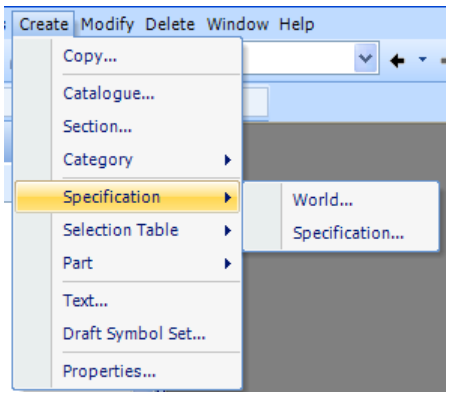
New Copy buttons have been added to the forms for creating structural geometry components and Plines. These make it easy for the user to copy an existing element and then modify the expressions rather than start from scratch. This approach is similar to that used for the Data Sets.

Details of the changes are given in the Catalogue & Specifications User Guide.

# 8.4 Creation of Structural Specs

In the Specification list form, available from menu **Display > Specifications**, there is now a button **Display Spec**. Pressing this button brings up the Specification form as before except that the form opens in Read Only mode. In this state the form UI changes slightly – the title includes [Read Only] and changes the wording of two link buttons from **Edit Spec Atts...** and **Edit CAT Atts...** to **Show Spec Atts...** and **Show CAT Atts...**

The Create menus in Steel Work and Equipment have had the **Specification** menu restored, moving the **Specification World** entry down to a submenu next to **Create Specification**. The **Modify** menus have had the **Specification...** entry restored.




When modifying specifications, some non-piping specifications cannot be altered by the form. Attempting to modify such a specification will put the form into read only mode as described above.

This form allows you to access various tasks which administer all aspects of a new Specification. The current version is primarily intended for use with piping specifications and may not always be suitable for other specifications.

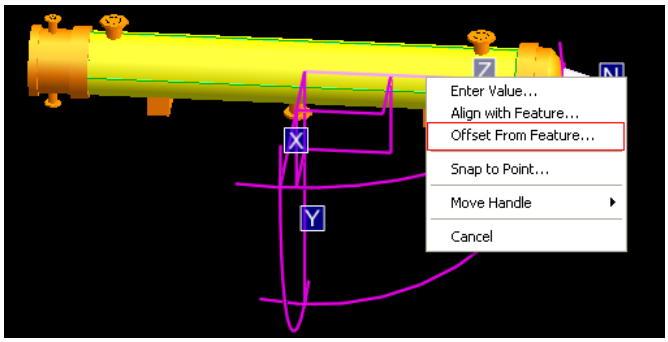
# 9 PDMS Design

## 9.1 Model Editor

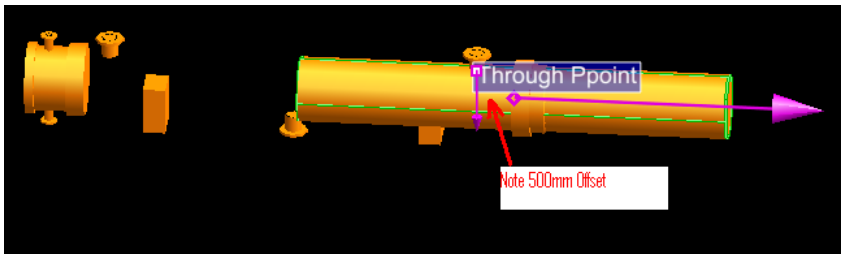
### 9.1.1 Offset From Feature… option

This new option has been added to the popup menu for the following Model Editor modes:

Model Editor, Equipment Editing, Quick Pipe Routing and Pipe Component Modification.

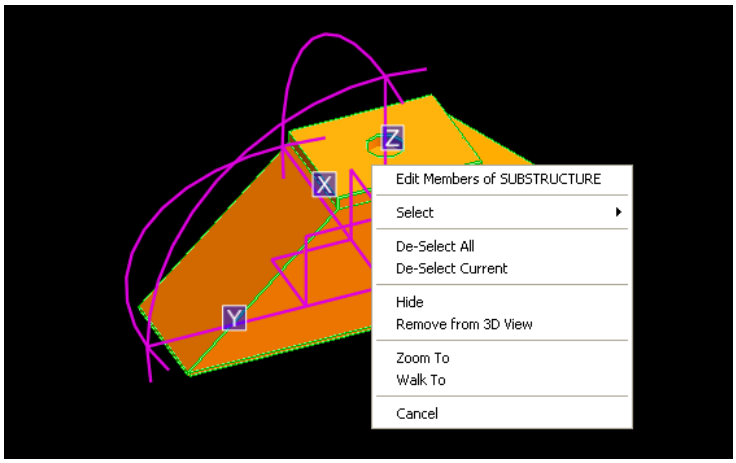



Selecting it gives the user a form to specify the offset and then pick the relevant feature:




### 9.1.2 Structural primitives

Primitives owned by structural elements can now be edited in a similar way to Equipment Editing, with a right click on the selected item.




Primitives owned by the following additional element types are affected:

STRU, SUBS, VOLM, SVOLM, PTRA, AREADE

# 9.2 Move, Drag Move and Plane Move Commands

The Piping, Equipment, HVAC and old cable tray application now have new positioning menus. Structural move commands are unchanged.

The new forms provide a WRT gadget to allow direction to be specified in terms of a local co-ordinate system. In addition, UNDO has been implemented for all move operations (i.e. when the Apply button is clicked).

All picks are now EDG picks, replacing the old ID@ style picking. This allows most of the pick functions to be replaced by a single EDG pick (i.e. screen, P-point, graphics and element picks can all be done using standard EDG position picks.)

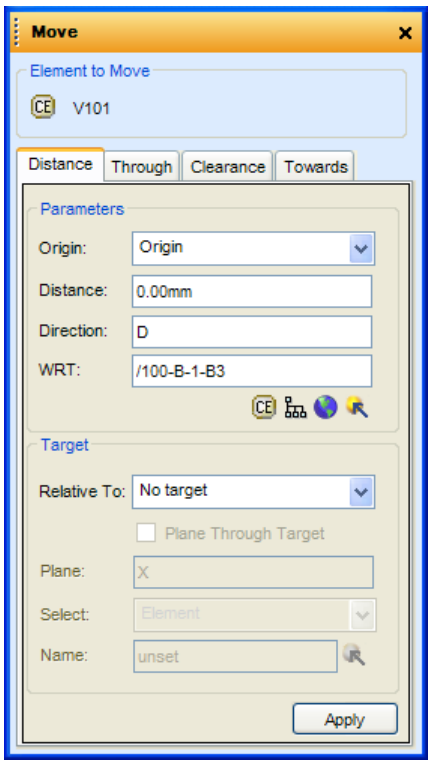
Note that many of the functions provided by these menu commands can also be achieved by using the Model Editor and Pipe Route Editor.

## 9.2.1 Summary of Move, Drag Move and Plane Move options

The Move commands enable the user to move the Current Element (CE) in a given direction. CE can be moved by a given distance in that direction or it can be moved to a position relative to another element, or relative to a plane through a given position.

For piping and equipment, the Drag command moves a piping item, together with other components, equipment and nozzles connected to it which form a constrained network.

The new form appears with four tabs:




The **Distance** tab moves an element a distance in a given direction.

The **Through** tab moves an element in a given direction until it reaches a point relative to a plane perpendicular to the direction of movement through another point.

The **Clearance** tab moves an element in a given direction so that its obstruction volume or a P-point is a given clearance from another element. The clearance is measured in the same direction as the direction of movement.

The **Towards** tab moves an element a given distance in a direction specified in terms of another element.

For details, please refer to the *Design Common Functionality User Guide*.

# 9.3 Change highlighting and reversion

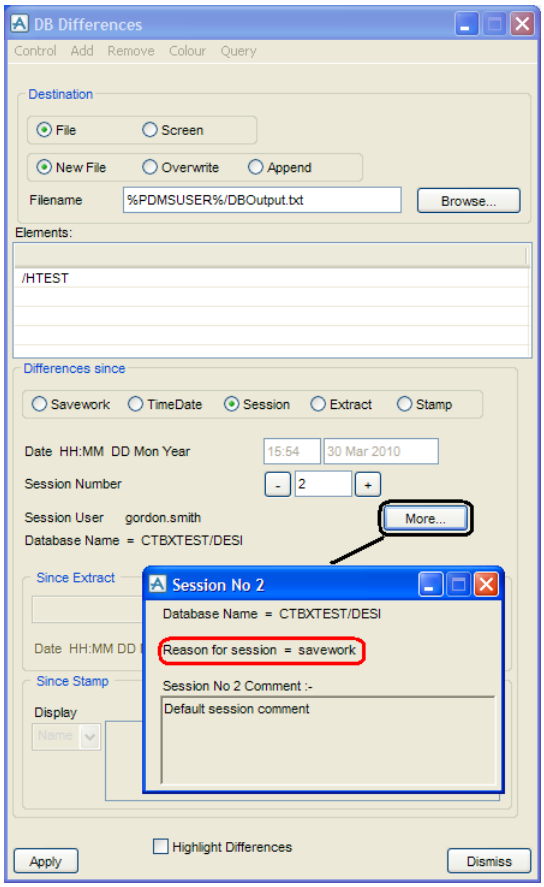
This development provides improvements in the management of change, including that resulting from the use of extracts. These changes fall into four categories:

- Enhanced sessions user interface to show the reason for each database session
- Command syntax to revert an element, or hierarchy of elements, to a previous state
- Improved Extract Data Control dialog to highlight extract changes
- Model Changes Add-in to explore and highlight general changes to the model

There is a separate Comparison add-in – see section 15.2.3 – available from the Schematic Explorer context menu. This can show changes related to diagram elements between two database sessions or stamps and can use the SVG Viewer to highlight the changes in colour.

## 9.3.1 Enhanced User Interface for Sessions

Forms that display details of a database session now also include the reason for that the session. For example, the database session form, accessed from **Utilities > DB Listing,** shows it thus:




Users can explore sessions containing an added element by selecting **DB Changes** or **DB Differences** from the Control menu, and selecting **Session** in the "Changes Since" radio button set.

## 9.3.2 Revert Elements Command

A new command can revert an element, or hierarchy of elements, to a previous state:

```
>- REVert -+- ELEment ---.
           |             |
           `- HIERarchy -+- <selele> -+- AT -----.
                                      |          |
                                      `- BEFore -+- <comparison> ->
```

where the <comparison> syntax is similar to that following the SINCE keyword in the DIFFERENCE and OUTPUT CHANGES commands:

```
-->-+- <date/time> -+-----------------------.
    |               |                       |
    |- LATEST ------|                       |
    |               |                       |
    |---------------+- EXTRACT -+-----------|
    |                           |           |
    |                           |- extno ---+
    |                           |           |
    |                           `- extname -+
    |                                       |
    `- STAMP - <name> ----------------------+->
```

If the BEFORE option is used, the elements will be reverted to the state they had *before* the specified session.

Examples:

```
REVERT HIER /EQUIP AT LATEST
```

reverts the element hierarchy rooted at /EQUIP to the latest saved session.

```
REVERT HIER /EQUIP BEFORE LATEST
```

reverts the hierarchy rooted at /EQUIP to the state it had before the latest saved session.

```
REVERT ELE /E1301 AT 20:16 26 / 3 / 2010
```

reverts the single element /E1301 to the state it had on the given time and date

```
REVERT HIER /PIPES AT STAMP /StampMilestone7
```

reverts the hierarchy rooted at /PIPES to the state it had at the named stamp

```
REVERT HIER CE AT EXTRACT
```

reverts the hierarchy rooted at the current element to its state in the parent extract

The Revert command ensures that every element creation, include, reorder and deletion, and every attribute change is allowed before proceeding. If any of these tests fail, for example due to legality checks, read-only databases or DACs, then the entire revert operation is cancelled and the following error is generated.

```
(43,615)  Cannot Revert elements. No changes have been made.
```

In this case a series of warning messages is written to the console indicating the causes of the error, for example:

```
DAC prevents deletion of element /DELETE_UDET_B
DAC prevents creation of element =15752/1363
DAC prevents modification of attribute Built on element /MODIFY_B_VESS1
```

Element locks do not prevent a Revert operation if those elements were unlocked in the previous state.

Note that this command is not directly related to the REVERT <database name> command available in Admin. This command allows an entire database to be reverted to the state it had at a previous session.

### 9.3.3 Change Highlighting via Extract Data Control

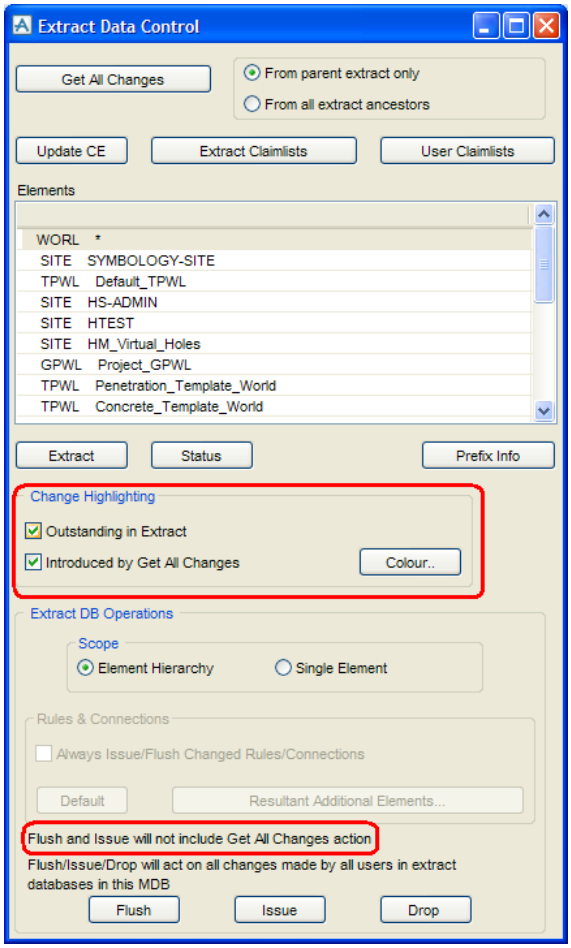
The **Extract Control** dialog has been enhanced to highlight outstanding changes in a child extract in the graphical view. It can also highlight changes introduced to a child extract by a refresh operation. The highlighting is controlled and customised within a “Change Highlighting” framebox, shown below.

When the “Outstanding in Extract” checkbox is selected, all changed elements in the child extract that have not yet been flushed or issued to the parent are highlighted if they appear in the current graphical view. The Colour button allows selection of the change highlight colour using the standard colour palette. The

highlighting is cleared when the dialog is closed, or when a subsequent extract operation is performed using the dialog. In the latter case the checkbox becomes unselected.

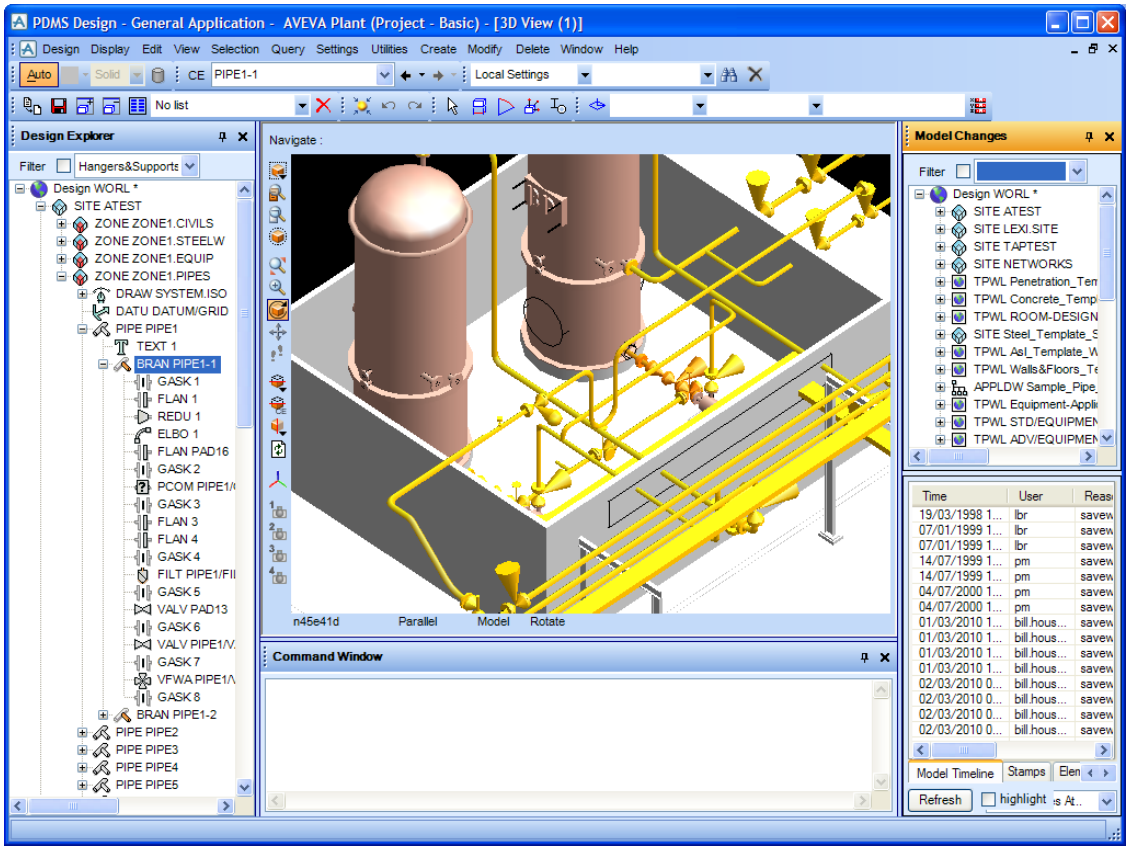
When the “Introduced by Get All Changes” checkbox is selected, all elements that are changed by the next Get All Changes action, or Flush or Issue actions if these include Get All Changes, are highlighted if they appear in the current graphical view. The same highlighting colour is used as for outstanding changes. The highlighting is cleared when the dialog is closed, or if the “Outstanding in Extract” checkbox is selected. In the latter case the “Introduced by Get All Changes” checkbox becomes unselected.

There is a subtlety to the Flush and Issue actions available in this dialog: these operations include an extract refresh by default. The exception is in a Global project, where the parent extract is not primary. In this case a refresh is not included in the operation. In order to clarify whether a refresh will occur as part of a Flush or Issue action, an indication has been added to the dialog, as shown below:

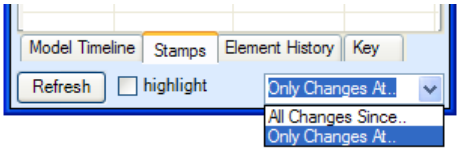



## 9.3.4 Change Highlighting via Model Changes Add-in

A new Add-in has been introduced to provide a general mechanism for exploring change and highlighting changed elements in the 3D graphical view. The **Model Changes** Add-in is activated and de-activated via menu option **Query > DB Changes**. This replaces the previous **DB Changes** option, though this function is still available via **Utilities > DB Listing**: see below. The Add-in is shown in its default layout below:



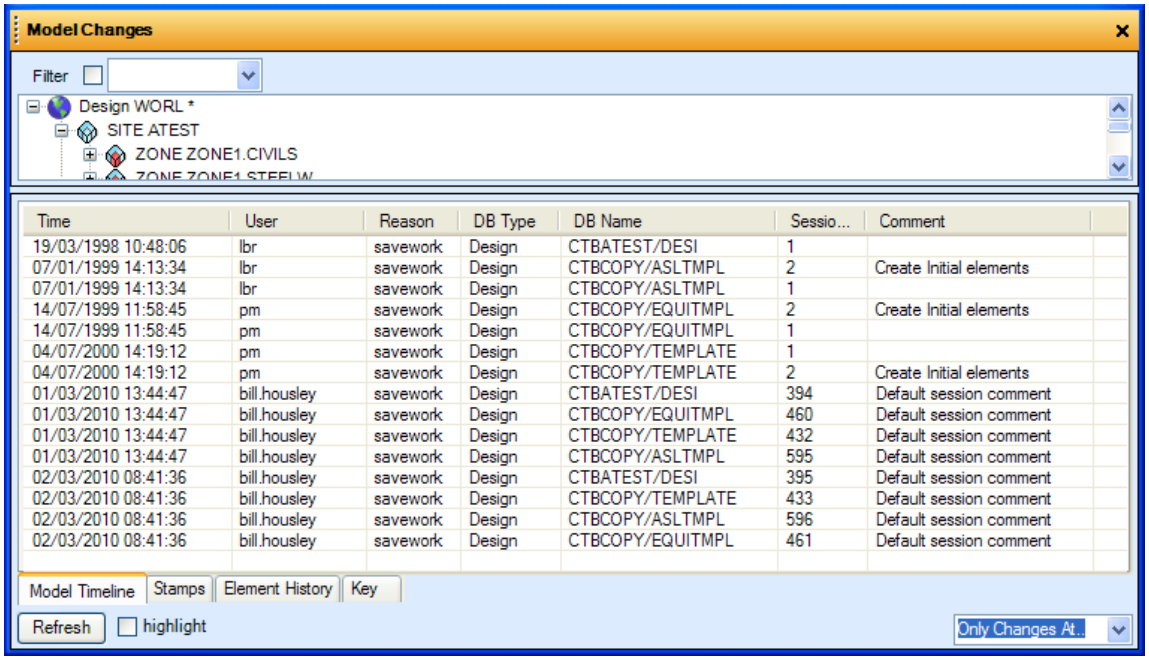

The Model Changes Add-in has two vertically split panes. The top split contains a Design Explorer; the lower split contains a tabbed pane and controls, as shown below:



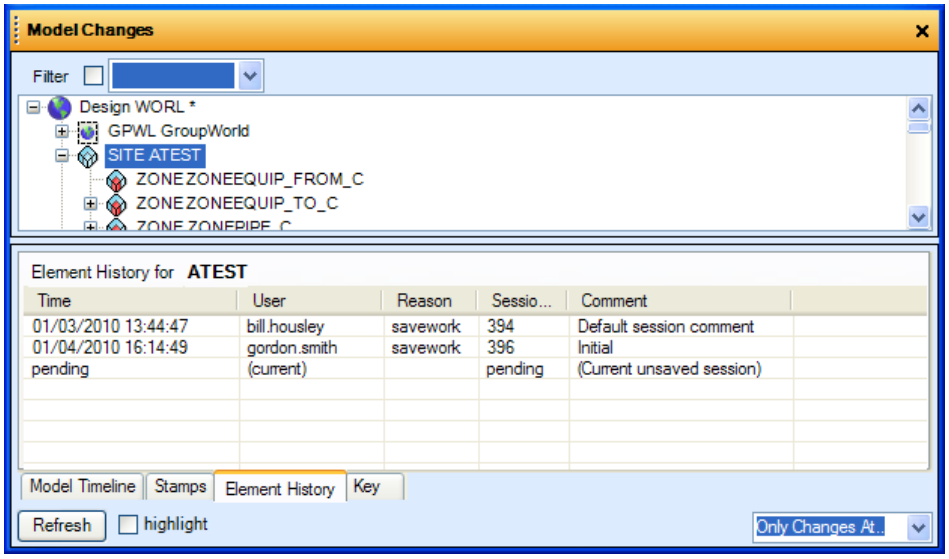

*Model Changes Add-in tabs and controls*

The tabbed pane condenses the following displays (see over):

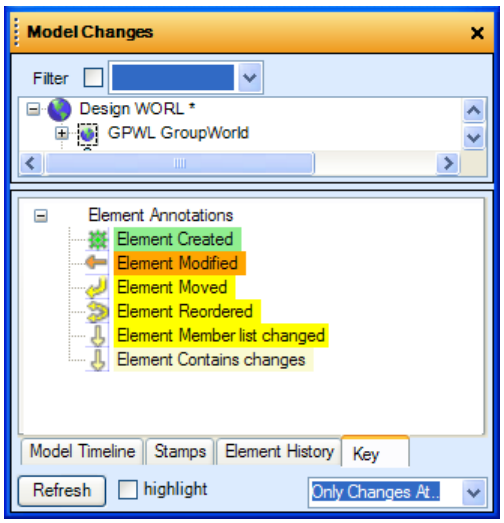
**Model Timeline**: every session for every Design database in the current MDB, ordered chronologically.
**Stamps**: details of every stamp that records session numbers for all of the Design databases in the MDB.
**Element History**: details of every database session in which the selected (current) element has changed.
**Key**: static tree control with images, colour and text explaining annotation of changes in the Explorer.




*Model Timeline pane*




*Element History pane*




*Explorer Annotations Key pane*

The Element History and Key panes are for information only; the Model Timeline and Stamps panes allow selection of a session or stamp upon which to base the display of changes in the Explorer pane, and optional highlighting of changes in the 3D view. Once a session or stamp is selected, changes can be highlighted by clicking the Refresh button at the bottom left of the Add-in (see above).

Two modes of change reporting are supported, according to the current selection in the drop-down list in the bottom right of the Add-in:

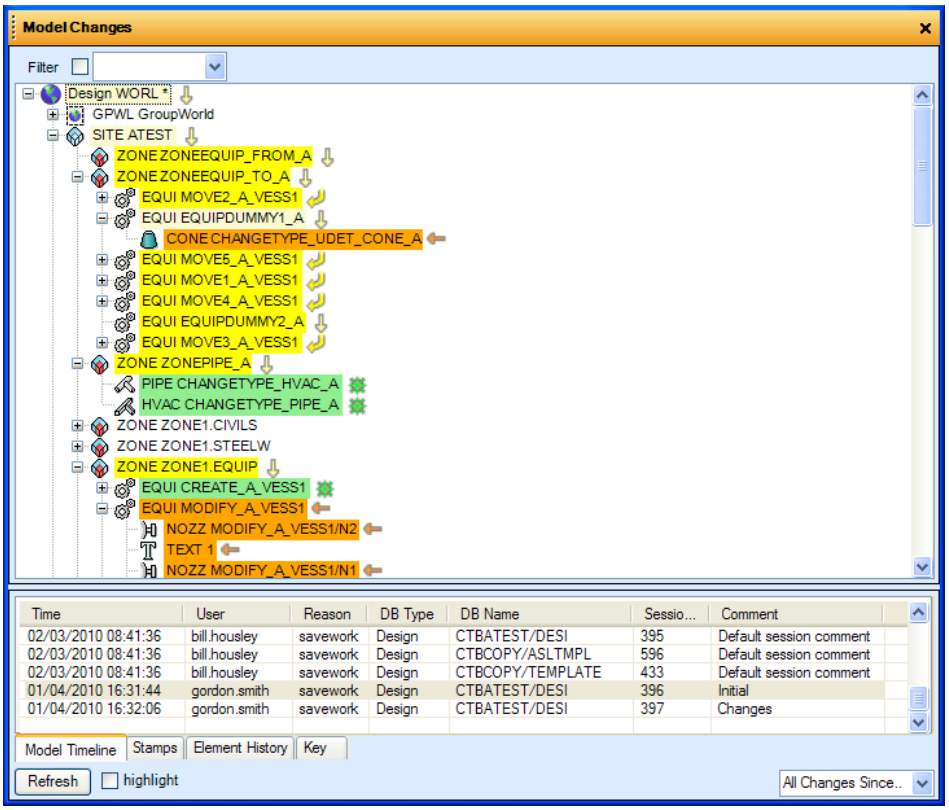
**Only Changes At...** shows *only* the changes that were made when the highlighted session was created. This may have been a **Savework** or as the result of an extract operation, such as a flush or refresh, as indicated by the Reason column in the Model Timeline table. Note that highlighting in the Explorer pane and in the 3D view is always with reference to the current state of the model; it is possible that no changes from a previous session will be visible, for example if all changes were made to elements that have since been deleted.

**All Changes Since...** shows *all* changes that have been made in all databases in the MDB between, but not including, the selected session or stamp, and the current state of the model. This does include any unsaved changes. Note that for large models this change analysis can take some time.

When the **Refresh** button is clicked and the change analysis operation is complete the explorer tree is updated with annotations which highlight the changed elements in detail. An example is shown overleaf:

The annotations are as described in the Key pane; in this example, we can see that:

- The World element and `SITE` element `/ATEST` are not themselves changed but have changed descendants. This helps navigation to the changed parts of the element hierarchy;
- `ZONE` element `/ZONEEQUIP_FROM_A` has member list changes only. Since no new or re-ordered elements are displayed, it can be inferred that all child elements have been removed;
- `CONE` element `/CHANGETYPE_UDET_CONE_A` has been modified (its type has been changed);
- `EQUI` element `/MOVE5_A_VESS1` has been moved from the child list of `/ZONEEQUIP_FROM_A` into the child list of `/ZONEEQUIP_TO_A`;
- `EQUI` element `/CREATE_A_VESS1` has been created under `ZONE` element `/ZONE1.EQUIP`, thereby changing its member list.




*Annotated Explorer*

Clicking the highlight checkbox at the bottom middle of the Add-in (see *Model Changes Add-in tabs and controls* picture above) has an immediate effect on all 3D graphical views if changes are currently displayed in the explorer tree. Any changed elements that have graphical representation and are in the drawlist for any active view are highlighted in colour. This uses the same customisable colour used by the "Highlight element" function available via right-click menu in the standard Design Explorer Add-in. Unchecking the checkbox returns the graphical display to normal colouring.

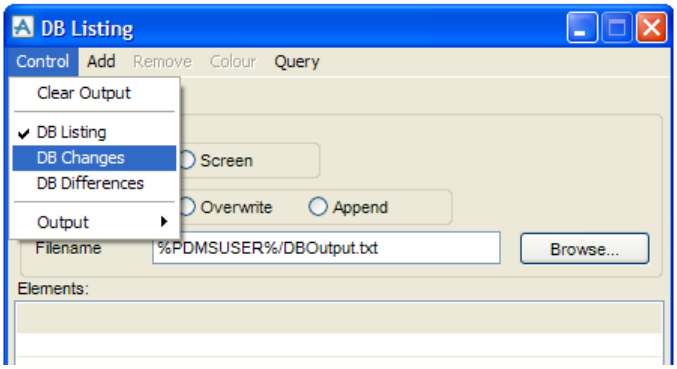
All panes of the Model Changes Add-in are updated and Explorer annotations and 3D graphical highlighting are reset in the following circumstances:

- further element changes
- Savework, Getwork, and Refresh
- User or MDB switch

Following any of these operations, the **Refresh** button must be clicked again in order to update the change highlighting.

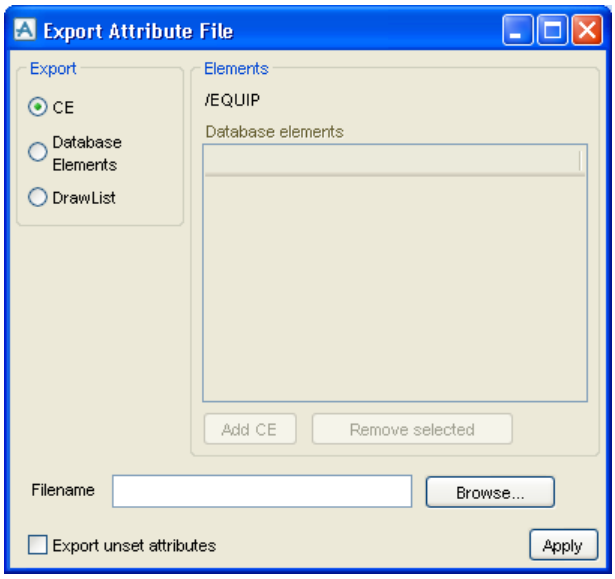
### Former DB Changes Dialog

The functions of the **Query > DB Changes** dialog in earlier versions of PDMS are still available via **Utilities > DB Listing**. This dialog is very similar, the only difference being the initial mode setting. This mode can be changed using the Control menu on the DB Listing dialog as shown below:




## 9.4 Enhanced attribute export to Review

The **Export Attribute** form, accessed from the **Utilities** menu, now allows the user various options to specify the element(s) to be exported and to pick the export file name from standard file browser.



## 9.5 Weight and Centre of Gravity (CofG) form

The **Within Area** option has been removed from this form (**Utilities > Mass Properties > Weight and Centre of** Gravity) as it depends on the INSIDE/OUTSIDE qualifier, which is not supported for these mass properties.

## 9.6 DRAFT Explorer

The DRAFT Explorer may now be made accessible in Design; this is only useful if the Draft databases are also made accessible (e.g. MODE PADD R) using the MODULE definition in Admin!

## 9.7 AVEVA Mechanical Equipment Interface

It is now possible to export to a single STEP file by specifying a file name instead of a directory name, e.g.

```
export file /c:\project\a345\pipe1.stp
```

Naming of exported items is unique within this file.

Note: It is still not possible to create a multi-level assembly hierarchy in a single STEP file.

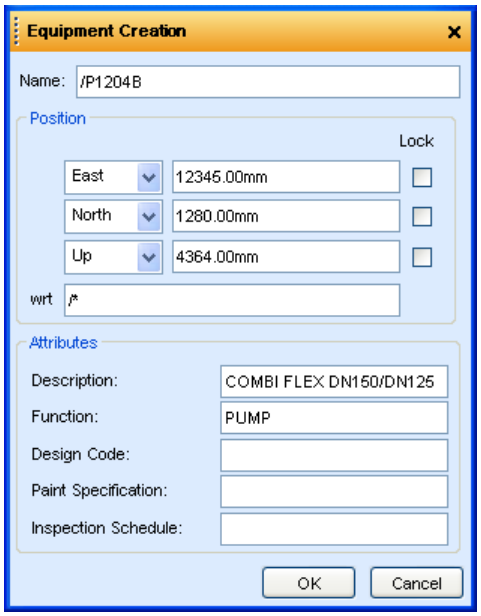
# 10 PDMS Design Applications

## 10.1 Equipment

The **Create>Equipment…** form has been redesigned with several enhancements:

- Equipment may be positioned using graphical picking
- Attributes are input directly using the creation form rather than a sub-form
- UNDO is available
- The form is resizable

For details, please refer to the *Equipment User Guide* (Section 4).




## 10.2 Piping

### 10.2.1 Sloping piping

The data structure for piping includes two new concepts for better handling of slopes or falls:

- An adaptive or "wobbly" P-point that can accommodate a specified range of angles – this is achieved by introducing a tolerance attribute OFFTOL on all types of P-point (in Paragon). A PDIR pseudo-attribute defines the actual direction, which must be within the tolerance of the nominal direction
- A Slope element or SLOELE, in a Slope table or SLOTAB, that can be referenced by the SLOREF of a SPEC, PIPE or BRANCH to specify default, minimum and maximum slope

The introduction of these new concepts has no effect on existing Cats & Specs or models. The new features are used in Quick Pipe Routing and also for sloping existing orthogonal piping. The Paragon GUI has been extended to cover Slope Tables.

The pipe creation form has an additional option for selecting from a list of slopes and the modify pipe form has the same option for setting branch values. The older pipe and branch modification forms have also been changed to include new options for slopes. Note: If the SLOREF attribute is set at pipe level, it is automatically inherited by new branches.

The Model editor has been extensively revised to handle elbows (as well as bends) and the new P-point options, as well as adding slope options to the menus. A new form can assist in applying a slope to an existing pipe, including all the branches within it. To display it, navigate to an existing pipe and select **Modify>Pipe Slope...**

For full details, please refer to the *Piping User Guide*.

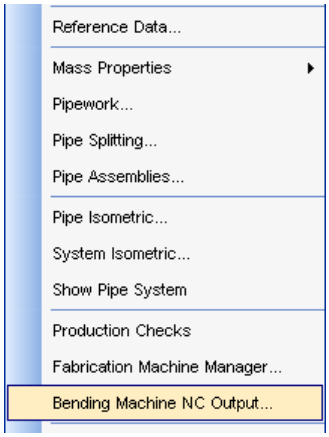
### 10.2.2 Direct setting of Insulation Thickness & Material

This allows the piping designer to choose piping insulation of a given thickness and material rather than setting the temperature and spec for automatic selection.

New sample insulation specifications are provided as a basis on which users can base company and/or project insulation specifications.

### 10.2.3 Bending Machine NC Output

A new option **Bending Machine NC Output…** in the **Utilities** Menu allows users to save a file, which contains the bending details of a specified list of pipe pieces. To use this, the current element must be a Site, Zone, Pipe, Pipe Spool List (PSLIST), Pipe Spool (PSPOOL), Pipe Piece List (PPLIST), or a Pipe Piece (PPIECE).




This enables you to search for bent pipe pieces, filter them, and then create a report.

### 10.2.4 Improved production checks

The Pipe Production Checks can now use a user-defined pipe stock length as well as the bending machine maximum material length (MML).

The Pipe Stock Length is set up in the Pipe Data Table (type PDAELE) using Paragon: the data elements of that table now have a field PStLen for pipe stock length. It may be queried using **q PStLen** on a pipe data table element. New Pseudo-attributes enable the pipe stock length of a particular (implied) tube to be queried: **q ATST** for 'Arrive Tube Stock Length' or **q LTST** for 'Leave Tube Stock Length'.

The production checks perform two tests on each pipe piece:

- Compare the pipe piece length with the stock length for that tube spec. If the piece is longer, the test will fail regardless of bending requirements
- Compare the pipe piece length with the maximum pipe length for the bending machine assigned to this branch or pipe. If it exceeds the machine-defined value, the test will fail

These two tests will be performed in the order above and in addition to any other tests, such as wall thickness, corrosion, etc. The user will be notified of the success or the reason for the failure.

### 10.2.5 Material search for Pipe Bending Machine setup

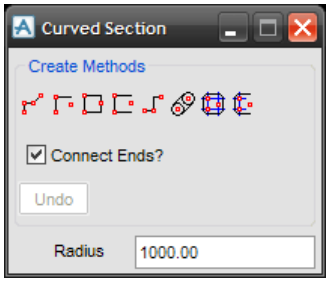
A Search button has been added to allow the user to search for the appropriate material (from all SMTE in catalogue or |SOLI in the Property database, with Filters if required).

# 10.3 Structures

## 10.3.1 Steelwork Connectivity Upgrade

The user interface for connecting structural elements has been improved in various places to use event-driven graphics (EDG) interaction. In addition, several operations now also work on GENSEC elements including curved members and UNDO is now available for some functions.

In particular, a **Connect Ends?** check box has been added to the form for creating Curved Section GENSEC elements. This check box allows the user to specify whether they wish to connect the ends if a suitable start or end point is selected.




Minor changes apply to creation of straight and curved members, connection and disconnection and several operations related to joints. For details, please refer to the *Structural User Guide*.

# 10.4 Hole Management enhancements

The Hole Management Utility which creates and manages penetrations in panels has been improved, by the addition of additional catalogue properties in the Pipework catalogue and HVAC penetration components. The utility is available only in the Pipework and HVAC Designer applications and accessed from the Hole Management Utilities toolbar.

To start the application, click the Hole Management Utility icon on the toolbar to display the Managed Hole Utility window. The main utility form is divided into 4 sections – for the creation, merging, modification of holes and utilities.

For further details, please refer to chapter 4 *Multi Disciplinary Penetration and Hole Management* of the *Design Common Functionality guide*.

## 10.4.1 Create Holes

In the Clearance field, specify the clearance to apply to the penetrating item. This is not applied if the software detects a clash with a pipework or HVAC component that has hole size properties.

Note: The clearance can be controlled by the component that passes through the panel if the penetrating component has a Property AHDI (for circular) or AHX, AHY (for noncircular) in which case these property values will control the clearance. For more information, refer to Configuration Hole Management Data.

Click Auto penetrate CE to automatically create holes in panels in a selected structure.

The clash analysis can take a few minutes; a progress message and bar will be displayed. Once the analysis has taken place, the Hole Association Manager window is displayed with the details of the newly created virtual holes.

Note: The Hole Association Manager window is not displayed if no virtual holes are created.

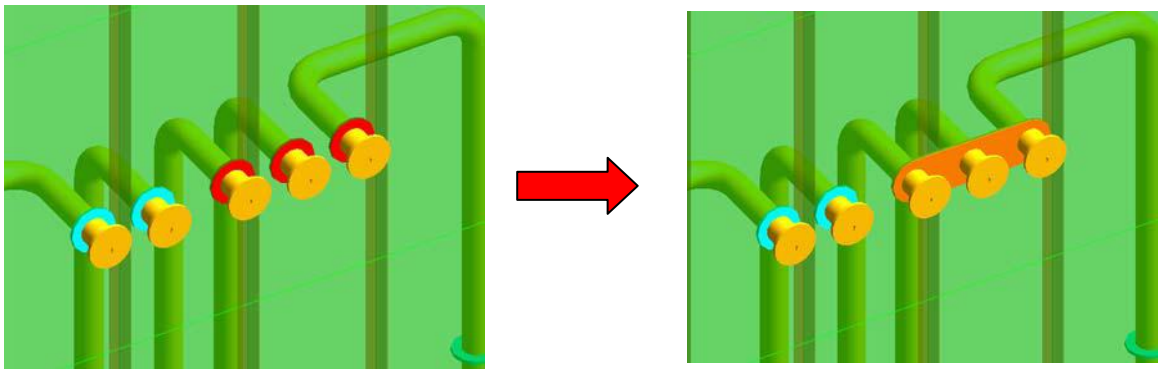
If more than 30 virtual holes have been created, there will be a confirmation message to display the Hole Association Manager window.

To create holes individually, click Create Hole. The user will be prompted to pick a panel, pipe or HVAC branch that penetrates the selected panel. The creation of the hole is identical to the automatic hole creation.

## 10.4.2 Merge Holes

Merged holes are individual holes merged together into a single hole. To merge holes, click Pick holes; the user is prompted to pick a Managed Hole fitting to be combined into a single merged hole.

Note: A minimum of two holes must be picked.



Click Merge Holes, the software creates a merged hole containing the selected penetrations.

### 10.4.3 Modify (and Delete) Holes

Created holes can be modified, managed or deleted.

To modify a created hole, click Modify CE. The Hole Modification window is displayed, modify the created hole as required, the Free Hole Boundary Editor can also be started from this window.

To manage created holes, from the Hole Association Manager window, select Managed Selected Holes, the Hole Management - Definition window is displayed.

Use this window to add single or merged hole penetrations, define the hole type, penetrating clearance, hole shape parameters, positioning and an option for the hole to revert to the catalogues specifications.

To delete a created hole, the user is prompted to pick a hole. If the hole has no status it is deleted; if the hole is Requested, the user will be prompted to confirm the deletion. If the hole is Approved, deletion is not permitted.

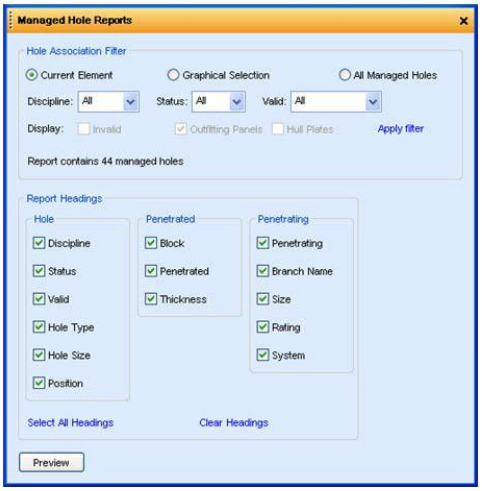
### 10.4.4 Utilities

All panels within the volume of the selected pipe or HVAC can be added to the 3D view. To do this, from the Utilities part of the Managed Hole Utility window, click Add Structure.

To view all pipe or HVAC elements within the volume of the selected structural panels, from the Utilities part of the Managed Hole Utility window, click Add Pipe/HVAC.

To generate and define a report on selected holes, click **Hole Report**. The report can then be printed or exported to Excel.

### 10.4.5 Managed hole reports



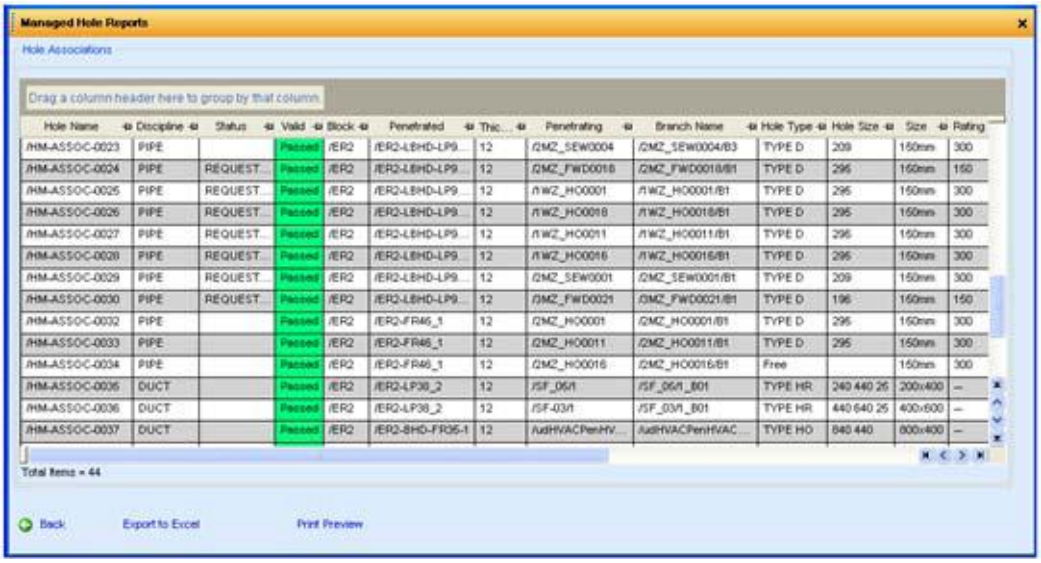

The **Hole Association Filter** enables the user to specify which Managed Holes to list in the Report:

| | |
|---|---|
| **Current Element** | Holes associated with the currently selected element only |
| **Graphical Selection** | Holes associated with elements in the current graphical selection |
| **All Managed Holes** | Holes in the MDB |

**Report Headings** may be specified**:**

| | |
|---|---|
| **Discipline** | Specify holes for all disciplines or a single one specified using the drop-down menu |
| **Status** | Specify holes at any Status or at a single Status option using the drop-down menu |
| **Valid** | Select all holes or only those that pass or fail the validation tests<br>**Note:** any option other than Not Checked may significantly slow down report generation as all the validation tests will be run for every selected hole |
| **Invalid** | Include hole associations that have any bad references, invalid references or invalid data |
| **Panels** | Select holes in panels |
| **Apply Filter** | Refreshes the Hole Report according to the element and filtering options selected<br>**Note:** It is necessary to select Headings required on the report before clicking on Apply Filter because heading data is collected when filters are applied. |
| **Report Headings** | Select headings required on the report from three categories: information about the hole, information about the penetrated item and information about the penetrating item |
| **Preview** | Displays **Managed Hole Report** window |

The **Managed Hole Report** window displays the specified report.




You can use grid column functions to sort and filter columns before printing or exporting the report. Select **Print Preview** to view the report or select **Export to Excel** to export it.

Right click the **Hole Associations** list to display the following pop-up menu:

| | |
|---|---|
| Navigate to | the Association, the penetrated or the penetrating item (single selection only) |
| Add to 3D view | Adds the selected holes and associated items |
| Remove from 3D view | Removes the selected holes and associated items |
| Focus on Hole | Zooms the 3D view to centre on the selected hole and zoom in. Clipping is applied if it is enabled (single selection only). |
| Export list to Excel | Exports the report grid to Excel |
| Print list | Shows a standard grid print preview for the report grid |

## 10.4.6 Configuration of Hole Management Data

Additional hole size properties on piping and HVAC components are used to control automatic hole dimensions. If these properties are not provided the system uses hole management default sizes (e.g. OD for pipe holes).

Hole Management Design and Catalogue data configuration is as described in the *Design Common Functionality User Guide*, with the addition of new data set properties on selected piping components.

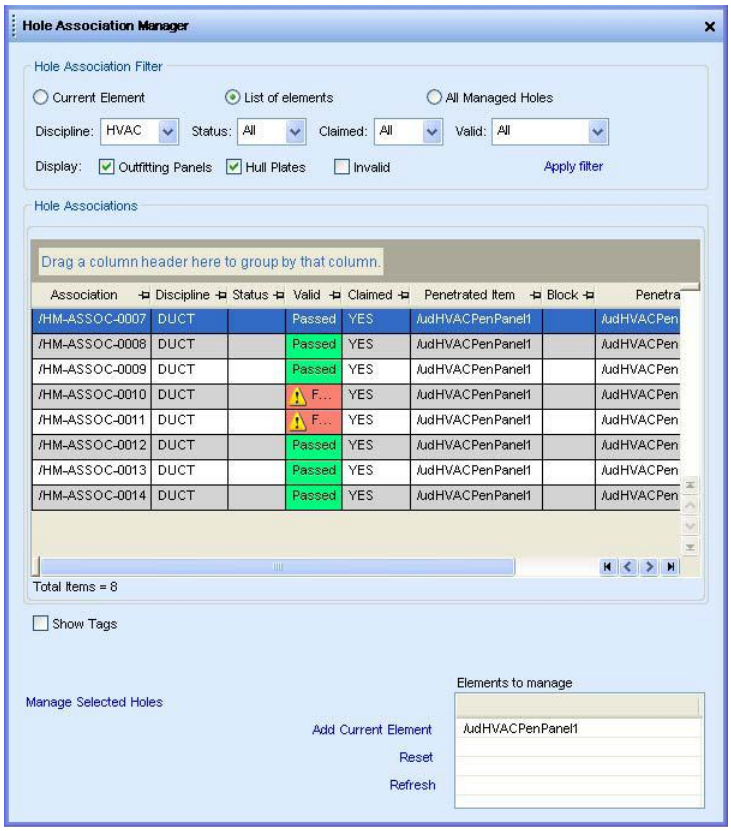
The following properties are used to control automatic hole sizes.

| Property Name (DKEY) | Description |
|---|---|
| AHDI | Property specifying the diameter of the hole required for the component (a REAL DISTANCE expression returning the hole diameter.)<br>The property is used if:<br>1. It is associated with a piping or HVAC component that clashes with the panel at the penetration. For example, this property may specify the outside diameter of a COUP element that represents a penetration sleeve.<br>2. It is associated with a FLAN component that is adjacent to a penetration clash with pipe implied tube. This allows for a flange clearance hole to be created.<br>If the AHDI property is applied, the Clearance value is ignored. If the AHDI property is not applied, (Pipe OD + Clearance) is used to calculate the hole size. |
| AHX | Property specifying the X dimension of a rectangular hole required for the component (a REAL DISTANCE expression.)<br>If the AHX property is applied, the Clearance value is ignored<br>If the AHX property is not applied, (Component width + Clearance) is used to calculate the hole size |
| AHY | As for AHX, but specifies the Y or height dimension of the hole. |

## 10.4.7 Hole Association Manager

The **Hole Association Manager** window is used to manage the tasks associated with holes.

The **Hole Association Filter** is used to select hole association(s) and structural elements to be displayed.




Select the element, specify the filter criteria and structural elements, then select **Apply Filter.** The selected hole associations will be displayed in the **Hole Associations** table.

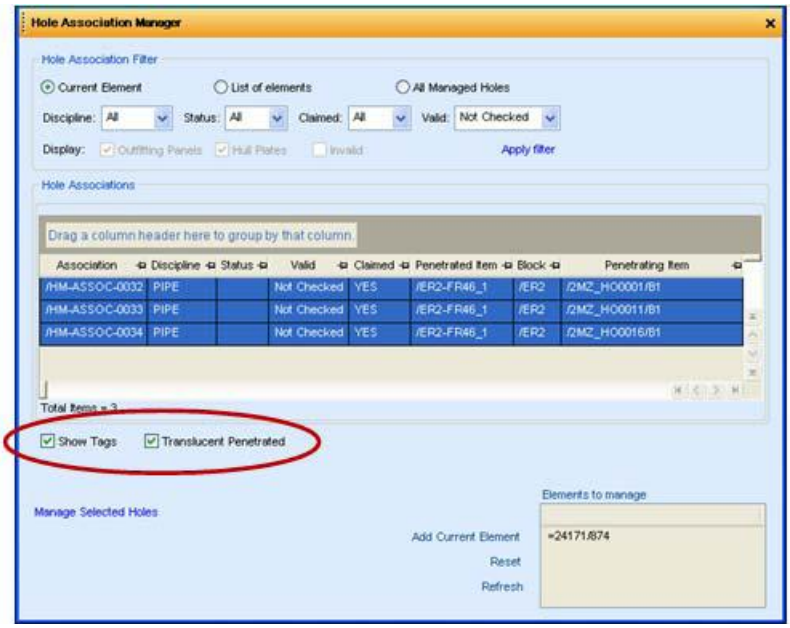
If some of the hole associations fail, navigate to the hole and use hole management to modify the penetration, then select **Apply Filter** from the **Hole Association Manager** window.

To add elements to be managed, select **Add Current Element**.

To remove the automatically created penetrations, select **Reset**, then **Refresh**.

## Displaying Holes

The **Hole Association Manager** window can also be used to display selected holes in the 3D view.



**Clipped Hole View**

The **Focus on Hole** option can be used to zoom in on a selected hole and remove all other elements from the 3D view. Make sure that the clipping and capping options are selected on the active 3D view.

From the Hole Associations table, right click to select a single hole and activate a popup menu. Select **Focus on Hole**; this zooms to the selected hole and clips the surrounding background.

To return to the normal view, de-select the clipping and capping options or select a different view.

**Show Tags**

To show tags and a box surrounding a selection of holes in the associations list, check the **Show Tags** box.

**Translucent Penetrated**

To emphasise the penetrated items selected in the associations list, check the **Translucent Penetrated** box.

# 10.5 Penetration with Piping Component

This new pipe penetration function enables a component such as a watertight bulkhead seal, modelled as a COUP, to be positioned on either side of the plate being penetrated. It can cope with cases where the penetrating pipe is not orthogonal to the plate.

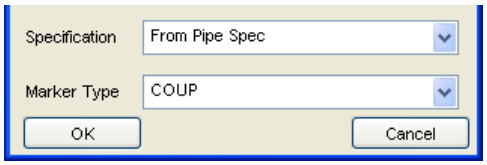
The component can be shown on pipe sketches and isometrics; Isodraft has been modified to add a new SKEY CPCF and a penetration seal symbol. Please see section 12.7.

Full details are given in the *Common Functionality User Guide:* Chapter 4. Catalogue Requirements are given in Section 4.2.13 Project Configuration for Hole Management.

## 10.5.1 Creation of Penetration

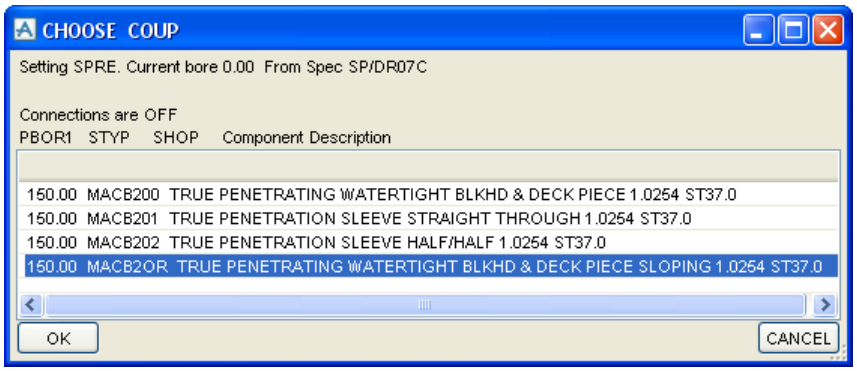
Normally, a penetration ATTA element is created on the pipe to mark the location of a penetration. It is possible to put a pipe component, representing a sleeve or penetration seal, at the penetration if the piping catalogue is suitably configured. Pipe penetration components are modelled as COUP elements.

When a penetration component is required, select **From Pipe Spec** in the Specification pull down, and select Marker Type COUP.

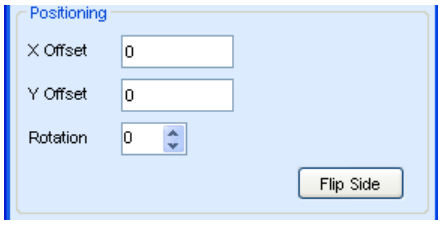



The **CHOOSE** form is displayed showing the couplings available from the piping specification. Select the required component and click the **OK** button.

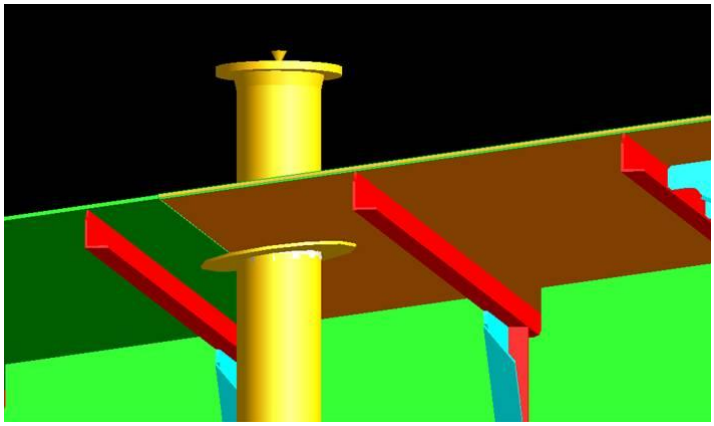
Note: In the sample MAS project, an example of a pipe penetration component can be found in category /MACB2OR.



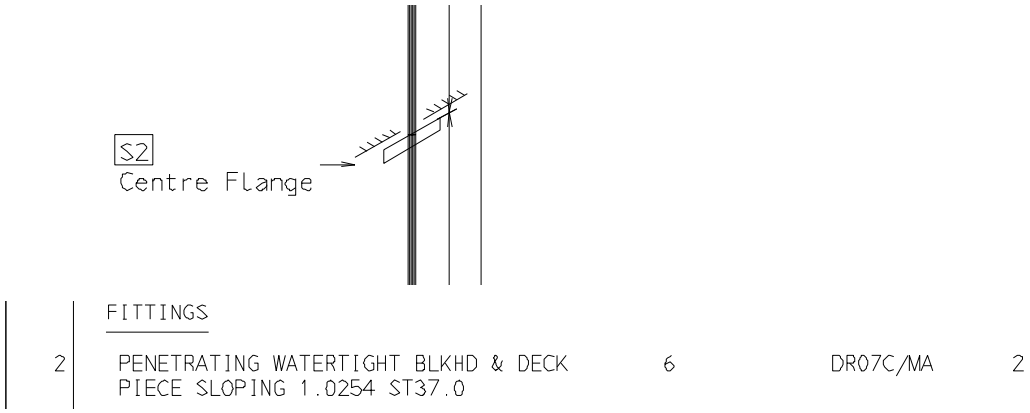

The **Hole Management – Definition** form is displayed. If a suitably configured piping component is selected, it can be placed on either side of the penetrated plate – an additional Flip Side button appears on the form.




Click on the **Flip Side** button to place the piping component on the other side of the penetrated plate.



The symbol for this component is represented on an isometric drawing as:

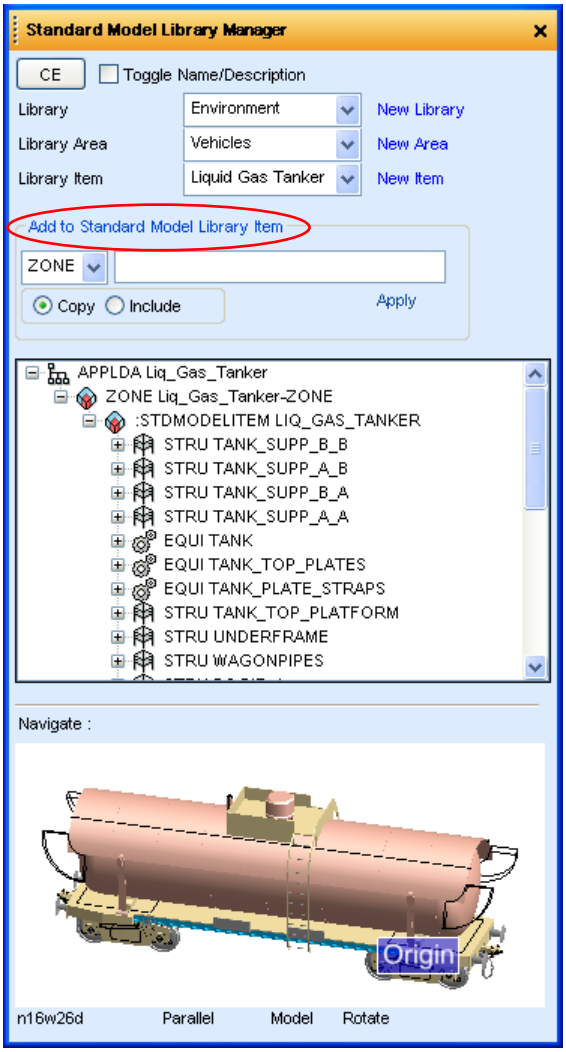


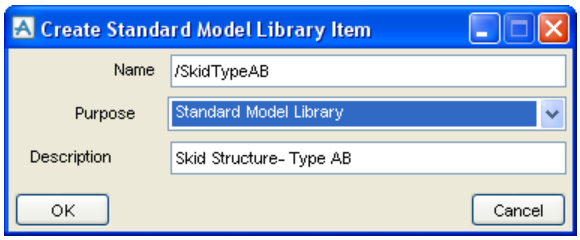

# 10.6 Standard Model Library

This new function, an early version of which was included in the Marine Outfitting Update 12.0.SP6.10, allows the user to capture multi-discipline design elements, store them in a library for re-use and then create any number of instances of them at any position in the model, as required.

It is accessed from a new **Standard Model Library Manager** form, accessed from the **Utilities** menu and uses a **Create Standard Model Library Item** form; these vary somewhat dependent on whether a user is a library manager or a general user.

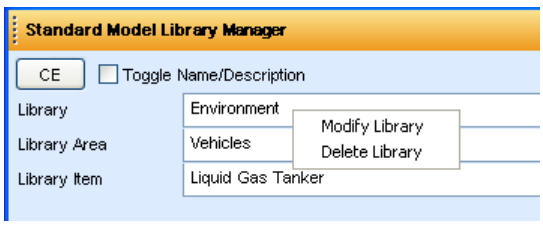
The first form to appear is the **Manager** form, which can be used to browse the library and add items to it:




This creates a new element in a Library in the application data world (APPLDW) – the library item is an APPLDA element in an APPDAR. A similar form is used to modify these items.

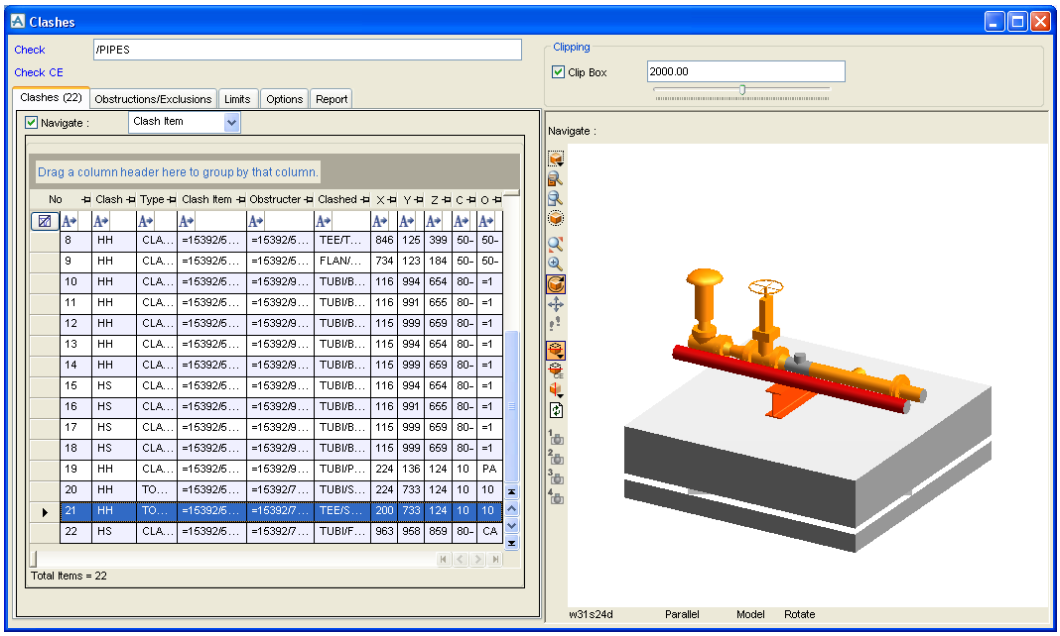
Libraries, Areas and Items are modified or deleted from a pop-up menu on the same form:




For full details, please refer to the *Design Common Functionality User Guide* manual.

# 10.7 Clash Utility enhancements

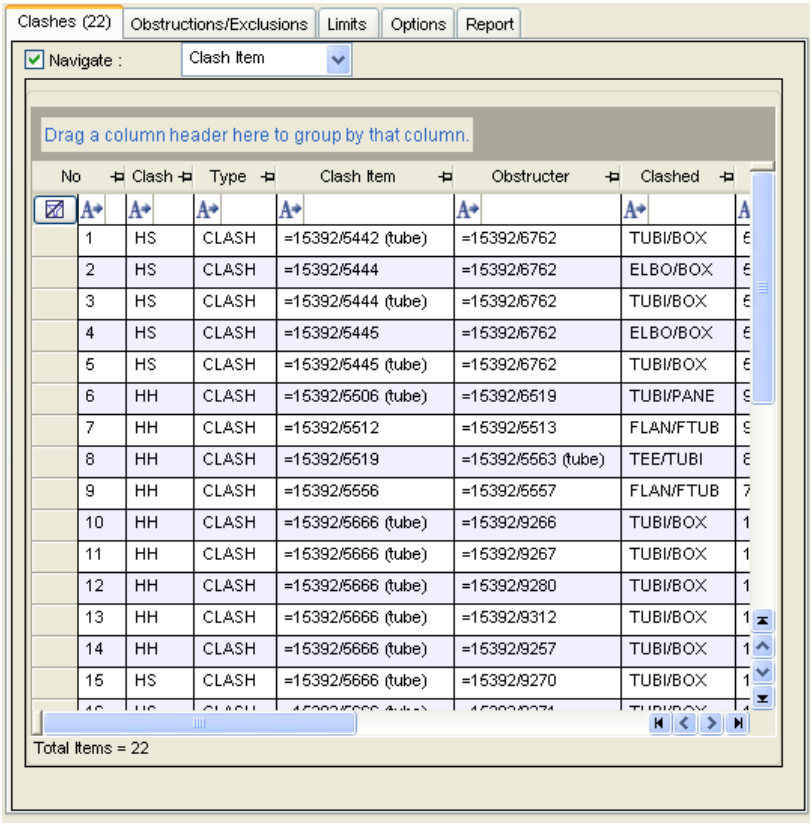
The Clash utility uses a new form, which shows all the options; it uses a grid gadget for filtering and grouping and a 3D view of the clash with aid graphics. Simple clipping, navigation, reporting and printing are also available.




When the form is first shown, the current element is selected in the Check field. Users can change this as they wish by typing any Design name or syntax such as ZONE. The element to be checked is always named in this text box. The options available are:

- **Check** Check the named element for Clashes
- **Check CE** Show the name of the current element and check it for Clashes

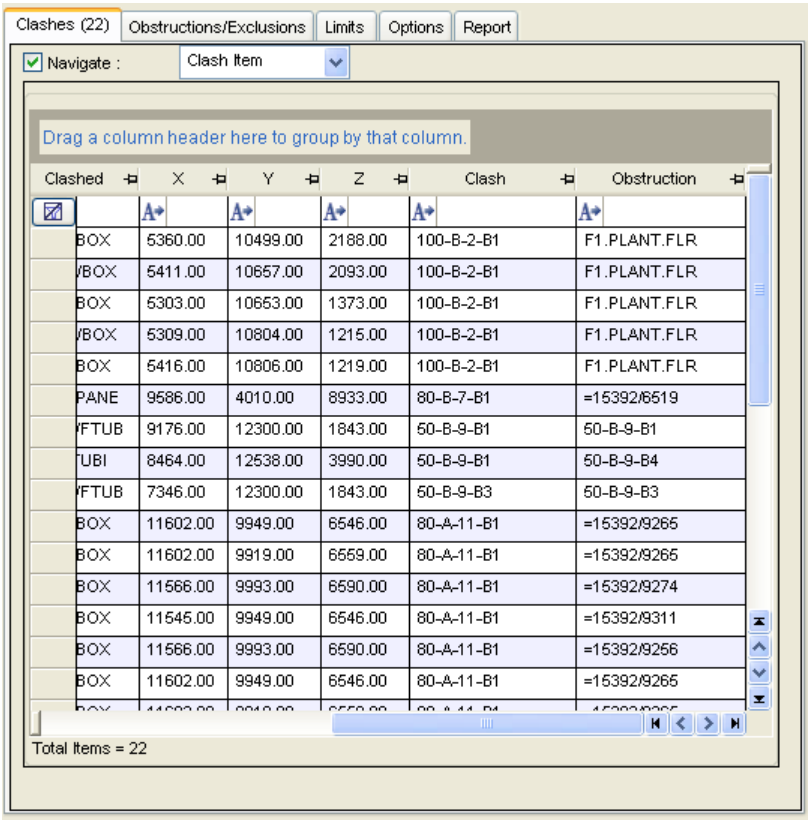
The Clashes are displayed in a grid, with the usual facilities for filtering, grouping etc:



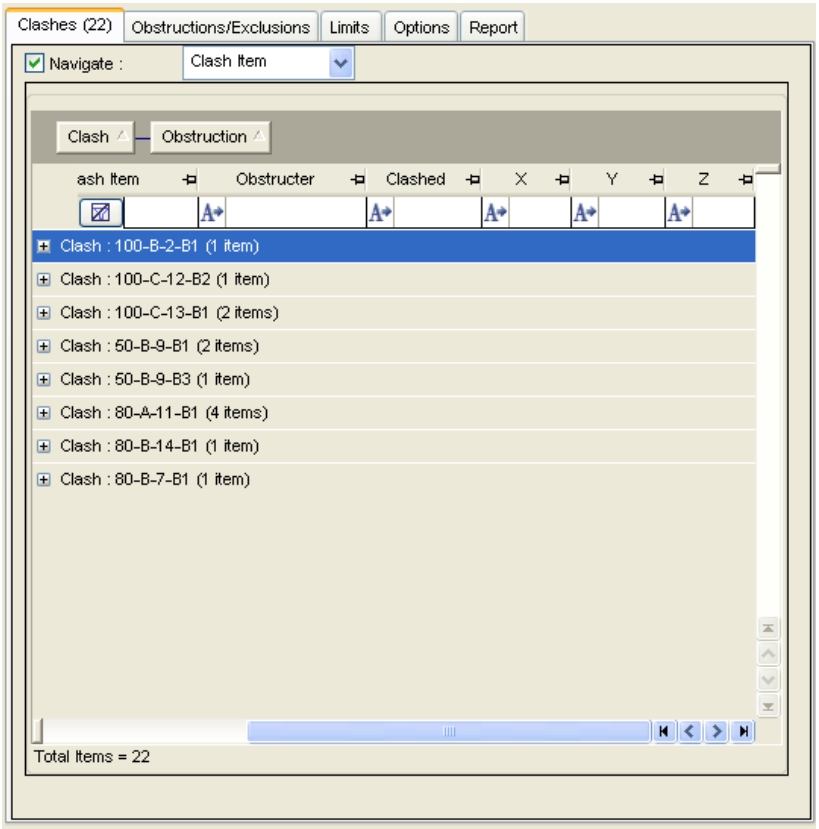

The whole grid can be printed or saved to file by the RH popup menu options:

**Print Preview**
**Save to Excel…**

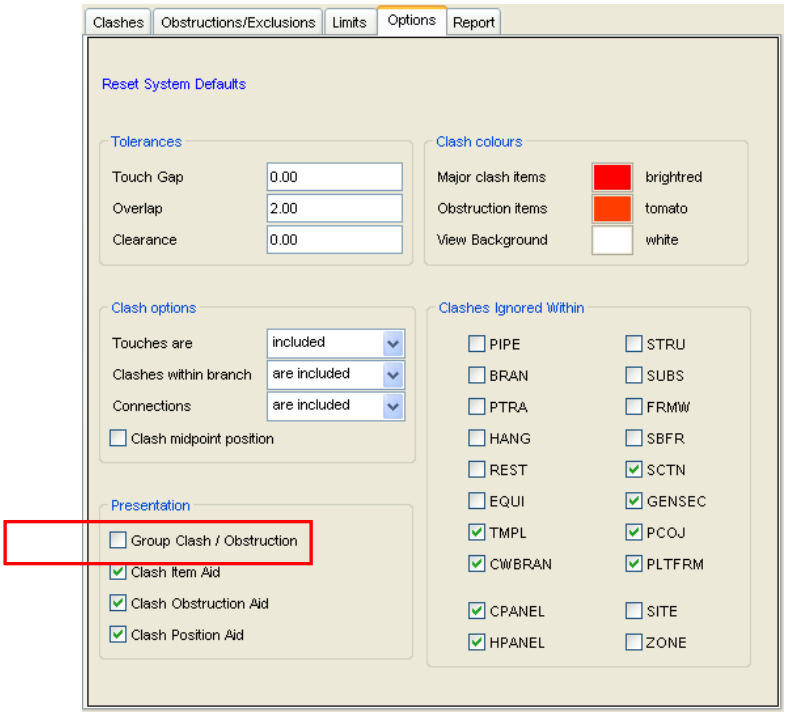
It is necessary to scroll the grid to the right to see all the information about the clash such as Position




There are also columns for the primary element that clashes or obstructs; any column can be dragged in the grid to group rows, for example:

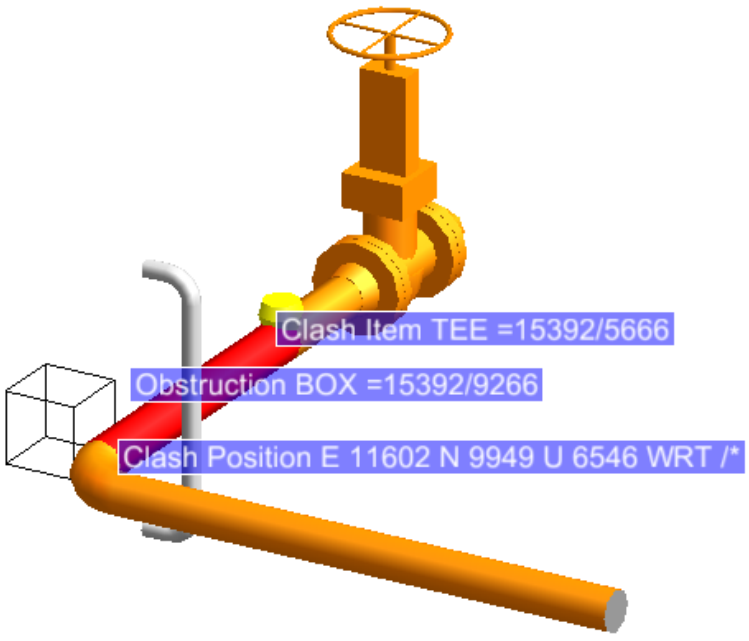


The example groups all clashes per branch and then clashes against the same obstruction. This is a common useful grouping so there is an option to set the default presentation.

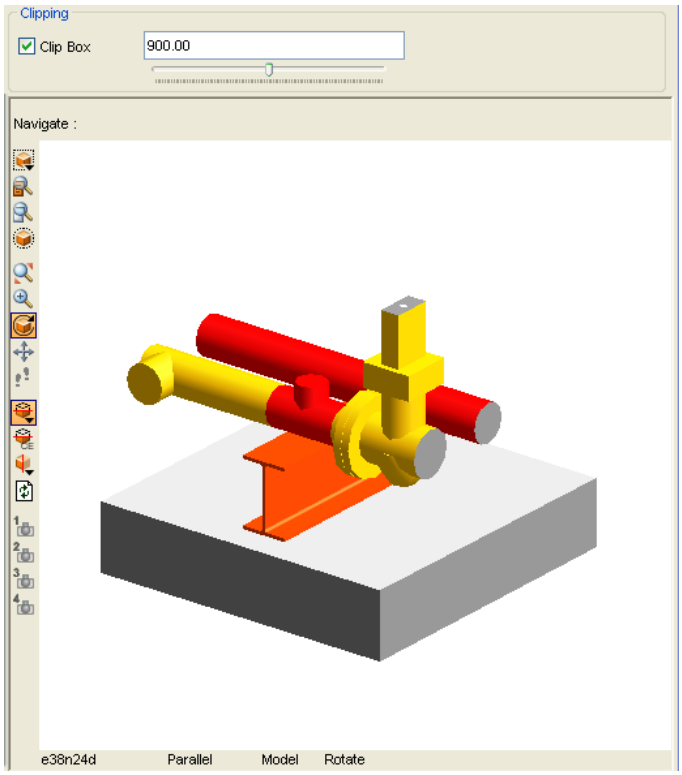



Other options on this panel are covered by the standard DESCLASH defaults.

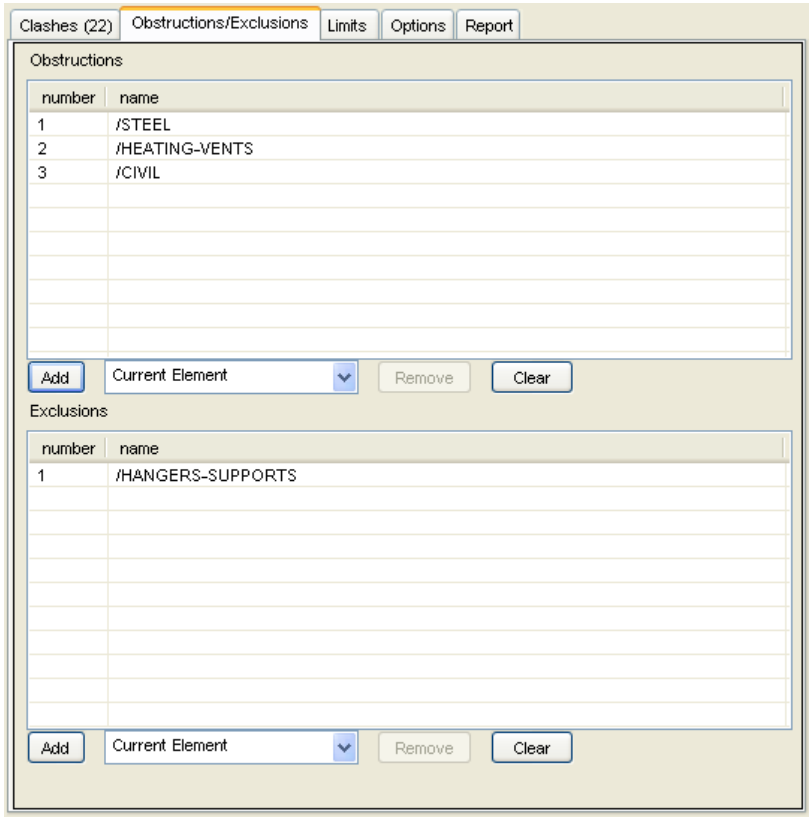
In addition to the DESCLASH options there are various other presentation defaults such as the View background colour and options to display aid constructs to in the 3D view.




By default each clash is displayed in a clipped view; the clip box size can resized by direct input or a slider bar above the view – or clipping can be switched off.




When checking for clashes, the default obstruction is All; this mean that the element is checked for clashes against everything in the MDB. In practice, it is perhaps more realistic to check for clashes against specific obstructions. This is specified in the Obstruction/Exclusions panel:




There are several options to help the user add to these lists:

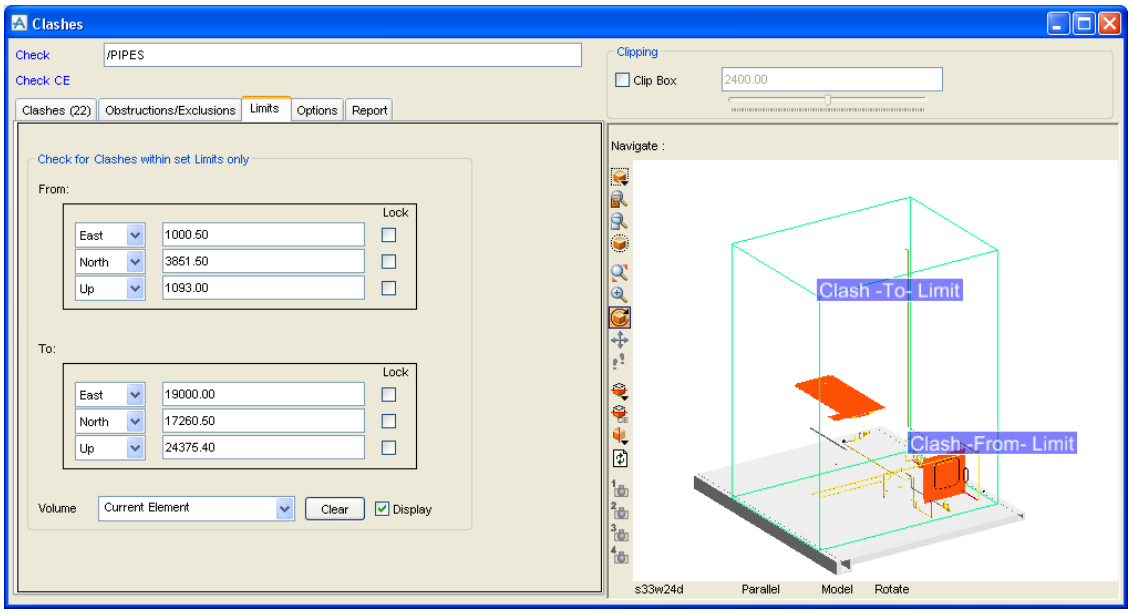
- Current Element

- Pick Element
- Current Selection
- Current List
- All

Remove removes any selected elements and Clear clears the entire list.

The application allows a limits volume to be set so that only clashes within these limits are reported. If all values are zero then there are in effect no limits to the clash check. This can be reset using the Clear button.

The volume box can displayed using the Display option:



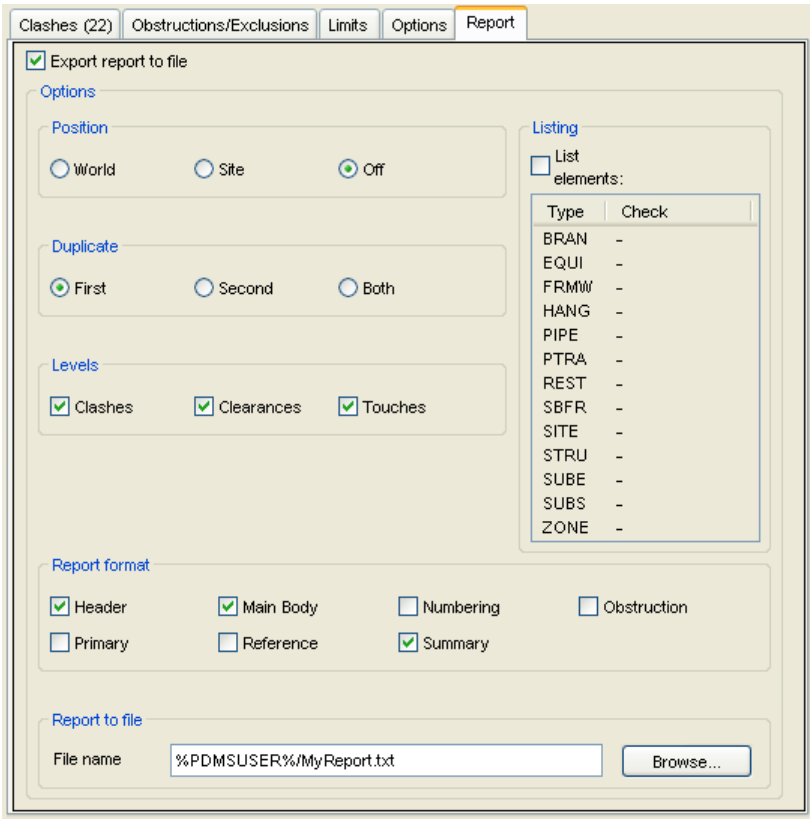

To set limits the Position can be directly input or set using the options:

- Current Element
- Picked Elements
- Defined by 2 Picks
- Current Selection
- Current List

The 3D view has all the expected functionality of a standard 3D view and can be Printed and Saved to file by setting focus to the view and selecting from the View > Print Graphics… and Copy Image options.

### 10.7.1 Reports

If a text report of the clashes is required this can be done by ticking the Export report to file toggle on the Report panel. The report will be written to file each time a Check is performed




**Other Changes to the Application**

- The old Clasher settings forms from Settings>Clasher have been removed
- The old Clasher form is removed but the Menu Utilities Clashes is still the same

# 10.8 AVEVA Nuclear Applications

## 10.8.1 Units

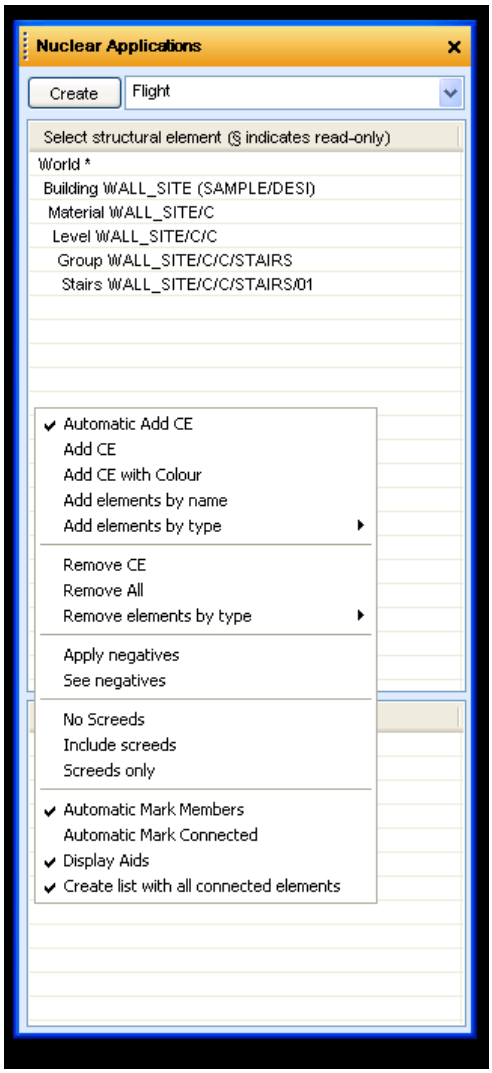
Nuclear Applications allow the administrator to specify units and precision of three distinct types of distance; those used to define stair angles, those used in contour editor and those used elsewhere. If the corresponding files CALCULATE, EDITOR and DISTANCE do not exist, sensible defaults are chosen depending on whether the project is metric or imperial. For volume and surface area calculations, units are in cubic and square metres for metric projects or cubic feet and square feet for imperial projects.

At PDMS 12.1, additional units are added for elevations, densities, volumes and areas. If the corresponding files ELEVATION, DENSITY, VOLUMES and AREAS do not exist, suitable defaults are chosen depending on the type of project.

As elsewhere, units are now shown for values. As different units and precisions are used for different types of distance, this can result in different units being shown on a single form.

## 10.8.2 List of Connected elements

To improve performance in Nuclear Concrete Design, it is now possible to hide the list of connected elements in the main window. This can be changed using the **Create list with all connected elements** toggle at the bottom of the pop-up menu on the main form. The administrator can change the default to hide the list by creating a file called HIDECONNECTED in the concrete-design sub-directory of the project defaults directory.




# 10.9 AVEVA Cable Design

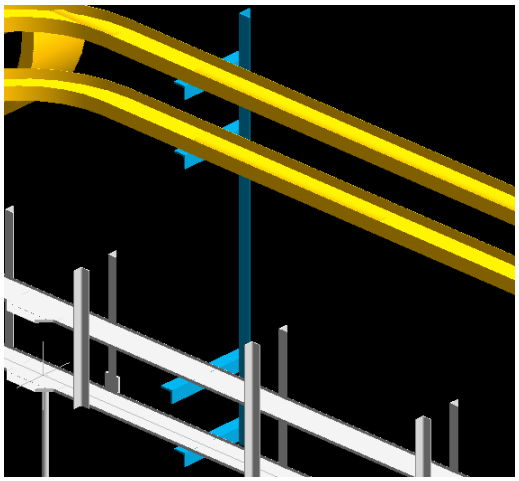
A number of enhancements have been made. Of particular note is a new **Manual Route Cable** 'task' that allows the user manually to create or modify a cable's route between its start and end references. For details, please refer to the *Cable Design User Guide*.

# 10.10 AVEVA Multi-Discipline Supports

## 10.10.1 Cable Tray Supports

MDS can now support the new cable tray CTRAY elements, as used in the Cable Design application. A CTSUPP element is used instead of an ATTA.

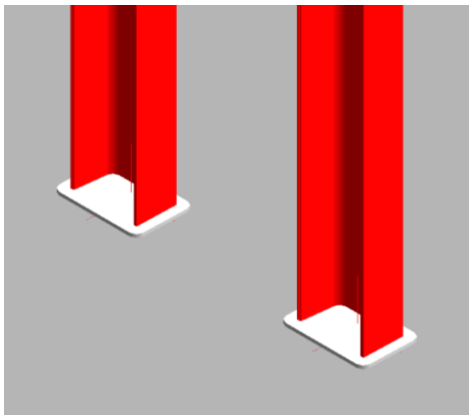
'Old' piping (BRAN) cable trays and CTRAY cable trays can be supported by the same cable tray support using the **Add Rack** function as usual:



### 10.10.2 Automatic generation of pads

There is a new application default to turn the auto generation of pads on or off; the default is on.

If the setting is ‘on’, pads are created when using a cursor based creation method (CURSOR or CLEARANCE) with a PANEL or HPLATE element identified. The section type is checked and a suitably shaped pad chosen, appropriate to the section type. For example, triangular shapes are used for angle and square (rectangular) for flat bar.



A new ‘Modify pad size’ button on the Modify Section form enables the user to change the dimensions of an existing pad.

In Paragon, the default value for the **Automatic Pads** option can be set On or Off in the MDS Admin Data form, under the top bar menu **Modify > MDS Application Defaults**…

### 10.10.3 Updating client project defaults

From time to time new or updated component standards will become available in the MDS catalogue. Where users are maintaining their own application defaults databases, these changes will not be immediately available because they need to be added to the database.

A new upgrade tool allows the MDS administrator to update existing standards or add new ones. This is useful for users upgrading from a previous version of a project or continuing work on a project that uses a copy of a previous version’s MDS/APPDEFAULTS database.

The ‘Check MDS Application Defaults’ tool is a new feature in the Utilities menu of the Paragon module and is available to administrators who belong to team ‘CATADMIN’. For details, please see the *Multi-Discipline Supports Administrator Guide.*

# 11 PDMS Drawing Production

A number of improvements have been made to PDMS DRAFT and its associated applications.

## 11.1 Extended hatch patterns

This development has three components:

- An additional 12 system-defined Fill Styles (or patterns) bringing the total to 30. These cover patterns such as brickwork and concrete and are shown in Fig 8-6 of the updated *DRAFT User Guide*.
- Creation of user-defined Fill-Styles has been enhanced to allow the use of non-solid line-styles. Two new attributes have been added to HPATTErns (see below). These provide values for new Wigwam parameters. As a result, users can create very complicated patterns.
- The existing GUI, allowing users to pick the system-defined Fill Styles, has been extended to include the 12 new ones. This meant the provision of 12 new icon files.

In addition, hatch and fill patterns are now exported to DXF as the appropriate entities rather than lines. See section 11.9.

## 11.2 Line styles

User-defined LineStyle & FillStyle elements have a system-generated Style Number that should be unique within the MDB. These attribute values are automatically created upon element creation. However, if a DRAFT database containing a Style World (STYLWL) is added to an MDB that already has a STYLWL it is possible for duplication of numbers to occur.

At PDMS 12.0, it is the later of the duplicates (in database order within the MDB) that has precedence when a Style of a given number is used. This is opposite to the case of duplicate names where it has always been the first that has precedence.

At PDMS12.1.1, this has been changed to ensure consistency of behaviour between duplicate styles and names. When an MDB contains Styles with duplicate Style Numbers, it is the first (in database order within the MDB) that will be used when that Style Number is used to draw graphical elements.

## 11.3 Line widths

PDMS 12.1 has been enhanced to allow accurate line widths to be output in all output formats. The definitions of the system line-styles are held in the System database and set up in the Admin module, using Line-style Width Definition elements (LSWIDDEFINITION) in a new Line-style World Element (LINESTYLEWORLD).

The upgrade from PDMS 12.0 to 12.1 can do this or PDMS can be left to use its default values. The AVEVA sample projects are provided with this hierarchy and new projects will also be created with it present.

Full details are given in the various Draft User Manuals and the *Administrator User Guide*.

### 11.3.1 System defined line styles

The system line widths of THIN, MEDIUM, and THICK are now configurable in ADMIN using the new line-style hierarchy in the system database.

By default, they have been changed to standard values from the ISO 128 standard, which specifies line widths of: 0.18, 0.25, 0.35, 0.5, 0.7, 1.0, 1.4, & 2.0 mm. The values chosen for THIN, MEDIUM and THICK are: 0.25, 0.35 and 0.7 mm, rather than the former 0.22, 0.5, & 0.7 mm.

The **Minimum pen line width**, formerly set by a gadget on the **Plotting Options** form, no longer appears. This is a parameter of the Plot command and is no longer required as the user has much better control of the widths. A very low value will be treated as the minimum width allowed for the format specified – PDF, DWG, etc. These may vary or have some special meaning.

**Note**: the line width resolution of PDF output is currently controlled by a reference printer, which is either the user's default printer (if there is one) or the user's screen resolution. If the resolution of the said printer is 600dpi, it will not be sufficient to show the difference in width of the example lines on A0. One way to prevent this problem from occurring is to set a default printer with a higher resolution, say 1200 dpi.

### 11.3.2 User defined line styles

User-defined line-styles will no longer be converted to a multiple of 0.2mm. Instead the precise width in mm specified by the user will be transferred directly to the export format.

### 11.3.3 Minimum Line Width

The MINLW parameter is configurable by the user in the DRAFT UI and via the DRAFT PLOT command; it was used to change the value of both THIN and the minimum user-defined line-style width. It applied only to the hardcopy exports (PDF, EMF etc) and did not affect DXF or AVEVA PLOT files.

It is no longer required, as the line-styles are now precisely defined. It has been withdrawn from the UI and the *PDMSUI/dflts/plotter_user_defaults* file where its default value was defined.

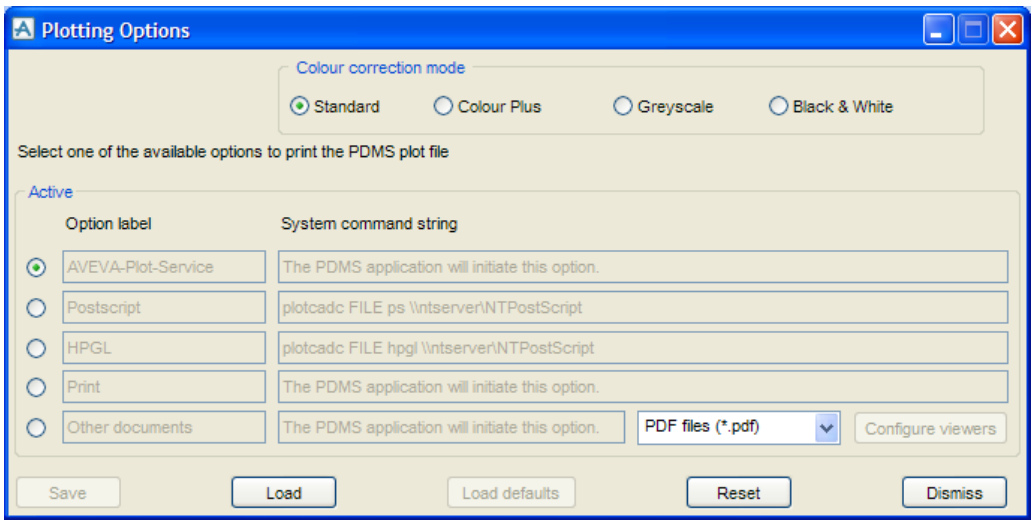
Its use with the PLOT command is deprecated: its value is ignored and a warning given if it is used.

Note that this means that the user no longer has a way to artificially thicken thin lines on a drawing during export. This was introduced at 12.0 and was a side effect of allowing the user to determine the value of THIN line-styles.

### 11.3.4 Plotting user interface

#### DRAFT "Plotting Options" form

The plot utility form, accessed from **Utilities > Plot CE > Plotters**, no longer has the Minimum Line width fields at top left:



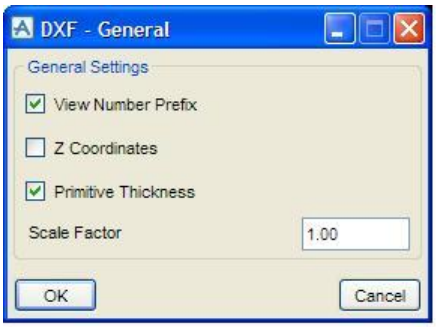

#### DXF – General options

The "Polyline width factor" and "Character encoding" fields have been removed from the DRAFT "DXF - General" form, which is accessed from:

**Utilities > Configurable DXF output > Modify > General**

or in Draft administration mode:

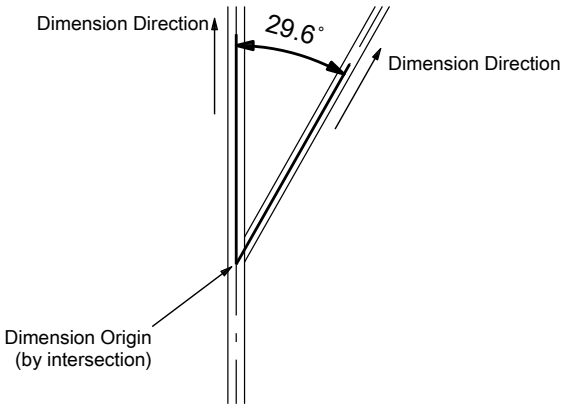
**Settings > DXF configuration settings > General**



# 11.4 Enhanced Angular Dimensions

Angular Dimensions (ADIMs) no longer need to have their origin defined, if it can be deduced from the vectors defined by their first two dimension points. Typically these are directions defined by P-lines but they can also be defined by P-points.

For example, the figure shows an Angular Dimension with its origin defined implicitly by the intersection of the two Dimension directions, which are P-lines of SCTNs.




This Angular Dimension could be created by typing the following commands, starting at Layer level:

| | |
|---|---|
| `NEW ADIM` | Create new Angular Dimension element |
| `FROM DIR IDPL @ TO DIR IDPL @` | Use cursor to pick P-lines defining the first and second Dimension Directions. |
| `DPOS @` | Use cursor to pick a Sheet position through which the Dimension Arc will pass. |

For full details, please refer to the *DRAFT User Guide*, section 12.6 Angular Dimensions, which has been extensively revised.

# 11.5 Enhanced P-line Picking

There is now an option for P-lines to behave in a similar fashion to P-points when creating annotation. If enabled on a View, P-lines appear as the mouse passes over them so that they can be picked. They can of course also be made part of the SCTN's permanently visible representation when required on the drawing.

The number of P-lines drawn thus can be limited by use of their PVIF attribute, as for P-points. Performance for `Update Design` when drawing sections with a large number of P-lines will therefore be improved by making suitable adjustments to the catalogue! Pseudo-attributes PLVIFlag and PLVISibility, equivalent to the PPVIF and PPVIS attributes, are also available.

The behaviour for picking is as previous versions when the new option is 'OFF.

For full details, please refer to the *DRAFT User Guide*.

# 11.6 Improved performance of extrusions

These enhancements are focused on speeding up Extrusions and Panels by improving the handling of their vertices. Vertex (VERT) & Panel Vertex (PAVE) elements have 10 p-points, mostly for dimensioning purposes. Each p-point number has a particular functional position:

| | |
|---|---|
| P0 | Origin of Vertex |
| P1 | Bottom panel face in line with panel vertex |
| P2 | Midway through panel in line with panel vertex |
| P3 | Top panel face in line with panel vertex |
| P4, P6 | Bottom face tangent points (for filleted radius at vertex) |
| P5, P7 | Top face tangent points (for filleted radius at vertex) |
| P8 | Bottom face fillet centre |
| P9 | Top face fillet centre. |

There are two changes to improve performance:

- calculate all the p-point positions in one go when drawing them in Draft
- omit P5 to P9 when the fillet radius is zero, as they are coincident with the first four

# 11.7 Drawing gridlines

Plant Design grids (GRIDSYstem and GRIDAXis elements) may now be added to IDLists, but may not be the sole member of the IDList. They are drawn using the Centreline Style/Colour; their GRIDLNs are considered to be of infinite length and so are extended to the VIEW boundary. AUTO commands ignore these elements when calculating the VSCA, THPOS, and SIZE attributes of a VIEW.

For details, please refer to the *DRAFT User Guide*, section 4.2, 4.3 and 12.9.

# 11.8 Intelligent text handling enhancement

Draft allows all Design and Catalogue database attributes and pseudo-attributes to be used in the annotation of drawings. It is also possible to use attributes of related elements; for example, #SITE gives the name of site owning the referenced element and there are many options for position attributes.

PDMS 12.1 has enhanced handling of the more commonly used position attributes (POS, HPOS, TPOS, APOS, TPOS, NPOS, POSS, POSE, DRPS and DELP). These may be qualified so as to provide only one of the coordinates. For example:

- #POS full 3D position, e.g. W12250 N7890 U3120
- #POSE Easting coordinate only, e.g. E12250, W9675

#POSN, #POSU, #POSX, #POSY, #POSZ are also provided.

Note that the codeword #POSE can have two meanings depending on the context: for SCTNs it means the POSE attribute (Section End Position), in other cases it means the Easting of the POS attribute

For other position attributes, single coordinates can be obtained by using a single index qualifier. For example:

- #GCOFG[2] would give the Northing (Y coordinate) of the Gross Centre of Gravity.

Positions can be output in '+/-' format by appending '+' to the codeword. For example:

- #POS+ would give -12250 +7890 +3120 for the example above

For full details, please refer to Chapter 14 of the *DRAFT User Guide*.

# 11.9 Export to CAD formats

Significant improvements have been made to the export of DXF, DWG and DGN format files from Draft, using the 'configurable' drivers (Draft_XXX_LI).

Recommended AutoCAD versions are 2007-2010, as shown in section 2.9.1. The DXF version used is now AutoCAD 2006, so it cannot be supported in earlier releases. Recommended MicroStation format is now v8. Additional limitations may apply for earlier releases.

For full details of configuration, please refer to the *Draft User Manual.*

## 11.9.1 Support for Unicode text

Drawing export to recent releases of AutoCAD and MicroStation should now cope with all supported languages for which the computer is set up. Full support is not possible for AutoCAD releases before 2007 or for MicroStation DGN v7 format. As noted elsewhere (see section 4.1.3), it is recommended that Latin filenames are used.

## 11.9.2 Improved drawing feature export

These changes should result in a much more usable drawings and, in many cases, smaller file sizes. The main improvements for the 3 formats are:

- User defined Line-styles: defined with PATDEF and PATREP but not PATNAM
- Fill Styles: export in native format hatch entities for all system defined styles 1-30: this includes the new ones (see section 11.1)

The following limitations apply:

- Draft's intelligent blanking primitives are not exported
- User-defined line styles with Glyphs and line pictures are not supported
- Only “built-in” line patterns are supported at present for layer definitions, not the full range of configurable line patterns

### 11.9.3 Configurable DXF & DWG export

Improvements also include:

- Symbols and Logos are exported as Nested Blocks; differentially scaled symbols are supported.
- Overlays and Design Elements are exported as Nested Symbols.
- Ellipse is exported as an entity (AcDbEllipse)
- Layers can be defined and exported – new switches control their use; for example rules can create new layers, set their colour, assign elements to layers by type. However, “colour bylayer” is not used for objects in the DXF/DWG file.
- Text Alignment has been improved

### 11.9.4 Configurable DGN export

Improvements also include:

- Symbols, Backing Sheets, Frame and Logos are exported as cells; differentially scaled symbols are supported. Cells are exported with Tag data attached.

The following limitations apply:

- Although user-defined glyphs and line pictures are ignored, it is possible to specify a MicroStation custom line-style for a given DRAFT pen number.
- Hatching (fill) patterns from HPATTERN19 to HPATTERN30 use a common shared cell definition. For these: Colours, Line weight and Line style will not be set.
- Dimensions are not exported as MicroStation dimensions. However, they may be grouped.

## 11.10 AVEVA Isometric ADP

This add-on application has been completely overhauled for PDMS 12.1. It can now be used for drawing detailed drawings, complete with parts lists, of both HVAC and Cable trays.

It is fully configurable and produces a fully annotated Isometric-style drawing with:

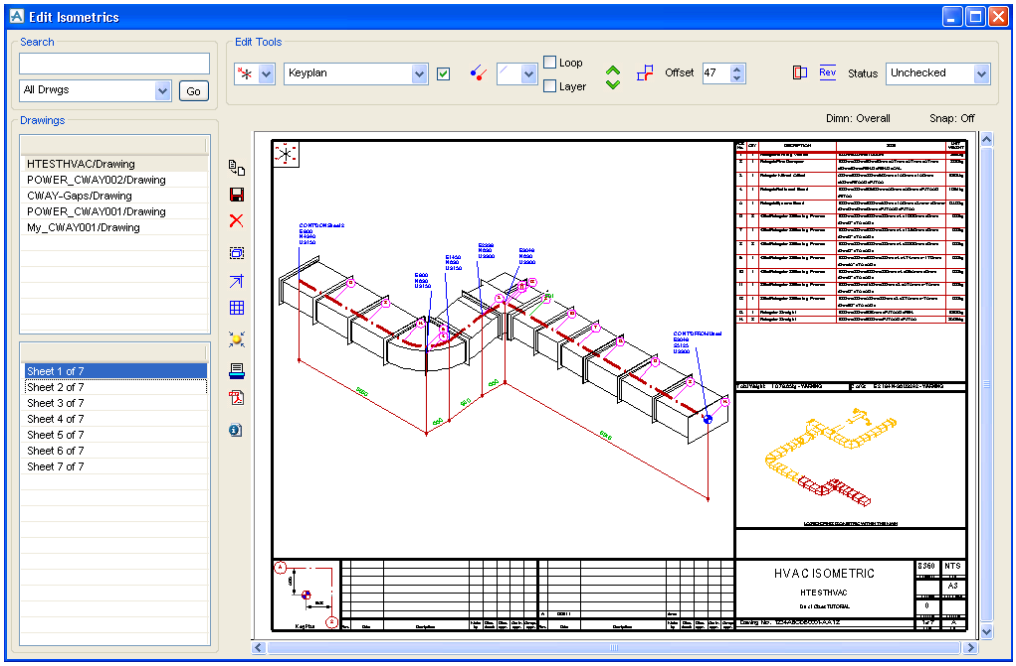
- Dimensioned and labelled Spool
- Material Take-Off Table
- Location Plan of the Spool in the Main
- Keyplan of location to nearest Grid Line
- Revision table
- Total Weight and Centre of Gravity

Drawing output is in PDF format, with Material Take-off to MS Excel. In addition, there is a dedicated Toolbar, Edit tools and a Print Tool for Multiple drawings.

Please note that this new release will not work with earlier versions of PDMS and that many areas are significantly different, including the following;

- HVAC Catalogue upgrades
- Draft Library elements for True-Type Fonts

The appropriate changes have been made to the sample data supplied with PDMS.




For full details, please refer to the updated *Isometric ADP* user documentation:

- *Installation Guide*
- *User Guide*
- *Administration Guide*

# 12 PDMS Piping Isometrics

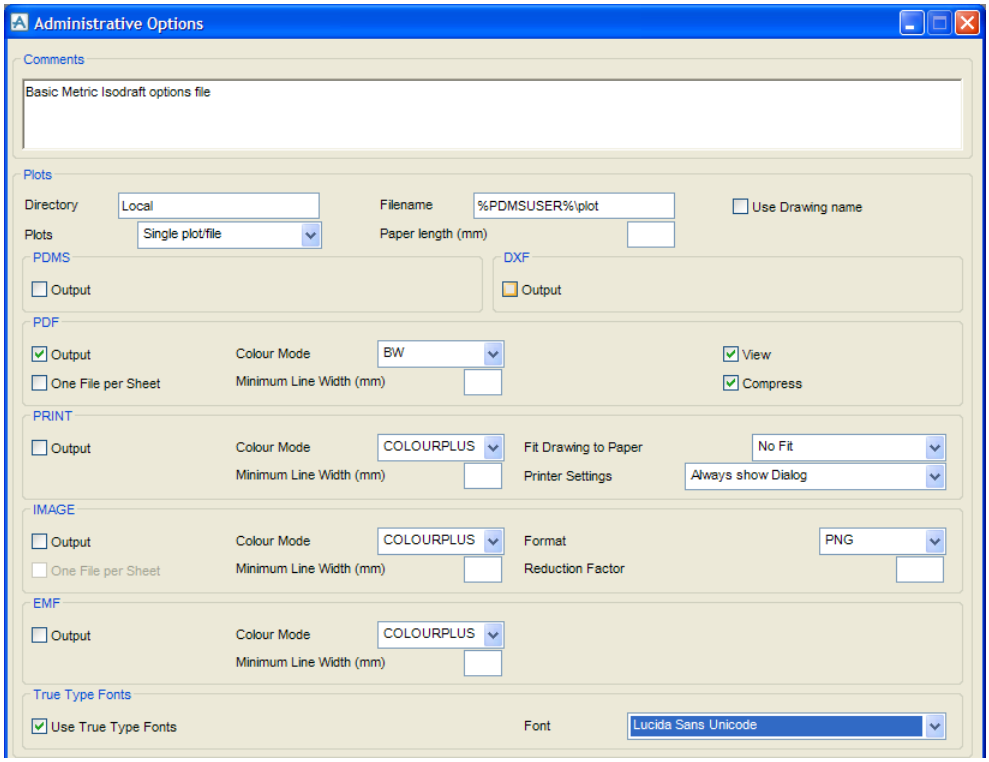
There are several developments in PDMS Isodraft version 12.1. For details, please refer to the updated User and Reference Manuals.

## 12.1 New output file formats, including PDF

Isometrics may now be produced in PDF, Image or EMF (Enhanced Windows Metafile) format. This is achieved through an extension of the FILE command, for example:

```
FILE PDF /filename
```

These formats may also be selected from the Options form:




## 12.2 TrueType fonts

TrueType fonts, as defined in Admin, may now be used on isometrics. The user can select the font type for all the text on the isometric (including material description) by font number, e.g. `TTFONT 5`.

Examples:

| | |
|---|---|
| `TTFONT OFF` | TrueType fonts are not used |
| `TTFONT ON` | Selected TrueType font is used |
| `TTFONT 5` | Times New Roman font as defined in Admin |
| `TTFONT 6` | Arial font as defined in Admin |
| `TTFONT NONE` | TrueType fonts are not defined |

TrueType fonts may also be selected from the Options form – see above.

Note: True type fonts may only be used when isometric output files are to be produced in DXF, PDF, Image or EMF (Enhanced Windows Metafile) format.

# 12.3 Large Coordinates

ISODRAFT can now handle coordinates larger than other limits in PDMS and show them on the isometrics. Its limit is now 2,147,483,647,000 mm (approximately 2 million km) – but please see notes about system limits – section 2.1.4.

It can also display large coordinates, such as those encountered when using coordinates related to a GPS datum, on the iso.

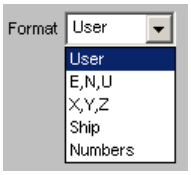
# 12.4 Additional Coordinate Formats

New commands and options on the Annotation Options GUI allow the user to specify format, units and precision for coordinates on the iso:

## 12.4.1 COFORMAT

Selects the format for the coordinates output on isometrics:

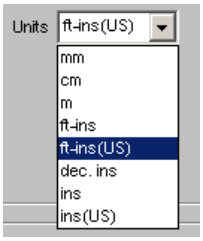
| | |
|---|---|
| **USER** | User-Defined using Alternative Texts (as before) |
| **ENU** | E, N, U format |
| **XYZ** | X, Y, Z coordinates |
| **SHIP** | Ship Reference system |
| **NUMBERS** | Purely numeric |




## 12.4.2 COUNITS

Selects units for the coordinates:

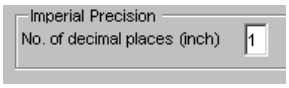
| *Command* | *Units* | *Example* |
|---|---|---|
| **MM** | millimetres | 6263.48 |
| **CM** | centimetres | 626.348cm |
| **METRE** | metres | 6.26348m |
| **FINCH** | feet and inches | 20’6.19/32” |
| **USFINCH** | feet and inches (US style) | 20’-6 19/32” |
| **DECINCH** | decimal inches | 246.59” |
| **INCH** | fractional inches | 246.19/32” |
| **USINCH** | fractional inches (US style) | 246 19/32” |




## 12.4.3 CODECP

Selects the precision (number of decimal places) for **DECINCH** (Imperial decimal) coordinates:

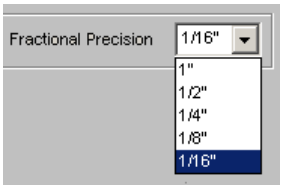
| | |
|---|---|
| 0 | precision to nearest inch |
| 1 | precision to nearest 1/10 inch |




## 12.4.4 COIMPP

Selects the precision for Imperial fractional coordinates:

| | |
|---|---|
| **FINCH** | (feet and inches) |
| **USFINCH** | (feet and inches - US style) |
| **INCH** | (fractional inches) |
| **USINCH** | (fractional inches - US style) |

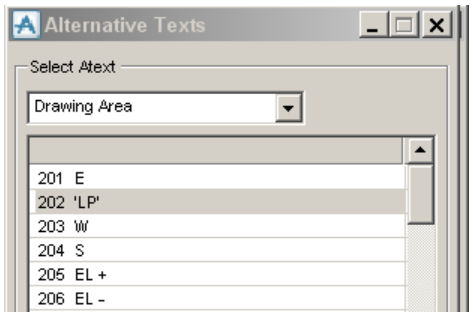



# 12.5 Drawing pipe spool (PSPOOL) elements

This enables isometrics to be drawn of the PSPOOL elements stored in PIPEs under a PSLIST. This is an alternative, used by pipe fabrication checking, to the SPOOL elements in the SPOOLER database.

## 12.6 'North' Arrow Text

The text shown with the 'North' arrow may be changed by means of the Alternative Text ATEXT(202). The default is 'N'; If the User changes ATEXT(202) to 'LP', the symbol will appear as:





## 12.7 Pipe Penetration Seal Symbol

This new user-definable symbol (SKEY CPCF) represents a Penetrating watertight piece modelled using a COUP element – see section 10.5.

This is in addition to the similar user-definable SKEY CPWP used for a Penetrating piece.

For details, please see the *ISODRAFT Reference Manual* section 3.27 Symbol Key Reference Index.

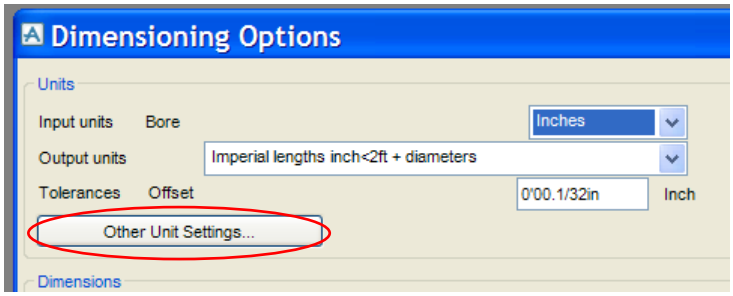
## 12.8 Setting Units in Options files

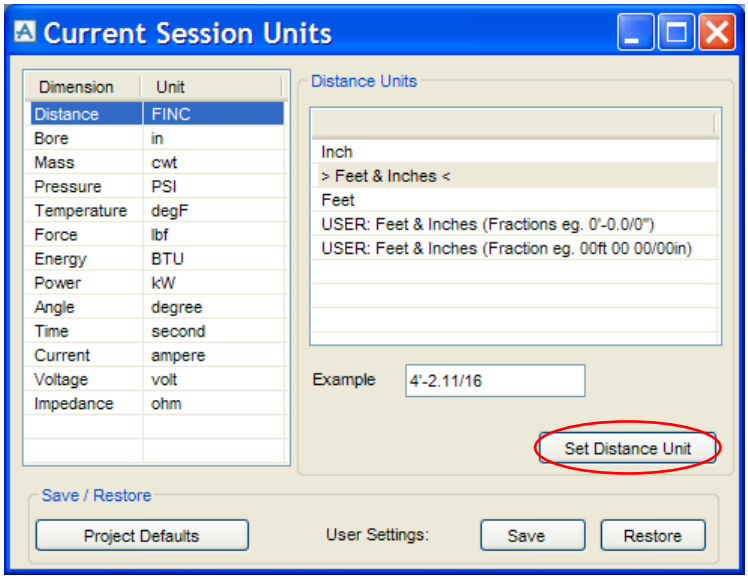
Isodraft loads the current units setting when the user enters the module but has its own units for defining bore and distance on Isometrics; these are built into the individual Isodraft options files. There is no change are to the way that bore and distance units are output but changes have been made to define the units required for some additional items.

Previous versions of Isodraft output units for Weight, Pressure and Temperature; these will be interpreted in current units and converted to the correct output value. For example Pressure is stored in Pascals but the user may require the equivalent in bar on the iso. To ensure this, the options file needs to contain the required output settings.

This is done by adding a block of code for setting units at the end of the options file. Each time an Iso is created, the options file is run as a macro so appending the correct units settings to this will ensure that Isodraft enter the detailing process with the correct units settings loaded. The process of modifying the option file will automatically append the current units so each option file can potentially redefine the current units.

The standard option setting process is to select **Options>Modify** from the main Isodraft menu bar to show the Modify Options form. After selecting an options file to modify, pick **Dimensioning Options.** A new button (**Other Unit Settings**) on this form shows the **Current Session Units** form as in Design:






The units settings can be reset using this form and need to be activated using the **Set … Unit** button.

Clicking OK on the options form will save the current units setting into the current options file. Once an options file has its own units settings, these will be loaded before generating isos or modifying the file.

Notes:

- Until an options file has been modified, the units displayed in the **Current Session Units** form will be the current Design session units as on entry to Isodraft. When an options file has been loaded, the units defined in the options file become current. Existing Options files will have no unit definitions until they have been edited and saved.
- Isodraft does not currently perform any units conversion for UDAs. Isodraft will output them in database units.

# 13 AVEVA Schematic 3D Integrator

Integrator has been extensively updated since its first release at 12.0; some of the developments noted below were first introduced in the Schematics Update Release at 12.0.SP6.8.

## 13.1 New Integrator Object Method

Integrator link information stored on CYMLNK elements consists of references to schematic and 3D elements. It is possible during project execution for these references to become invalid when elements are deleted. A method is provided to clean up CYMLNK elements with invalid references.

```
!!Integrator.ValidateLinks()
```

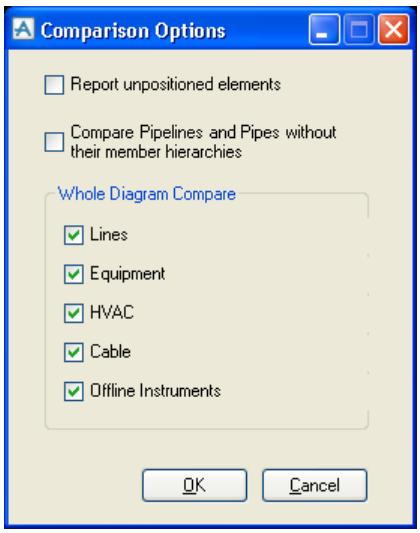
Note: This method should be used only when all of the schematic and design databases, holding elements that have been linked, are current on the MDB.

## 13.2 Electrical connections

When building an equipment with a template, Integrator will try to match schematic electrical connections to 3D electrical connections within the template. It already does this for nozzles which are matched on BORE, but for ELCONNs it now tries to match on CATREF. Details are included in the updated *Integrator User Guide* Section 5.4.1 Building Equipment.

## 13.3 Whole Diagram Compare

The Comparison Options form has been extended with new options. The Whole Diagram Compare options allow you to set which main types will be included in the report for a Compare Diagram operation.

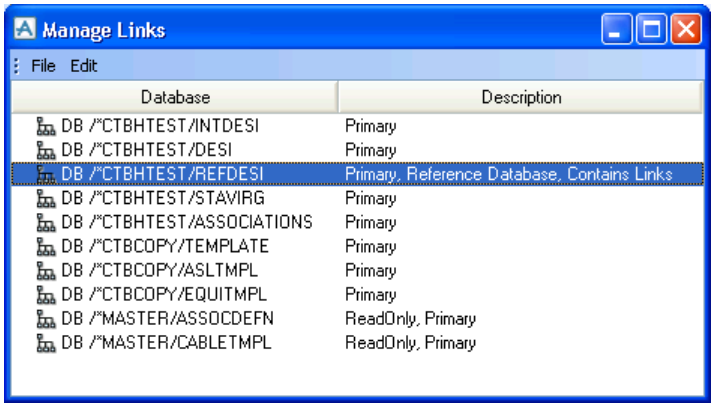



## 13.4 Selector Rules

Quotes are no longer required in selector rules for long STYPs as Integrator will automatically include quotes for text selectors. For example, a rule with `SCSTYP OF source` operating on an *SCVALV* with *SCSTYP PTFE-LINED* will generate `Choose with STYP |PTFE-LINED|`.

# 13.5 Improved Links Administration

Integrator no longer automatically creates a Link World. Project administrators are recommended to create a separate Design Reference database to hold links, and then use the new **Manage Links** dialogue, available from the **Integrator > Settings** menu. This can be used to create and manage Link Worlds in the appropriate database, including consolidating links from separate databases.

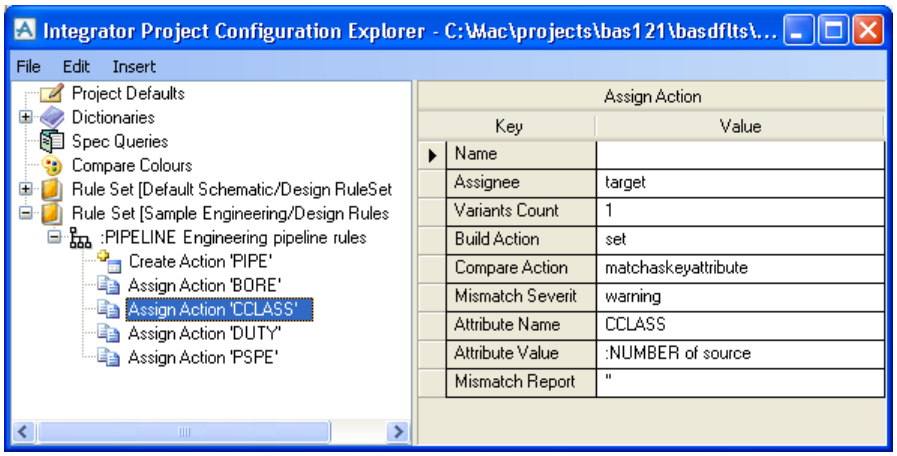



Manage Links is also available with the new Compare/Update Utility.

For More Information, please refer to the *Integrator User Guide* sections 4.7.16, 5.2 and 5.3.

# 13.6 Configuration Rules Extensions

Integrator's Project Configuration Explorer is now shared with the Compare/Update Utility, and so can hold rules for comparing elements between design, schematic and engineering databases. A Rule Set holds all the Rule Groups for a particular pairing of database types. For example, the sample configuration has a default Rule Set for comparing Design database content against Schematic database content. You can add Rule Sets for other combinations of database types, e.g. schematic and engineering, for use with Compare/Update.




Top level Rule Groups now have a source type which is the type of element for which they will be applied (in place of the condition setting type of source).

For More Information, please refer to the *Integrator User Guide* section 6.5.5.

## 13.7 Example Macro

Some users may prefer to use a macro to run the comparison. The example macro below compares all schematic equipment and pipelines that appear on a particular diagram:

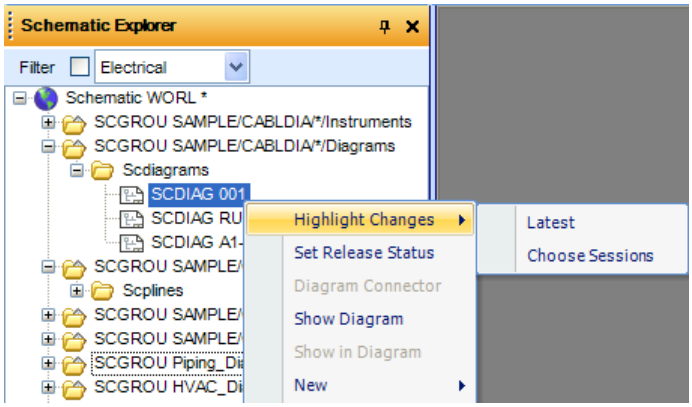
```
-- File: compare macro for user guide.pmlmac

-- Initialise Integrator
!!integratorInit()

-- Collect schematic equipment and pipelines that appear on this drawing
!scgroup = |/Piping_Diagrams|
!sctypes = |SCEQUI SCPLIN|
!diagExp = |name of diaref eq '/A1-51-2003'|
!sccoll = object COLLECTION()
!sccoll.scope(!scgroup.dbref())
!sccoll.types(!sctypes.split())
!sccoll.filter(object expression(!diagExp))
-- Integrator compare method needs array of strings
!comlist = ARRAY()
do !element values !sccoll.results()
  !comlist.append(!element.ref.string())
enddo

-- Set report direct to file and do compare
!!integrator.setreportvisible(false)
!!integrator.setreportpath('c:\mac\compareReport.xml')
if (!comlist.size() gt 0) then
  !!integrator.compare(!comlist)
  handle any
    write !!error.text
  elsehandle none
    -- Write out the compare summary
    !!integratorSupportHandler.printSummary()
    -- View the report unless running in non graphics mode
    if (not istty) then
      !file = object FILE('c:\mac\compareReport.xml')
      if (!file.exists()) then
        !!integrator.openreport()
      endif
    endif
  endhandle
endif
```

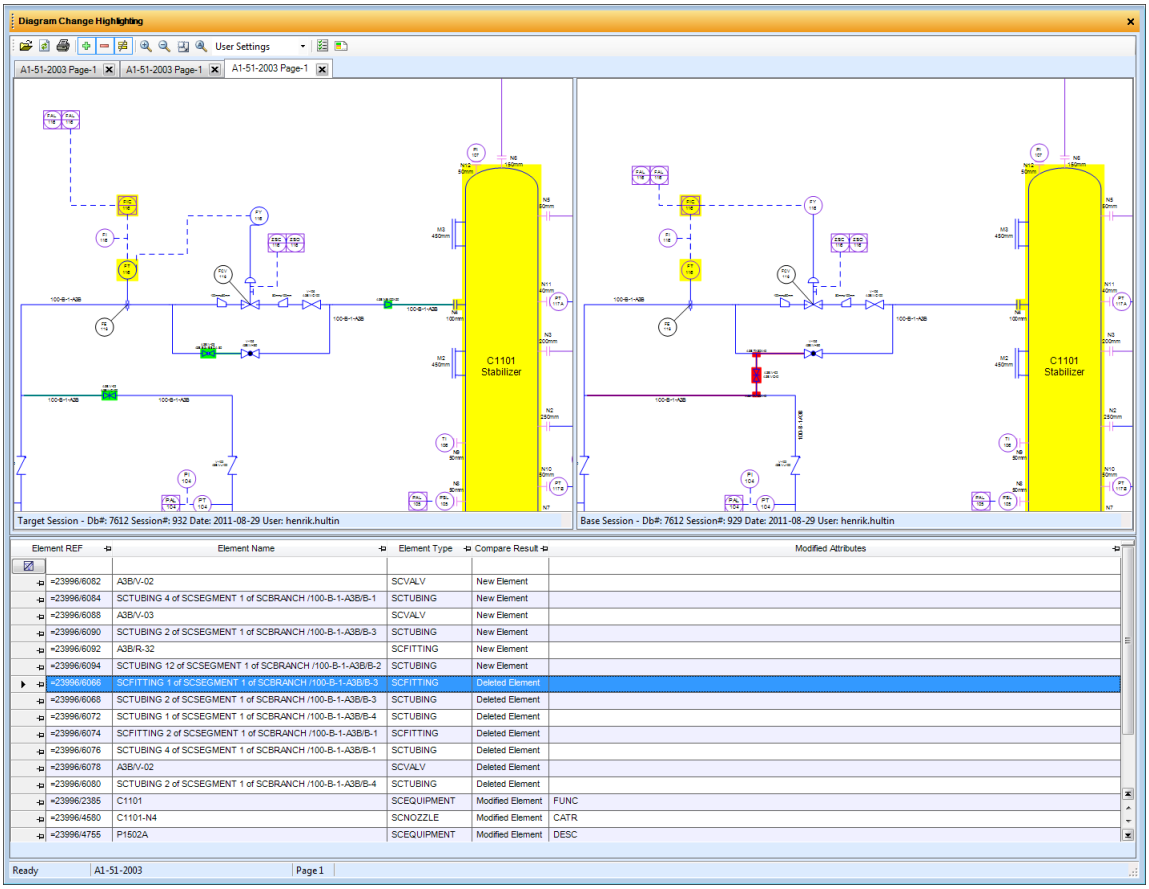
# 14 AVEVA Diagrams

## 14.1 Diagram Change Highlighting

Changes to schematic diagrams can now be highlighted in the Diagrams, Schematic Model Manager and Tags modules, using a new Diagram Change Highlighting add-in. This add-in enables the database changes between two database sessions to be viewed, using the AVEVA SVG Viewer to highlight the changes in colour. It also provides a summary of the changes in the list below the two viewer screens.

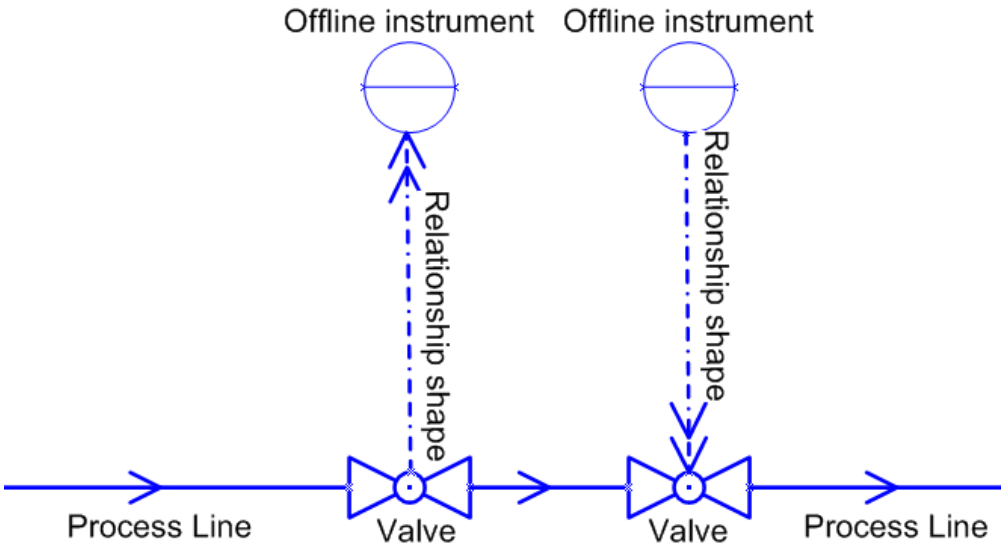
It can be accessed from the context menu of the Schematic Explorer:



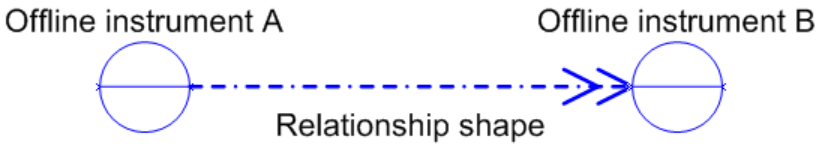
Note: For this function fully to work with the data created by the Diagrams application, it requires that SVG files are created for the relevant sessions. This is affected by the "Keep session files" and "Create SVG on Save Work" settings in Diagrams Options, as well as the possible use of the "Release Diagram to 3D" button. For more information, please see the *Diagrams User Guide*.

## 14.2 Connection between instrument and process items




It is now possible to use Instrument Relationship Shapes to connect Offline instruments or Actuators to any valid process item. The connection point will be created automatically on the shape if connection is possible, so the user will not have to create any additional ones beforehand.

However, connection points on in-line items that were designed for in-line flow connections cannot be used for instrumentation connections.




## 14.3 Automatic upgrade of Options settings files

The Diagrams Options files (DiagramsDefaultSettings.xml and DiagramsAttributePresentation.xml) are now automatically upgraded from previous versions, so that existing project settings can be preserved in the upgrade process while also gaining access to new settings and options introduced in the latest version.

The process of upgrade relies on a proper placement of the file containing the options values from an older version of diagrams. The proper place for the file is described in detail in the Diagrams User Guide, in the Diagrams→Getting Started→Application Settings→Diagrams Options section. The upgrade is fully automatic and executes upon application start. A report of the upgrade process, containing descriptions and locations of the participant files and any problems that might have occurred is available in the Diagrams Message Log.

## 14.4 Admin Settings vs. User Settings

It is now possible for customers to define and set up which settings should be Admin Settings and which settings should be possible for regular users to change.

The administrative set has the same format as the current version of diagrams options store, but is located at a location which is write protected for the user but read/write for administrators.

When an option in the administrative set has a “ro” value of the access attribute (access=“ro”), this option’s value will overwrite the value set in the user’s options store, and the option will be disabled (greyed out) in the Diagrams Options dialogue.

## 14.5 Handling of Units in Annotations

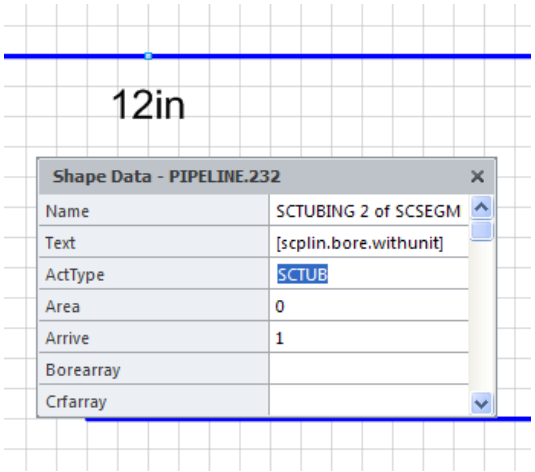
With the release of AVEVA Plant 12.1, some changes and enhancements have been made to the handling of Units (see section 4.2).

In AVEVA Diagrams changes have been made to accommodate the new functionality and to allow presentation of values with or without units in shape text and annotations.

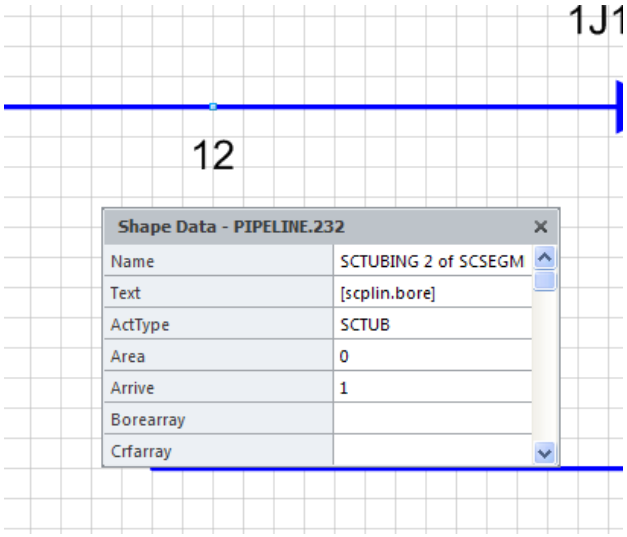
Some attributes with numeric values are now dimensioned and have associated units. For example, attribute PRESS of element of type SCPLIN currently has a dimension of type “pressure” and can have units of pressure (psi, bar, etc.). All attributes that are dimensioned have current session units.

If the current session unit for the dimension of pressure is psi, and the value of the attribute PRESS is 23psi, one can use [scplin.press] to use the value of the attribute in annotation: this will produce the value of the attribute in the current units - “23”. If the units are desired, the “.withunit” keyword can be used - [scplin.press.withunit] will give the result in the annotation text as “23psi”.

The following screenshot shows annotation where the “.withunit” keyword is used:




This shows the same annotation without using the “.withunit” keyword:




For more information, please see the *Diagrams User Guide*.

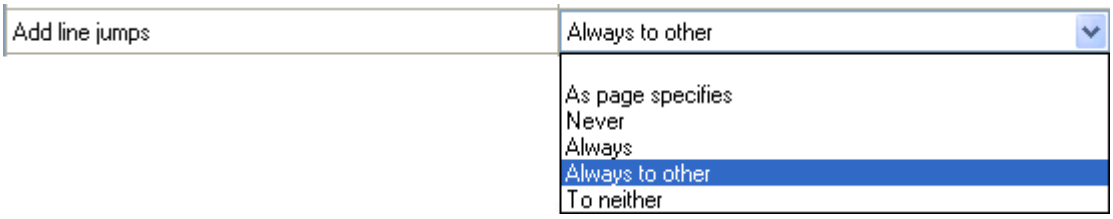
## 14.6 AVEVA NET Gateway

A new "Publish to AVEVA NET" function enables diagrams and their related data to be published to AVEVA NET. Please see the Utilities section of the *Diagrams User Guide* for more information.

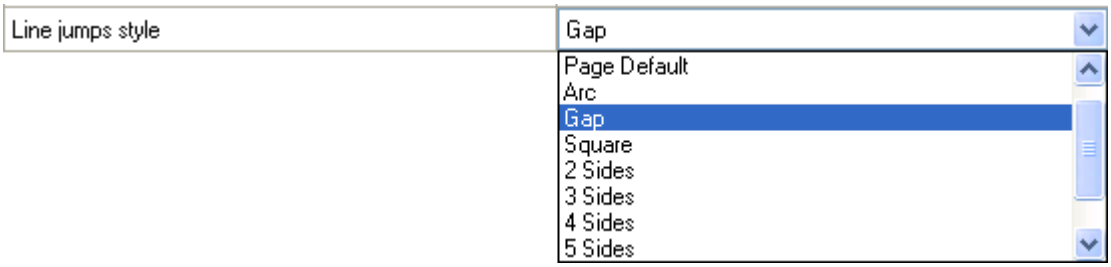

## 14.7 Automatic Line Breaks Depending on Line Priority.

Support for line jumps has been introduced in the Auto Formatting Rules feature. Two new format types have been added on the 'Format to Assign' tab in the 'Auto Formatting Rule Details' window:

- Add line jumps – allows the user to specify the behaviour of the line when crossing another line shape. It can be selected from a list of standard values:




- Line jumps style – allows the user to specify the style of jump if the line is the one which should break. It also can be selected from a list:




The new settings together allow the user to specify the behaviour of crossing lines depending on defined conditions. If the settings are applied properly by rule, the result is visible on the drawing and also appropriate values are shown for particular shapes on the tab in the Visio Format->Behaviour dialog.

See *User Guide:* Diagrams / Working with Diagrams / Auto Formatting Rules

## 14.8 Improved Shape Annotation in Schematic Model Viewer

It is now possible to individually control the shape annotations for the element types in the Schematic Model Viewer. The following settings can now be made using the options dialog in the Schematic Model Viewer:

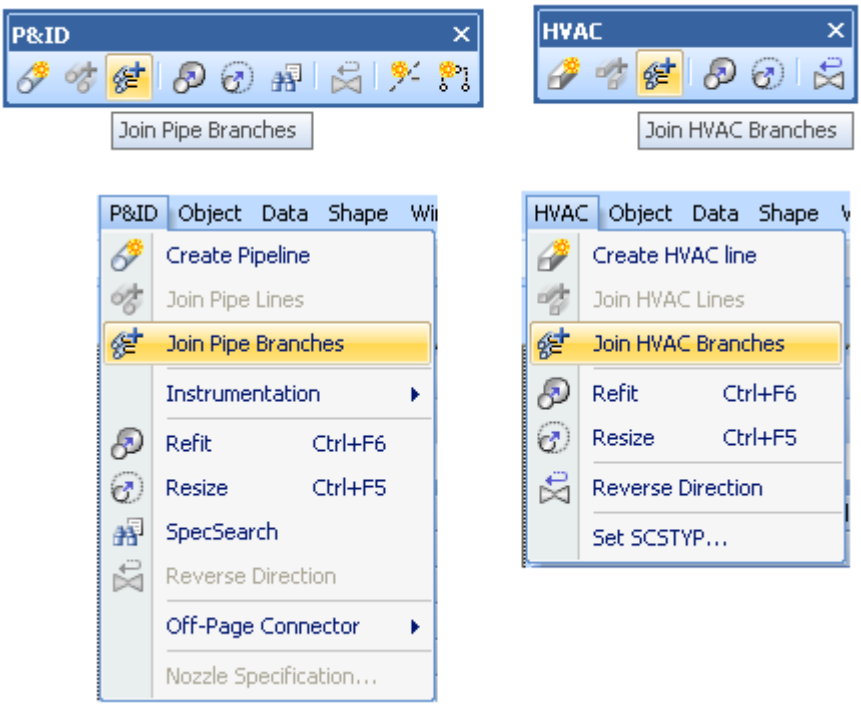
- Display criteria for selection of shapes
- Display text
- Icon (.png file)
- Stencil shape

For More Information, please see *User Guide* Diagrams / Schematic Model Viewer

## 14.9 Split-Merge for SCBRAN

Split-Merge functions for SCBRAN are now available in Diagrams.

To join two branches, please select two valid connectors and execute the Join <LineType> Branch option from toolbars or menus:

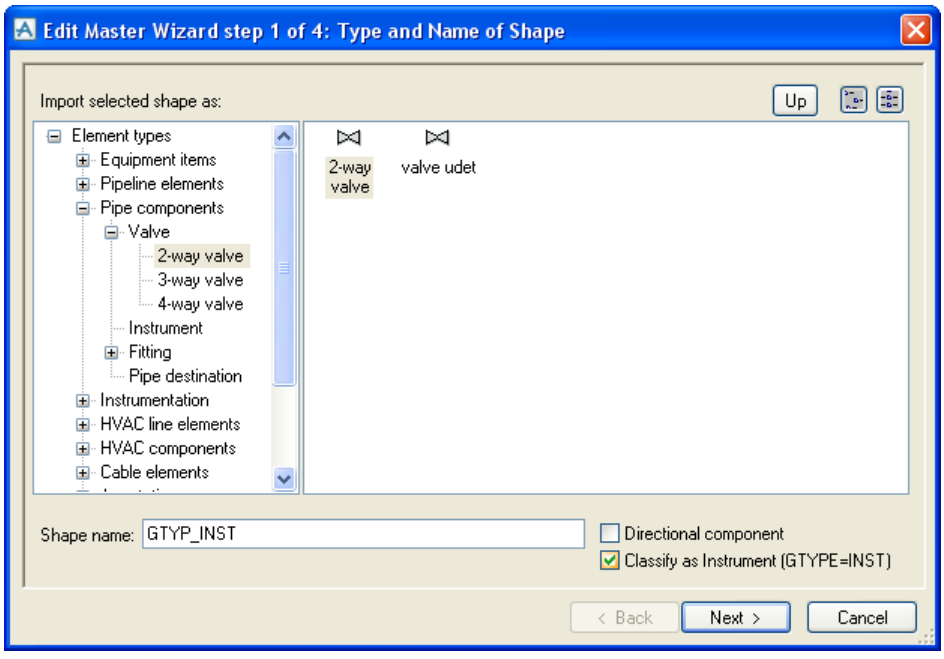



If the join is not possible, the system will notify the user in the System Message log.

To split branches use the 'Branch splitter' symbol; this works in the same way as 'Line splitter'.

## 14.10 Setting SCVALV GTYP to INST rather than VALV

It is now possible to use INST as a GTYP on SCVALV elements instead of VALV, VTWA or VFWA. To achieve this, the master shape must have the 'Classify as Instrument (GTYPE=INST)' option checked on the Edit/Import master dialog.

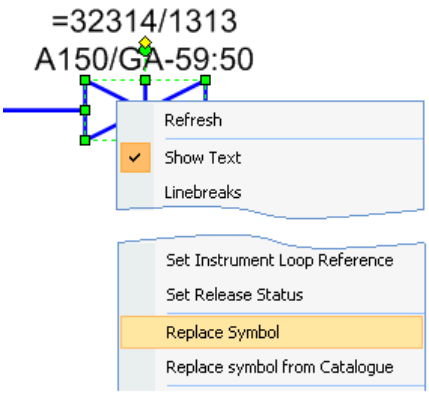


When this option is checked in the master item, all SCVALV's that will be created from this master will have GTYPE set to INST.

## 14.10.1 Changing existing items

### Changes on opened diagram

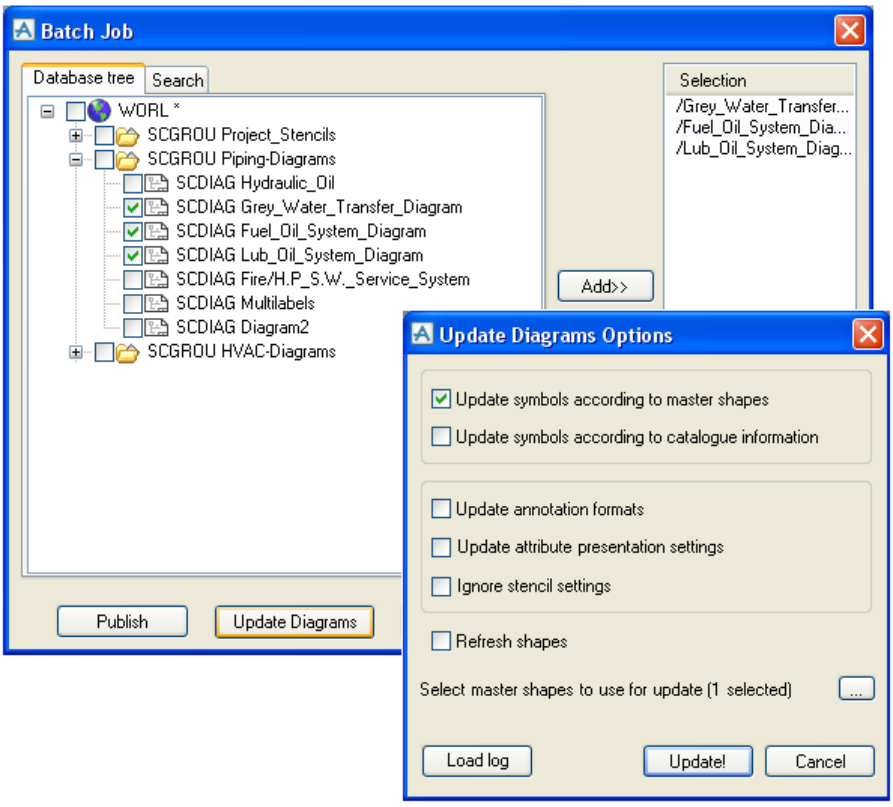
It is possible to change an existing SCVALV GTYP from VALV, VTWA or VFWA to INST using the shape context menu option 'Replace Symbol'.



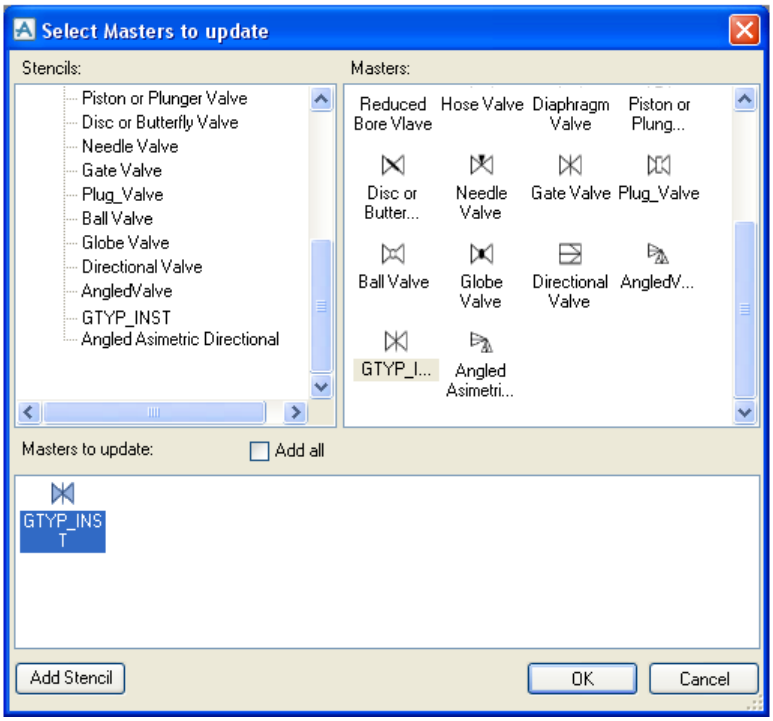

If your current item has a GTYP different to INST and you replace this shape with a master that has the 'Classify as Instrument' option checked, then after shape replace, the system will change GTYP from the existing one to INST and give a warning message in the System Message Log. Of course this can work the opposite way around: the system is also able to change INST GTYP to VALV, VTWA or VFWA.

### Batch changes

In case you want to update all items on all drawings, you can use the 'Update symbols according to master shapes' option from the Batch Job update:



Before using this option you have to modify the masters that were used to create valves by checking/unchecking the 'Classify as Instrument' check box. After that, you need to select it using the dialog below:



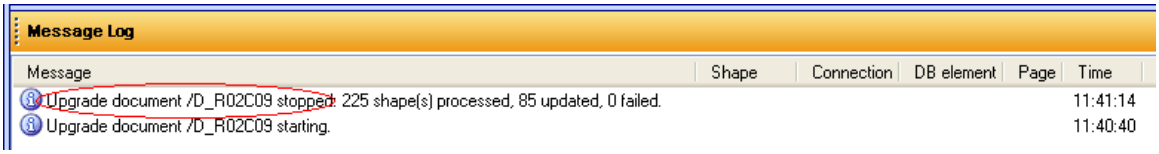

If the system changes the GTYP during this operation, a warning message is displayed in the batch job log. If the GTYP is changed and the existing item has valid a SPRE attribute set, the system will try to find the new specification.

For more information please refer to *User Guide* Diagrams / Utilities / Batch Job.

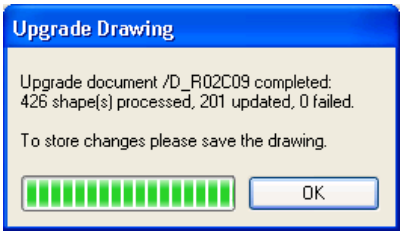
## 14.11 Changes to Upgrade Drawing Function

A progress bar is now shown during 'Upgrade Drawing' and the operation can be safely cancelled:

Appropriate messages are added to the message log on operations start and cancel/finish:




When 'Upgrade Drawing' is called manually from the Tools menu, a status window appears after the operation is completed or was stopped by the user:



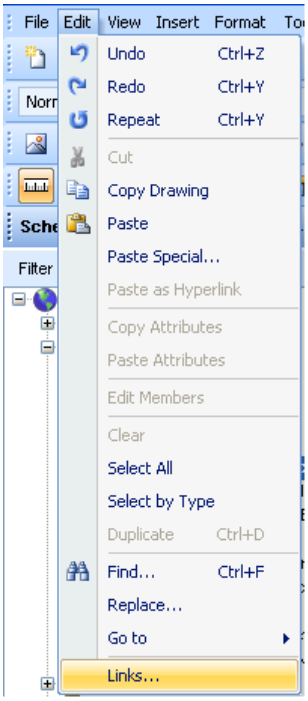

Appropriate warnings also appear in the message log if:

- the 'Upgrade drawing on Open' option is set to false and the user opens a drawing that is not updated to the current product version
- the 'Upgrade drawing on Open' option is set to true but the drawing cannot be opened automatically

## 14.12 Linked Files Update

There are new ways to update linked objects in a diagram.

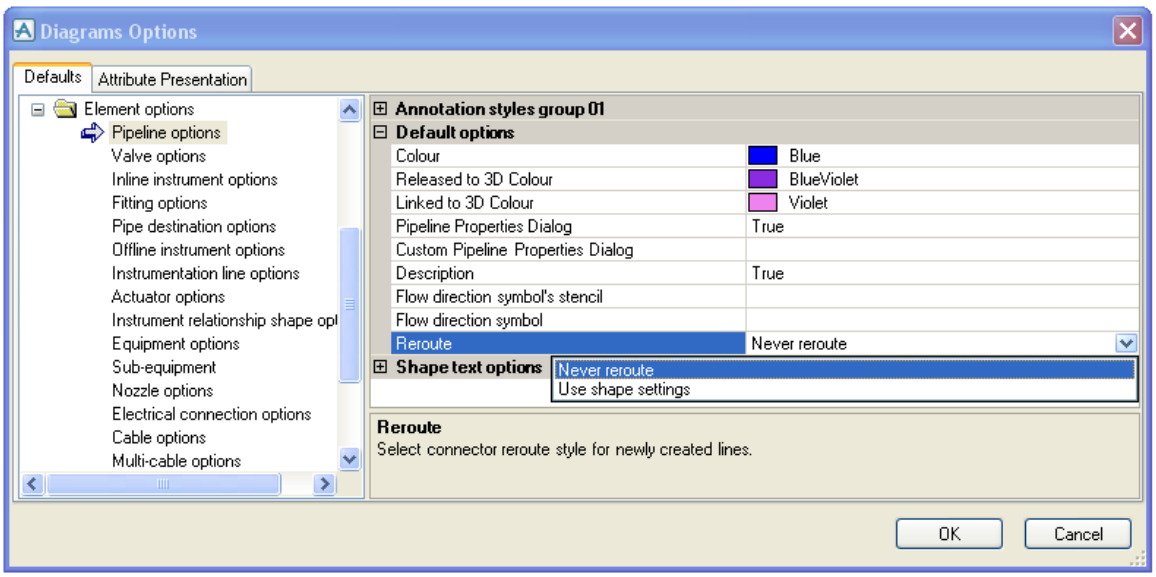
When a drawing that contains linked objects is active, the ‘Links…’ option is active in the ‘Edit’ menu.




There is also an option to ‘Update Diagrams’ in a batch job.

## 14.13 Determine Connector Re-route Style

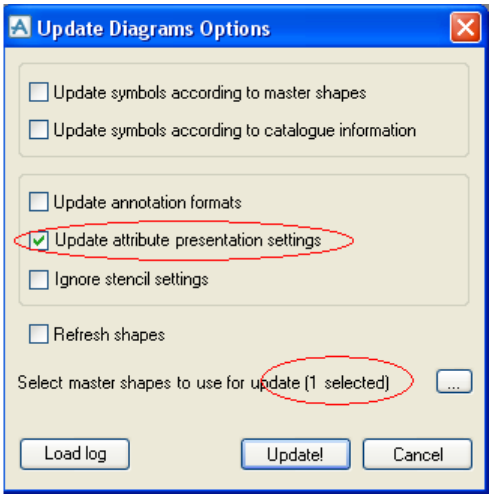
It is now possible to determine a connector re-route style for newly created lines. For HVAC, Pipe and Instrument line types a special option called ‘Reroute’ has been added. This option allows the settings ‘Never reroute’ or ‘Use shape settings’ for newly created connector lines. By default ‘Never reroute’ is selected. In case the ‘Use shape settings’ is selected, Visio decides which setting will be used.



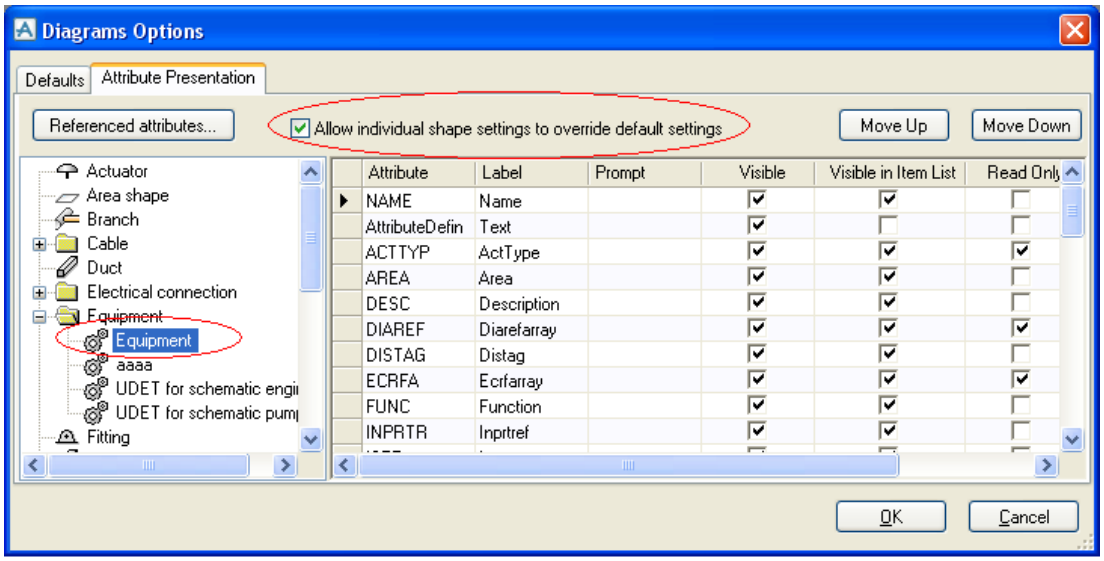

For More Information, Refer to *User Guide* Diagrams / Piping and Instrumentation Diagrams / Adding Parts to a Branch / Dropping and Connecting.

## 14.14 Setting Default Value of Stencil in Batch

To set default values for all items that have been created from particular equipment masters, it is necessary to edit the equipment master and set the default value for the new UDA and then run a Batch Job with 'Update attribute presentation settings' selected. The master that contains the modified data must be selected.




Before starting the batch update, it is important that 'Allow individual shape settings to override default settings' is checked for items that need to be updated.




If this setting is not checked, the default value of the new UDA will instead be taken from 'Session Defaults'.

If the system changes the database attribute, there will be detailed information in the batch job log.

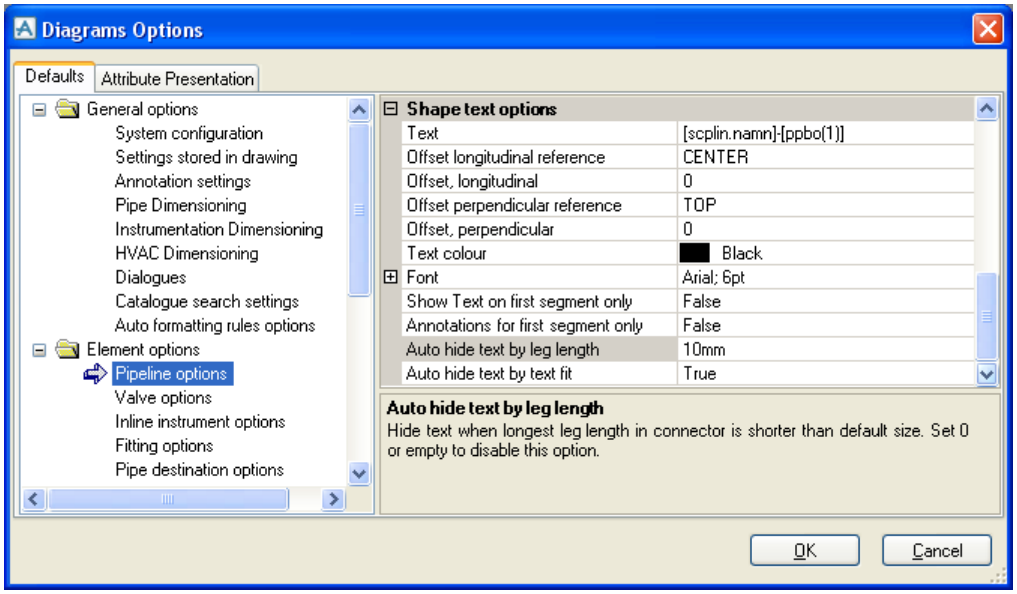
Please note that the system will not set attribute value for items where a UDA was already defined in shape data. If refresh is executed before the update, it will add any missing UDA to shape data with a default value. Then the system detects it and will not set a default value to database.

## 14.15 Auto Hide Option for Shape Text for Short Connectors

Two new options have been introduced to keep diagrams clean where text is displayed on connectors only when some criteria are met. These options are valid for pipelines, instrument lines and HVAC lines.

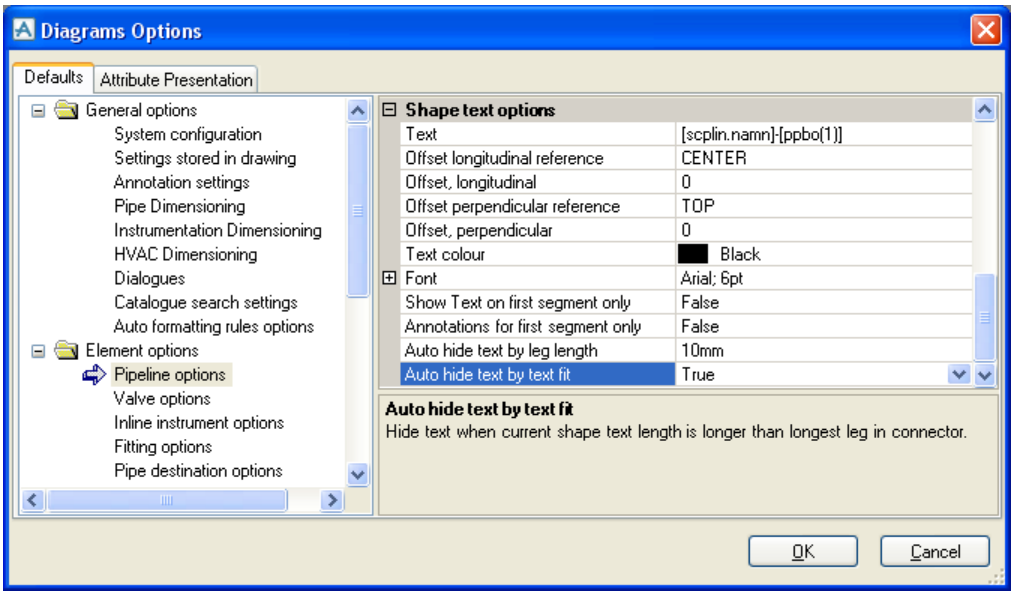
### 14.15.1 Auto hide text by leg length

This option allows the user to set a minimum size for the tallest connector leg where text will be visible. If the tallest leg of a connector is shorter than this default, the text will be hidden and the system will note this in the System Message Log. It is possible to use metric or imperial units for the distance value. To disable this option, set it to 0 or blank.




### 14.15.2 Auto hide text by text fit

This option hides the text on the connector if the tallest leg is shorter than the text that is currently displayed on it. If this happens the system will note this in the System Message Log.




Both options are activated when the connector size is changed. This means that text on connectors will be visible after you set the options and accept changes; to make it work, the connector size must be changed. To enable text that has become invisible because of these options, the ‘Show Text’ option in the Shape Context menu must be ticked.

## 14.16 Miscellaneous minor improvements

A number of further improvements have also been made to Diagrams for this release:

- **Area Shapes DB representation:** A new Database Element Type (SCAREA) to represent Area Shapes has been introduced. This allows data to be stored in the database related with Area Shapes, allowing them, for instance, to represent rooms with related attributes and properties.

- **Consistency Check Improvements:** The Consistency Check function now detects further issues that may exist with the objects on the diagram, such as bad references and inconsistent use of fluid between connected pipelines.
- **Auto Formatting Rules Improvements:** The “Format to Assign” tab in the Rule Details window now includes more options for format type; a number of UI enhancements have also been made to the Auto Formatting Rules windows.
- **Diagram and Page References:** Pseudo attributes that return references to the diagram(s) and page(s) on which objects are shown have now been introduced for further types of objects, for instance inline valves & fittings. This may help integration with other data sources such as Instrumentation.
- **Fixed Shape Text and Label position:** For tube & branch labels on Visio connectors, when the option 'Use Control Handle' is set and the text of a line is positioned using this, the position will be kept when the line is split by inserting a component. For all 2D shapes, there is now a new “Move label with 2D shapes” setting in the Annotations section in Diagrams Options. This allows the user to have labels with a fixed position, for instance Equipment Data Block labels that will not move when the equipment item itself is being moved.

# 15 AVEVA Engineering

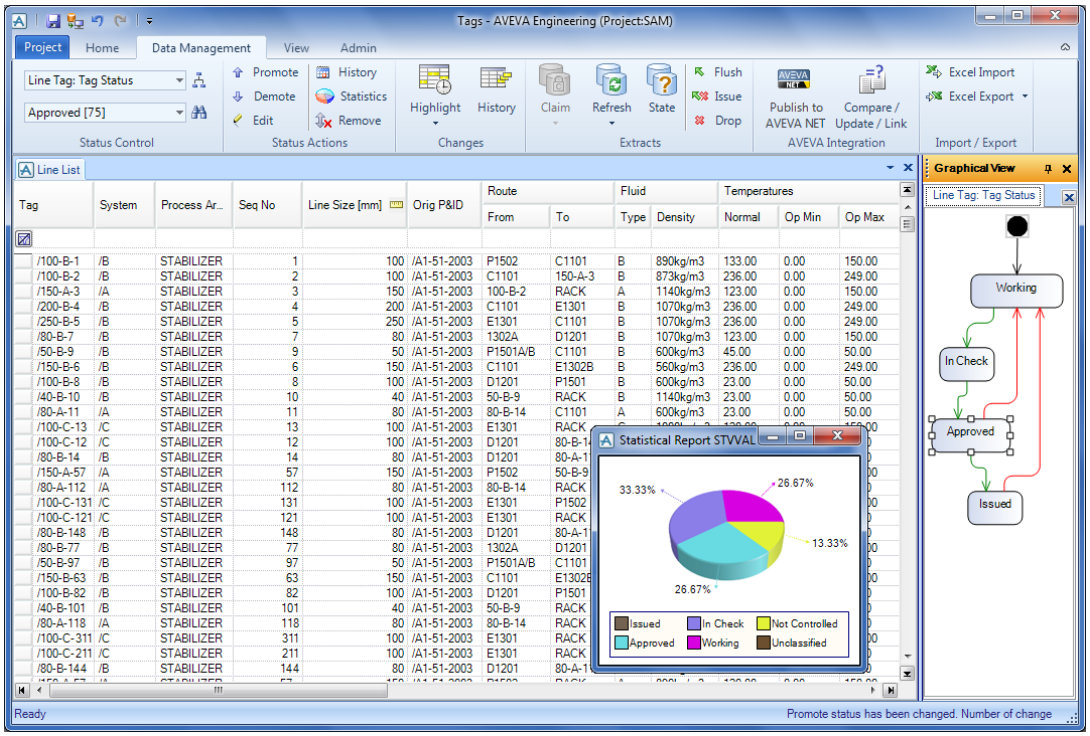
A new AVEVA Engineering product has been introduced with the release of AVEVA Plant and AVEVA Marine 12.1. This new product includes a new Tags module as well as a new ENGIneering Dabacon database type, designed and optimized for Engineering data. The Engineering product also includes Schematic Model Manager, which is no longer sold as a separate product.

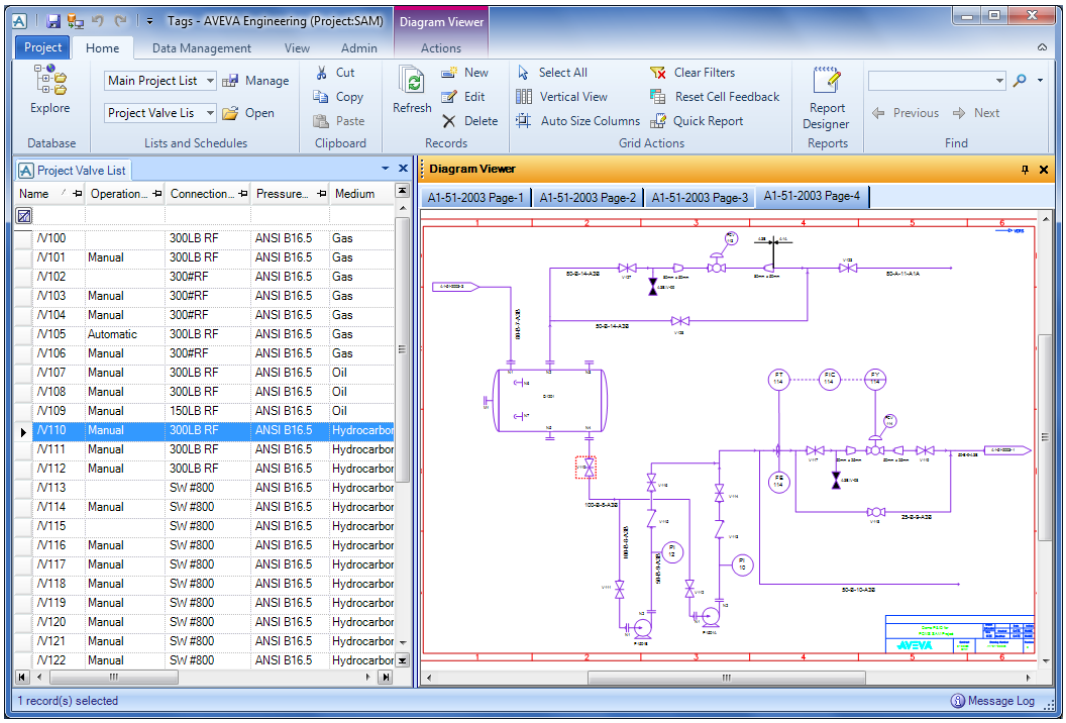
## 15.1 Tags

The new Tags module provides an easy-to-use and powerful user interface for engineering users, allowing them to work on Engineering Lists & Schedules and related data.

Some of the more prominent features and functions of the Tags module are as follows:

- **Easy-to-use User Interface:** Familiar Microsoft Office 2010-like UI. See pictures overleaf.
- **List Editing:** Grid-based editing of list data in the new ENGI database. List views can be set up Project Wide by administrators. It is also possible for regular users to create and use their own specialized layouts. This includes grouping/filtering and bulk editing capabilities.
- **Multi-discipline concurrent engineering:** By using the new Distributed Attributes and Database Views mechanisms, it is possible to allow true parallel work between different disciplines, even on the same object.
- **Navigation:** In addition to the list editing, it is also possible to navigate the engineering or system hierarchy to find and edit individual items.
- **Data Management functions:** A number of management functions such as Status Control, Change Highlighting, Attribute History and Extracts are available to manage the lifecycles of engineering objects.
- **Change Highlighting:** It is possible to highlight and report on changes made by different users and disciplines. This also includes highlighting of changes made in diagrams.
- **Diagram viewer:** A built-in diagram viewer allows users to view and navigate P&IDs and other schematics.
- **Compare & Update:** Engineering data can be compared and updated against a number of other AVEVA sources, such as Schematics, 3D, AVEVA Instrumentation etc. (see Compare/Update). It is also possible to compare individual items of the same kind against each other to find differences.
- **Excel Import/Export:** Engineering data can be imported from external sources and exported to external applications by using Excel Import/Export utilities.
- **AVEVA NET Integration:** Engineering data can be exported to AVEVA NET
- **Reports:** Project-quality formatted reports can be created direct from the Dabacon databases. As Engineering is based on the same platform as the 3D and Schematics tools, it is very easy to combine data from these sources into common reports.




For full details of this important new module, please see the *AVEVA Tags User Guide*.

### 15.1.1 Admin Tab

The Tags module includes a new concept for administration. There is an “Admin” tab in the ribbon bar which is only available for users that are:

- Free users (Like SYSTEM)
- Members of the TAGSADMIN team

Allocating users to the TAGSADMIN team allows superusers or department managers to perform certain admin tasks in Tags / engineering, without them having to be free users.

### 15.1.2 Tag Deletion

In the new Tags module, data for a single tag can be distributed over multiple databases to allow for different disciplines, possibly operating in different locations. For any tag, the data for each discipline is stored on a separate object but presented as if on a single object. It is thus possible to delete a tag but not have access to delete all of the distributed data, and this can result in orphan objects remaining.

The **Delete Tag Orphans.pmlmac** macro (available from AVEVA Support Knowledge Base) can be run in the Tags module to find and delete orphan objects. Please note that all relevant databases should be current before running this macro (it contains a warning). It maintains a log of its results including any errors where it is unable to delete an object. It may need to be run at different locations to tidy up periodically.

# 15.2 Schematic Model Manager

## 15.2.1 Use of units

Schematic Model Manager now uses the new units capabilities rather than its former specific units functions. This means that imported data is automatically converted to the appropriate units chosen for the project. In the Project Options dialogue, the Units tab has been removed.

The specific Units UDAs have been removed from the default file and will no longer be populated on import. Users can choose to use them but will need to set them up as required.

The Attribute Type is no longer needed in the Attribute Mapping file, so has been removed from the Attribute Mapping UI.

## 15.2.2 Units upgrade

Schematic data imported prior to 12.1 must be upgraded. A check is performed automatically on entry to Schematic Model Manager and the user will be warned if an upgrade is required. The upgrade process must be carefully considered by project administrators as it can affect multiple projects and locations. Firstly, schematic data is scanned to identify changes required. Secondly, UDA definitions are updated for the appropriate units. Thirdly, the changes identified are applied to the schematic data.

Please refer to the *Schematic Model Manager User Guide* for full details of this process.

## 15.2.3 Change Highlighting in Diagram

Changes in Diagrams may now be highlighted in Diagrams, Schematic Model Manager and Tags, using a new Diagram Change Highlighting add-in.

Please see section 14.1 in the Diagrams chapter.

# 16 Customisation & PML

Customers who use their own PML applications (appware) should be aware that some of the changes made for 12.1 may affect the operation of these applications. In particular, syntax changes have been made for the better handling of units of measure. Every effort has been made to minimise any disruption but some changes are unavoidable. Further information is given in the *12.0 to 12.1 Upgrade* and *Software Customisation* manuals; this is a summary.

## 16.1 Unicode

The command processor now supports Unicode characters and handling of text strings is almost entirely handled using Unicode. All PML string variables support Unicode values. You can use Unicode characters in PML variable names, PML object form and gadget names, PML method and function names.

It is recommended that PML language files should either be Unicode UTF-8 format with a byte-order-mark (BOM) present or else strictly 7-bit ASCII (basic Latin) format, so that all characters can be reliably transcoded to Unicode. Unicode UTF-16 or UTF-32 encoding (big-endian or little-endian) with BOM is also acceptable. Other formats may contain characters that will not be recognised if the language is set to anything other than Latin.

Filenames and directory names can also contain foreign Unicode characters, but may cause problems in other systems so it is recommended to keep to ASCII names. There are also some known limitations at this release – see section 17.1.1. Please see section 4.1 for general information about the Unicode changes.

It should be noted that textual output is now by default in Unicode. See below.

In spite of these extensive changes, many PML applications should be unaffected. A few exceptions are noted here.

### 16.1.1 Text output

As noted in section 4.1, all sequential text files read by PDMS are by default expected to be in UTF-8 format with a Byte Order Mark (BOM) present to identify them. Similarly by default all sequential text files written by PDMS will be in Unicode UTF-8 format with a BOM present. A simple command line 'transcoder' is also supplied; this may be used in some applications to convert files to a different encoding – see section 16.1.2.

Environment variables are available for users to modify the way PDMS handles sequential text files:

| | |
|---|---|
| *CADC_LANG* | Specifies the file encoding for reading external files which do not have a Unicode BOM present. If the variable is unset, this defaults to LATIN-1. Files with the following Unicode BOMs will be translated to UTF-8 on reading: UTF-16 little-endian, UTF-16 big-endian, UTF-32 little-endian, UTF-32 big-endian. |
| CADC_LANG_NEW | Specifies the file encoding for new files written. If the variable is unset, the default is Unicode UTF-8 format with a BOM present. |

The following encodings are currently supported:

Unicode

| | |
|---|---|
| UTF8 | Unicode UTF-8 |
| UTF16LE | UTF-16 little-endian |
| UTF16BE | UTF-16 big-endian |
| UTF32LE | UTF-32 little-endian |
| UTF32BE | UTF-32 big-endian |

ISO

| | |
|---|---|
| LATIN1 | ISO8859-1 |
| LATIN2 | ISO8859-2 |

LATIN5 ISO8859-5 Cyrillic

Windows code page

| | |
|---|---|
| CP932 | Japanese Shift-JIS |
| CP936 | Simplified Chinese GBK |
| CP949 | Korean |
| CP950 | Traditional Chinese Big5 |
| CP1250 | Central European |
| CP1251 | Cyrillic |
| CP1252 | LATIN-1 + some extras (beware) |

For backwards compatibility with legacy PDMS Projects

| | |
|---|---|
| JAPANESE | Japanese Shift-JIS |
| CHINESE | Simplified Chinese (EUC) |
| KOREAN | Korean (EUC) |
| TCHINESE | Traditional Chinese (used in Taiwan for example) (EUC) |

### 16.1.2 Transc.exe

Transc.exe is a stand-alone executable program, which is used to convert files between different character encodings. It may be used, for example, to convert the default UTF-8 output format to a local format, which may be useful if third party systems do not support Unicode. Care must obviously be taken to ensure that all characters are available in the target encoding!

Details of the command line arguments may be found using the command:

```
Transc -h
```

or

```
Transc -?
```

A list of available encoding names or code pages is available using:

```
Transc -l
```

### 16.1.3 Removal of $X escape sequences

The use of Unicode means that the Command Processor $X escape facility ($X+, $X- and $X) is not necessary in order to enter Cyrillic, Hungarian and West European special characters etc. These escape sequences, which were used for 8-bit (non-Unicode) characters, are no longer supported.

### 16.1.4 Use of @ character

It is no longer necessary to use $@ to get the '@' character into a text string in the command line. $@ is still supported for backwards compatibility.

### 16.1.5 Deprecation of STRING object methods

The built in STRING object methods DLength, DMatch and DSubstring are no longer necessary and may be removed in a future release. You should now use the equivalent methods Length, Match and Substring.

## 16.2 Forms & Menus

The use since PDMS 11.6 of variably spaced fonts improves the look of the PML form and menus interface but has given rise to some layout problems. Many other new facilities have improved the possible intelligence of the PML GUI, and this release brings a further enhancement aimed at making form layout simpler and better. We have removed the need to supply tag width and the widget size specification where explicit text is used to define the gadget.

Forms & Menus (F&M) uses a system font to provide the character representations on any forms, gadgets and menus. This system font has variable width characters (referred to as VarChars), so different characters have different widths. A notional character width (usually the width of upper-case X) provides a rough guide to the width of a text string as (number of characters X notional width).

The recommended system font Arial Unicode MS supports many of the World's character sets, so forms can be designed to use non-English characters, and even to mix different languages on the same form. In order to achieve this PML and F&M now use the Unicode standard as their internal character format.

## 16.2.1 Variable character width based Form Layout

The release supports two layout modes, namely FixChars and VarChars.

FixChars is the old layout mode (prior to version 12.1), which is based on the use of notional character width to calculate the (approximate) sizes of textual gadgets and gadget tags. Because the calculated sizes are only approximate, the user has to make frequent use of the gadget's Width specifier and TagWidth specifier and considerable trial and error to achieve a desired layout.

VarChars is a new layout mode, which is based on measuring precise string widths. It is better suited to the use of variably spaced fonts, and removes the need for most uses of the TagWidth specifier. The benefits of using VarChars are:

- It tends to produce smaller, more pleasing forms, without unwanted space.
- No text wrap-around, except possibly in conjunction with TagWidth.
- No truncation of explicitly defined text except possibly in conjunction with TagWidth.

The recommended layout mode for all new forms is

```
setup form !!formname . . . VarChars
```

The current default layout mode is FixChars, as this will probably be the least disruptive for existing user Appware, so FixChars mode will currently result from either of

```
setup form !!formname . . .
setup form !!formname . . . FixChars
```

The VarChars mode has several benefits, which are explained below.

### Relaxation of Text Width specification requirement

All gadgets support an optional explicit width specifier for the displayed Tag and for the interactive Widget, to allow greater alignment flexibility. However it is unwieldy for the user to always have to specify the tag width and the widget size if the textual content is also being provided explicitly and the user is not trying to achieve alignment of a set of gadgets.

### Gadget tags

For gadgets with integral tag text (option, combo, toggle, rtoggle, text, numeric input) when the tag text is specified but the TagWidth specifier is NOT, i.e. the user is not trying to create a specific layout for alignment purposes, then the precise tag width is calculated for the current gadget's current font and used to size the gadget.

Note that for other gadgets with tag text displayed as a title (frame, textpane etc.), the tag text width is calculated precisely to remove the over-sizing or under-sizing which happens in previous releases.

### Paragraph TEXT specifier

In a similar way to the gadget tag, the paragraph gadget's optional TEXT specifier will determine the paragraph width precisely if the optional Width attribute is not provided. If Width is provided then it will override the TEXT specification.

### Button text

Similarly for the button gadget, if the tag text is specified but the Width attribute is not, then it will precisely determine the gadget width. If Width is provided then it will override any tag text.

## 16.2.2 Possible disadvantages of Variable Character layout

This is not an upwards compatible change, so there are bound to be forms which will look less satisfactory. Forms which have avoided alignment by space-padding (e.g. by using TagWidth and Width) should not be adversely affected. There may be some overall reduction in form width.

Padding of text with spaces to achieve alignment of a set of gadgets will no longer work (note, this was not recommended anyway).

Some uses of Align Right may fail with the message “Attempt to place gadget off limits of form”, because the relative sizes of the aligned gadgets will have changed.

### 16.2.3 Future change to VarChars as default

The intention is to change the default layout mode to be VarChars at a subsequent release. The effect of this will be that:

```
setup form !!formname . . .
```

will result in VarChars mode. FixChars mode will then have to be explicitly specified for each form.

In order to help prepare for this change, the FMSYS object has been enhanced to allow users to set the required default layout mode, and query the current default layout mode.

```
!!FMSYS.SetDefaultFormLayout(layout is STRING)
!!FMSYS.DefaultFormLayout( ) is STRING
```

This can be used to help evaluate any existing Appware to determine which forms need layout adjustment.

For example: `!!FMSYS.SetDefaultFormLayout('VarChars')` causes any forms (without a VarChars or FixChars keyword) which are loaded and shown to use the VarChars mode. If you kill and re-show a previously shown (unqualified) form, it will have the new layout, so it is easy to compare the difference.

`!!FMSYS.SetDefaultFormLayout('FixChars')` will return the default to FixChars.

In VarChars mode, forms which have avoided alignment by space-padding (e.g. by using TagWidth and Width) should not be adversely affected. There may be some overall reduction in form width.

Possible problems are noted above in section 16.2.2. Minimal adjustment could be made by adding the FixChars keyword to restore the old presentation, but a layout revamp would obviously be better.

## 16.3 STRING Object Enhancements

New methods have been introduced:

| Methods | Result | Purpose |
|---|---|---|
| EQNoCase( STRING ) | **BOOLEAN** | Compare equal ignoring case, with given string. |
| isLetters( ) | **BOOLEAN** | String is a contiguous string of letters only. This includes the letter characters from any Unicode supported language. |
| isDigits() | **BOOLEAN** | String is a contiguous string of decimal digits only. This includes the digit characters from any Unicode supported language. |
| Digits() | **REAL** | If String contains decimal digits only, then return the positive value represented, else return value -1.0. This handles the digit characters from any Unicode supported language. |
| isLettersAndDigits( ) | **BOOLEAN** | String is a contiguous string of letters and decimal digits only. This includes the letters and digits characters from any Unicode supported language. |

#### Compare strings ignoring case

Examples:

```
-- Create STRING object
!str = 'Русский'
```

```
-- Compare it ignoring case with another string
q var !str.eqNoCase('рУсСЛий')
<BOOLEAN> FALSE
-- Compare it ignoring case with mixed case version of itself
q var !str.eqNoCase('рУсСКИй')
<BOOLEAN> TRUE
```

Notes:

The new construct `if( !this.attrib.eqNoCase('Name') )` is more efficient than comparisons of the form `if( !this.attrib.upcase() eq 'NAME' )` particularly when the check fails. It is also more reliable because it doesn't matter what is the case of the value checked against.

It may be worth revisiting such checks in the Appware and replacing them with the new construction as this could fix undiagnosed defects and improve performance!

### Is string letters only?

Example:

```
-- Create STRING object
!strlet = 'Русский北方'
q var !strlet.isLetters()
<BOOLEAN> TRUE
```

### Is string digits only?

Example:

```
-- Create STRING object, with Bengali digits for 1 and 2
!strdgts = '১২34'
q var !strdgts.isDigits()
<BOOLEAN> TRUE
```

### Get value of digits only string

Example:

```
!val = !strdgts.Digits()
q var !val
<REAL> 1234
```

### Is string letters and digits only?

Example:

```
!strmix= !strlet + !strdgts
q var !strmix.isLettersAndDigits()
<BOOLEAN> TRUE
q var !strmix.isLetters()
<BOOLEAN> FALSE
q var !strmix.Digits()
<REAL> -1
q var !strlet.isLettersAndDigits()
<BOOLEAN> TRUE
q var !strdgts.isLettersAndDigits()
<BOOLEAN> TRUE
```

# 16.4 Gadget Enhancements

## 16.4.1 Gadget background colour enhancements

The Textpane gadget can now have its background colour modified using the gadget Background property and method.

Gadget background colour for gadget types Button, Slider, Paragraph and Textpane can now be reset to the default (which will be different for different kinds of forms) by setting the gadget Background property to zero.

### 16.4.2 COMBOBOX: SetDisplayText method

It is now possible to set the display text field value programmatically, as well as being able to read it.

| Methods | Result | Purpose |
|---|---|---|
| SetDisplayText( STRING text ) | **NO RESULT** | Set the display text field value, if the gadget is editable. |

### 16.4.3 TEXTPANE: force fixed width font

The Textpane gadget definition has a new keyword 'FixChars' to force the use of a fixed width font. This allows it to be used to show simple reports laid out using the <space> character.

The chosen font is ***Courier New*** (TrueType), because it has a reasonable selection of character glyphs (nowhere near as extensive as the default variable width font ***Arial Unicode MS***).

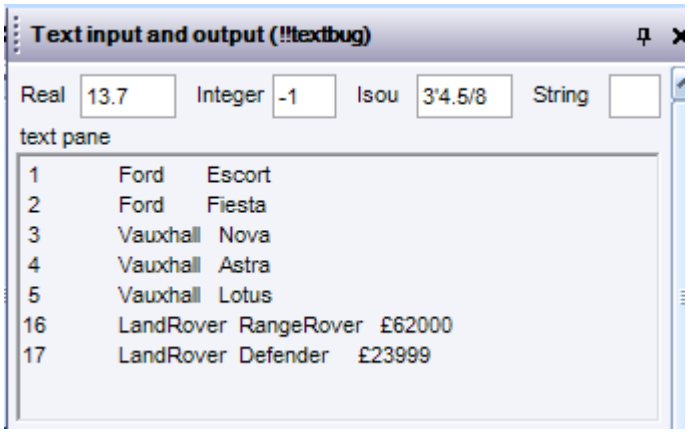
```
                        .--------<--------.
                       /                  |
>-- TEXTPane gname --+-- tagtext---------|
                     +-- <fganch> -------|
                     +-- <fgdock> -------|
                     +-- <fgpos> --------|
                     +-- FIXCHARS -------|
                     +-- CORE -----------* Core managed gadget
                     '-- <vshap> --->
```

#### Example

```
SETUP FORM !!textbug  dialog dock right NoAlign VarChars
   TITLE |Text input and output (!!textbug)|
. . .
   -- Text pane ------------------------------------------------------------
   Path down
   hdist 1
   vdist 0.1
   --Default: variable spaced font
   textpane .tp1 |text pane| at xmin form anchor l+r+t wid 43 hei 9
. . .
define method .initialise()
  -- initialise on show
  -- add data into textpane
    !s[1] = | 1     Ford       Escort|
    !s[2] = | 2     Ford       Fiesta|
    !s[3] = | 3     Vauxhall   Nova|
    !s[4] = | 4     Vauxhall   Astra|
    !s[5] = | 5     Vauxhall   Lotus|
    !s[6] = |16     LandRover  RangeRover   £62000|
    !s[7] = |17     LandRover  Defender     £23999|
  !this.tp1.val = !s
. . .
```

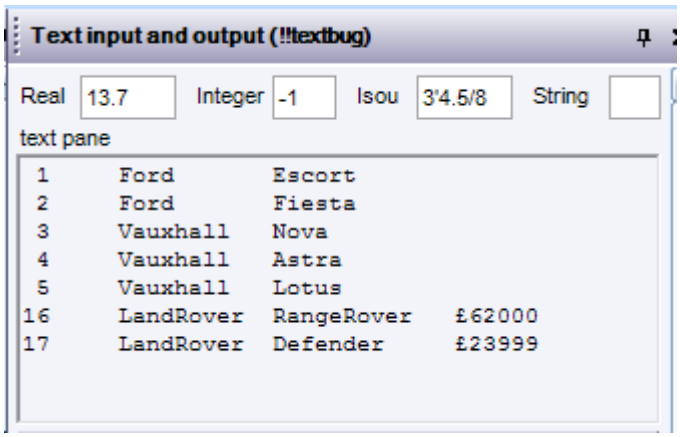
*See over for results:*

### Variable spaced font




### Fixed space font

```
--Force fixed spacing font
textpane .tp1 |text pane| at xmin form anchor l+r+t FixChars wid 43 hei 9
```



# 16.5 Units

This section describes the impact of the 12.1 Units development on PML code, and describes PML functions provided to handle common operations with units in 12.1. It should be noted that units can be set to NUMERIC for any physical dimension, which prevents any conversion; this will behave in much the same way as previous releases but will lose most of the benefits of the new functions.

## 16.5.1 Querying & Units

In order to understand how the Units changes affect PML code, the PML writer needs to understand how REAL numbers and PML expressions behave. This section illustrates the use of new units functions in 12.1 with a few simple command line examples.

Look at the effect of setting MASS units, using mass unit qualifiers (kg), and using new methods available on REAL objects. Notice that the real variables !m and !p know that they represent a MASS, and that the value stored in the variable !p is automatically converted from kilograms to the current working unit:.

```
!unitObject = object unit('kg')
!massObject = object measure('mass')
!massObject.setunits(!unitObject)
!m = 1kg
Q VAR !m
<REAL> 1kg
Q VAR !m.string()
<STRING> '1kg'
$P $!m
1kg
Q VAR !m.units()
<UNIT> kilogram
Q VAR !m.dimension()
<MEASURE> Mass

-- Now look at the value 1 kg with current working MASS units set to Pounds
!unitObject = object unit('pound')
!massObject.setunits(!unitObject)
!p = 1kg
Q VAR !p
<REAL> 2.204622621848781b
Q VAR !p.string()
<STRING> '2.204622621848781b'
Q VAR !p.units()
<UNIT> pound
```

Go to a BOX element in the database to see area and volume units being derived from PML calculations:

```
q var !!ce.xlen
<REAL> 510mm
!area = !!ce.xlen * !!ce.ylen
!volume = !area * !!ce.zlen
q var !area !volume
<REAL> 102000mm2
<REAL> 23460000mm3
q var !!ce.gvol
<REAL> 23460000mm3
Q VAR !area.units() !area.dimension()
<UNIT> mm2
<MEASURE> Area
```

Go to a SCTN element with a MATREF set to see a compound unit derived from mass and distance:

```
UNITS METRE DIST
q var !!ce.gweight
<REAL> 17.794kg
```

```
q var !!ce.cutlength
<REAL> 0.774996172710133metre
!unitWeight = !!ce.gweight / !!ce.cutlength
q var !unitWeight
<REAL> 22.959536446628kg/m
Q VAR !unitWeight.units() !unitWeight.dimension()
<UNIT> kg/m
<MEASURE> UnitMass
```

### 16.5.2 Distance Units

Existing PML code has had to solve problems with distance units; most of it allows correct presentation in both metric and imperial distance units. Unfortunately, the techniques used are varied and scattered throughout the code.

New distance units can cause problems in this existing PML code, most of which assumes that the only metric measure of distance is millimetres. Current metric distance units can now be set to other measures such as centimetres or metres, and imperial distance units can be set to decimal feet or yards. There are many core functions and a few database attributes that require all values to be specified in millimetres (the database storage unit for distance). PML code has to protect users working with imperial distances from these core issues by switching units to MM, interacting with core, and then switching back to saved working units. Old techniques used for switching units do not work with the new distance units.

It is now necessary for PML code to protect users working in centimetres or metres from core functions and data that work only in millimetres. One of the most revealing tests that you can do is to use your PML application with the current distance units set to centimetres or metres. This is more likely to fail than using imperial units.

### 16.5.3 Area and Volume

Area and volume units are new at 12.1. Before 12.1, PML code had to convert the result of an area or volume query (i.e. NSRF or NVOL) to the required units. This is now done by the core so no unit conversion calculations are necessary in PML. This means that all such code needs to be replaced to avoid the conversion being done twice.

### 16.5.4 New Dimensions

Many values stored in PDMS databases had no physical dimension associated with them in previous versions; they were treated as purely numeric. This includes angles, mass, pressure, density, temperature and the electrical quantities added at PDMS 12.0 for the Cable Design.

The system assumes that all such values that were previously undimensioned are stored in database units, e.g. Degrees Centigrade for temperature, Pascal for pressure, kg for mass. However, there is nothing to prevent users from storing these properties in other units. We know that some US customers have stored temperature in Fahrenheit and mass in pounds, and may even have stored mixed unit values for the same dimension in the same Project (e.g. some temperatures in Fahrenheit and others in Celsius). This is likely to cause problems when upgrading from PDMS 12.0 and earlier versions to 12.1.

Values retrieved from temperature, pressure, mass, density and angle fields in the database will now be converted into the current working units for that dimension.

### 16.5.5 Angles

The database unit for angle properties is degrees. At 12.1 it is possible to set the current angle units to Radians or Gradians. This can cause problems if an angle is tested against literal values such as 90, 180 etc. If the current working angle unit is not degrees, this will give the wrong result.

The current recommendation is to disallow users from setting the current angle unit to any unit other than degrees, but allow users to specify any angle unit in PML Format objects for presentation.

### 16.5.6 Design and Catalogue Parameters

Parameters may be set to real numbers (dimensioned or undimensioned) or to a WORD; they may be set individually or as a block. There has always been an issue when setting the whole block if a user wishes to

use a WORD that is also a units keyword, such as FEET. Now that there are more units keywords, it is recommended that PML sets parameters individually, which removes any ambiguity. For example,

```
PARAM 200 200 FEE BWD
```

is interpreted as:

```
PARAM 200 60960mm BWD
```

So it is simpler to use the syntax:

```
PARAM NUM 1 200
PARAM NUM 2 200
PARAM NUM 3 FEE
PARAM NUM 4 BWD
```

Dimensions of Design and Catalogue parameters have not been stored in previous versions. Even parameters representing a distance could only be identified when accessed using a DIST data property in a Dataset. Parameter dimensions can now be specified when they are updated in the database, but there is no requirement to force users to upgrade all parameters. This means that when directly accessing a parameter value (not using a DATA Property), the result returned could be an undimensioned REAL value, assumed to be in database units corresponding to the dimension of the parameter, or it could be a dimensioned value in the current working units for that dimension. A PML UNIT object is provided to help deal with this issue – see 16.5.16 below.

### 16.5.7 Rounding Values

There may be places in the PML code where values are rounded up, down or to the nearest integer value. For imperial distances, some code rounds to the nearest 1/32nd inch. This is done in various ways, e.g. using int() and nint() functions, using FORMAT objects with the .DP property set to 0 or .DENOMINATOR property set to 32, or by using the Real object .string('D0') function. This is dangerous where the code incorrectly assumes that the current value is in MM.

The following code would probably have an undesired result.

```
UNITS METRES DIST
!distance = 123.45678mm
!displayedDistance = !distance.string('D0')
```

or

```
!displayedDistance = !distance.int().string()
```

The result would be

```
<STRING> '0'
```

and not

```
123mm or 0.123 metres
```

### 16.5.8 Testing for Metric or Imperial Distance and Bore Units

There are several methods used in old PML code to find out whether the current units are metric or imperial. These methods all parse the result of the command

```
VAR !units UNITS
```

which returns a string of the form:

```
INCH Bore INCH Distance
```

This technique will not work in 12.1 for any current distance units other than mm or inch. Code that tests for imperial or metric units must be replaced by the new `!!isImperialLength` function.

### 16.5.9 Save and Restore Units

The trick most commonly used to save and restore units is:

```
var !units units
mm DISTANCE
… Code that must be executed in MM distance
```

```
--reset units
$!units
```

If the current distance unit is Metres or Centimetres, this code will not revert back to the original distance units. The command `$!units` will execute the command `MM DIST MM BORE` leaving current distance units as MM.

Old PML save and restore units code must be replaced by the new COMUNITS object.

### 16.5.10 Units Conversions

There are several methods used to convert real numbers to distance values in old PML code. For example, taking a catalogue or design parameter value which is known to be a distance in millimetres and converting it to a distance value in current distance units.

One of the most commonly used methods is to convert a number to a string, append 'mm' to the string, and evaluate the string back to a REAL value. This will not work at 12.1.

Some old PML code converts between mm and inch by dividing or multiplying by 25.4. This will not work at 12.1 because current distance units could be cm, metres, feet etc.

### 16.5.11 Removing units from a REAL

Sometimes it is necessary to work with a real value without units. A core method on REAL is provided for this.

```
!val = 123.5mm
!r     = !val.value()
Q var !r
<REAL> 123.5
```

### 16.5.12 Units Display

Display of values with or without unit qualifiers is mostly controlled by using FORMAT objects, particularly !!distanceFmt. This is still OK in 12.1. The REAL.string() method now returns a STRING value with unit qualifier.

### 16.5.13 Text Boxes on Forms

The main impact on PML forms will be seen on text boxes. Instead of these holding the value as a number they will now often by physical quantities (most frequently distances, but also angles, densities, masses, areas, volumes etc. When these are populated by the system, especially with a format object, they will have their current working units attached. This means that the width of some input fields on forms must be increased to allow for the unit qualifier.

ISOU text boxes will also be parsed, and in 12.1 all forms of distance will be accepted (there was only limited parsing of ISOU text boxes prior to 12.1). Many ISOU fields are now removed from forms and the documentation of how to create them has been removed, but they still exist.

Format parsing is now much more generic, including use of user defined unit labels, feet labels, and inch separators, being considered when interpreting input values in text boxes.

Drop down lists will often have units appended (and they might not be the current unit!)

Files written for output and for configuration will have units appended (mainly because the .string() method and $! and var ! commands will all generate strings with units attached. If this is not wanted then .value() must be used first remove the unit entirely by making the number purely numeric.

### 16.5.14 Dimension of REAL Expressions

It is necessary to be able to test the dimension of REAL expressions to validate an expression before storing it in the database. This might be used for example, to test that an expression for a DDAT property is consistent with the PTYPE of that property.

The DIMWORD function returns the PTYPE of the dimension of an expression. For example,

```
Q DIMWORD ( 1 KG PER CU METRE )
DENS
```

```
Q   DIMWORD (2 * pi * power(100mm,2))
SQDI
Q   DIMWORD( gweight / cutlength )
UMAS
```

Or as a text string description of the dimension (which is also valid in format objects etc.)

```
Q  DIMENSIONOF (1 kg/m3 )
Density
```

The units of the evaluation (i.e. current units of the dimension) as unit qualifier as a text string:

```
q UNITSOF( GVOL * DNST )
kg
```

If assigned to a PML variable, the result is a text string variable

### 16.5.15 Other Units Considerations

There are some cases in old PML code where positions were constructed as follows:

```
!x = 100mm
!y = 200mm
!z = 300mm
!pos = object POSITION('E' + !x.string() + 'N' + !y.string() + 'U' +
!z.string() + 'WRT WORLD')
```

*or*

```
!pos = object POSITION('E' & !x & 'N' & !y & 'U' & !z & 'WRT WORLD')
```

These expressions will now generate an error because, until 12.1, the strings would have evaluated to:

`E100N200U300WRT WORLD` *This is valid syntax*

but at 12.1 the string evaluates to:

`E100mmN200mmU300mmWRT WORLD` *This is not valid syntax*

We must make sure that there is a space between the real value and the next command word.

Remember that $!v will output a unit qualifier in 12.1 if !v is dimensioned.

For example, if XLEN is 1000mm:

```
!v = !!ce.xLen
!s = '$!v mm'
```

In previous versions, !s would contain the value '1000 mm', whereas at PDMS 12.1, !s contains the value '1000mm mm'

### 16.5.16 New PML objects for Units

There are new objects UNIT and MEASURe, as well as updates to the REAL, FORMAT and STRING objects. For details, please see the *Software Customisation Reference Manual* and *Software Customisation User Guide.*

### 16.5.17 .NET extensions for Units

There are .NET extensions (DbDouble, Dbformat, DbUnits, DbDoubleUnits, DbDimension and DbDoubleDimension to assist in units handling. These are documented in the *.NET Customisation User Guide.*

# 17 Product Faults & User Requests

## 17.1 Outstanding Faults and Issues

Please refer also to the Product Release letter included with the release – this may have updated information. Unless otherwise indicated, the following faults will be corrected, if at all possible, by the time of the next service pack; in many cases, they will be corrected in an earlier fix release.

### 17.1.1 General issues

#### Internet Explorer 9

AVEVA does not recommend the use of Internet Explorer 9. In particular, it has a fault associated with the use of the .CHM online help files, when they reference external files such as PDF. It is anticipated that a hotfix will be made available by Microsoft during October 2011.

#### Unicode filenames

The use of ASCII (Basic Latin) filenames is recommended for two reasons: compatibility with other systems and various specific issues which have yet to be resolved. This applies to some of the systems to which PDMS is interfaced, and even to some of the interfaces where PDMS makes use of third party software such as output of DXF and DGN. PML Publisher does not currently fully support Unicode filenames.

In particular, defect P-39998 reports that the new Reporting function does not currently attach documents with Unicode names to an email, when using the option 'Export the current document in one of the available formats and attach it to the mail' icon in the Run Report window. When there is a Unicode character in the name, it correctly saves the file but it has to be sent manually. It is likely to work if the operating system supports the appropriate language.

#### Limitations

AVEVA recommends that changes to Database Views (DBVWs) are not made whilst users are live in the system. Changes to ATTCOL attributes in Lexicon may otherwise cause Tags to crash.

### 17.1.2 PDMS Applications (Appware)

These are supplied as standard text files, not as UTF-8 files with a BOM. They are therefore subject to interpretation according to the CADC_LANG environment variable. Most of them adhere to the ASCII character set so will work correctly for all supported languages. However, a few files have been amended to use a new function, which **must** be UTF-8 in order to work correctly in non-Latin languages:

\pmllib\common\functions\charactersymbol.pmlfnc

If this is the case, incorrect characters may be displayed or the PML file aborted with unpredictable results, after a console error message such as:

```
FHSTRC file-read transcoding error: Could not convert from specified encoding
CP949 to Unicode
****** USCNVR error 1, at byte 1 of 2, value 146
****** while converting substring {)}"
Command was: {--      (panels')}
```

The data file \pmllib\isometricadp\data\Hvac_Paragon.dat also needs to be UTF-8 to read in successfully.

### 17.1.3 AVEVA PDMS & associated applications

| *Incident number* | *Defect number* | *Product / Module* | *Description* |
|---|---|---|---|
| | P-39437<br>P-39898 | Admin | Database description greyed out on Create/Modify DB form – but still active (*Please note: there are other instances of this issue*) |
| | P-40377 | Admin | Unhandled DB error 18 crash, when creating a database with a number that is already used in the project, and with Description text |
| | P-40379 | Login | It is not possible to login from the command prompt using proj="Project ID" |
| | P-40708 | Login | The new login screen won't let you log in to a project with NT authentication switched on, even as a free user (e.g. SYSTEM) - the password field is greyed out the moment you select the project. The workaround is as follows:<br>1. Run Monitor in TTY mode from command window or shortcut pdms tty<br>2. In Console enter project, user, mdb and switch to Admin in graphics e.g.<br>proj bas<br>user SYSTEM/******<br>/CTBATEST<br>dev gra<br>admin<br>3. In Admin, add authenticated user |
| | P-40765 | Isometric ADP | This application does not yet fully handle the MDS support option. An error message "(2, 769) An object does not have a member METHOD" may appear when drawing supports for cable way or HVAC. |
| | | | |
| | | | |

### 17.1.4 AVEVA Global

Global 12.1 does not fully support projects with spaces in their pathnames. Work is in hand to remove this limitation but no definite release date is yet set.

The daemon will work when installed in C:\Program Files\ (see section 1.3.4) but there is a known issue (defect P-40174).

| *Incident number* | *Defect number* | *Product* | *Description* |
|---|---|---|---|
| | P-31224 | Global | RPC Daemon cannot detect if a WCF daemon is already running for current location of the project |
| | P-38853 | Global | PDMS reports "(1,504) Unexpected error contacting Daemon - check versions match" when missing global client dlls |
| | P-38602 | Global | Element claims can be lost for distributed extracts if an issue fails. This can lead to the error message 'has been deleted in a later session' |
| | P-38903 | Global | The new Database Distribution allows a collection of DBs to be relocated to another location. If the HUB daemon is down, the form will hang until all relocation commands have timed out |
| | P-38938 | Global | Default Drawing files and Stencils are not propagated to location project on creating the new location |
| | P-40174 | Global | REMOTE CHECK will fail to run Standalone DICE if the daemon is installed in a folder which contains spaces, partly due to the semi-colon delimiter |
| | P-40736 | Global (WCF only) | Global WCF cannot process database filenames with large DB numbers unless these are named using FINO. This is a range error in the validation in the Global WCF Config file. Administrators can correct it by modifying admindWCF.exe.config: FileNumber UpperBound should be 250000 inclusive. Please see Pivotal Knowledge Base article 3736. |

### 17.1.5 AVEVA Schematic 3D Integrator

Some errors can appear using Integrator if there is no configuration file local to the project. The Integrator Link function can raise an Internal Integrator Error and edits in the Project Configuration Explorer may not be displayed correctly. The Compare and Build functions are unaffected, and if one of these has been run in the session then the Link function will also work.

The workaround is to copy the file ProjectConfiguration.xml from the installed 12.1.1 folder to the folder <proj>dflts\ModelManagement, where <proj>dflts is the folder defined in the appropriate environment variable, e.g. %samdflts%. The same result can be achieved by a free user starting up Integrator, then clicking on Integrator>Display>Project Configuration Explorer, then saving the file.

### 17.1.6 New Reporting add-in

This new feature has a number of known limitations at this release, which will be improved in future releases. These include:

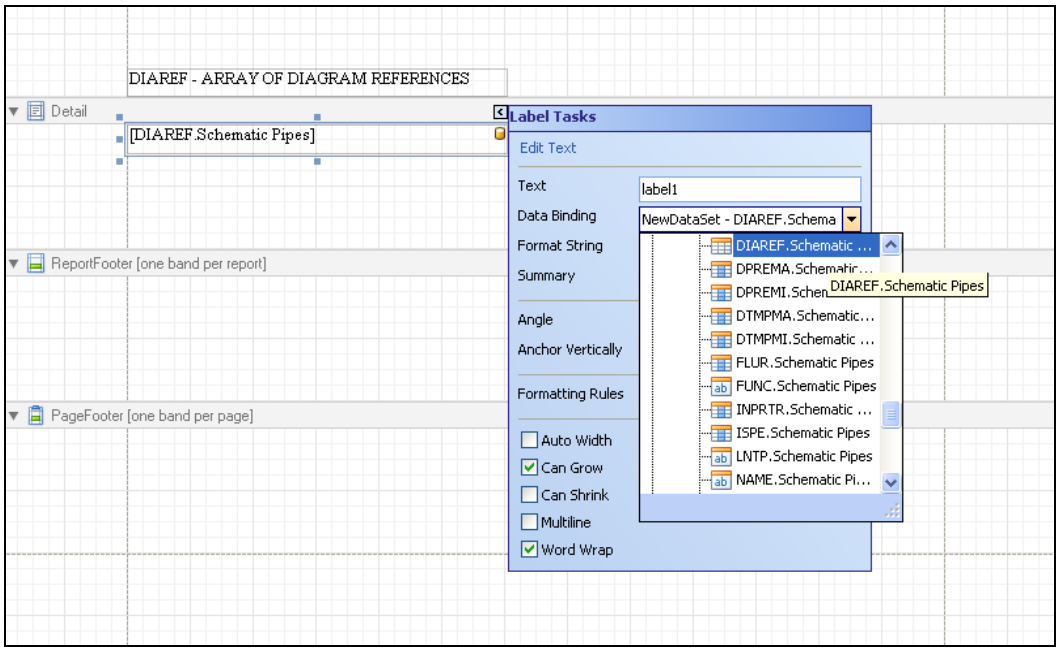
- Improving performance while running reports in batch mode
- Background colour not exported in RTF format
- Watermark fails to display in the report
- No Copy / Cut / Paste available in table modifications
- Changing the Zoom in the Report designer causes Report to crash – with Exception error message, which you cannot close, making it hard to close Tags as Report Designer keeps screen focus.

Some other limitations may be worked around as follows:

#### Drag and drop of DBView array fields to report designer

This does not work at present; as an alternative, you can use an Array field in a report and place a control which can be bound to a field on the report. By setting the Data Binding property of the control it can be bound to an array field.

In the example below a Label has been placed in the Detail section of a report for binding to the array field.



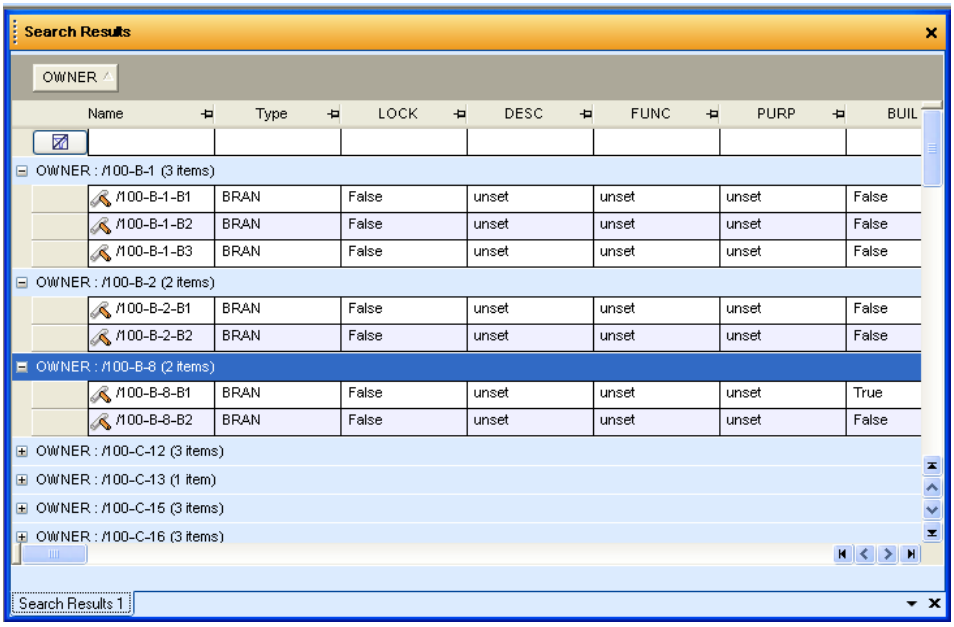

## Quick Reporting – Handling of Grouping

Where grouping is applied in the search results grid, the group layout result will not be maintained when a quick report is generated.

This is because:

- This would lead to an inconsistency with quick reporting functionality in Instrumentation
- Different layouts need to be maintained for use in the reporting tool for grouped and non-grouped quick reports

Note: To enable group sorting: right click on the search results grid column heading, selecting Enable Group Sorting, and then dragging the column heading of the attribute you wish to group by into the group area of the search results grid (see example below).




## Use of summary in calculated fields

Where a summary field is used in a report the results of this summary cannot be used in a calculated field.

This has been identified as a future enhancement. A workaround is available.

## Use of the results of one calculated field in another calculated field

It is not possible to use one calculated field in another calculated field.

This has been identified as a future enhancement. A workaround is available.

## Not possible to hide group header only

In the report designer, hiding a group header via the Group and Sort window also hides the group footer. However, hiding the group footer still leaves the group header visible.

Workaround: To hide only the group header, assign the height as 0 to group header.

## PageRange property ignored when the ExportMode property is set to SingleFile

DevExpress recommends that the ExportMode should be set to any other value to resolve this issue.

## AVEVA Net Gateway - Unicode characters

The field list explorer will not display Unicode characters unless the respective language pack is installed. The user can specify Arial Unicode font for reporting to display multi-byte characters in the report, PDF, excel, etc. without installing the respective language pack.

## Reporting Default values in cells

When a value is not found, the error text “!Error” is given. In the UDA definition there is a default value defined, which should be in the report.

**Workaround:** This workaround removes “!Error” from the report field, and replaces it with empty string.

1. Select the cell/label or control in report designer
2. Add the script for before print, select new when creating script for the first time.
3. Change the text from !Error to desired string as below:

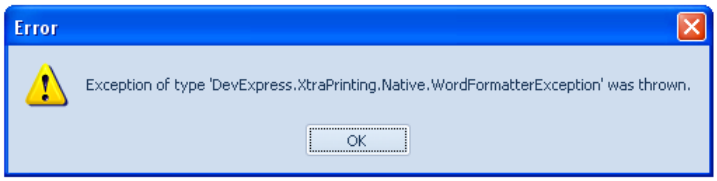
```
private void label8_BeforePrint(object sender, System.Drawing.Printing.PrintEventArgs e) {
 if(label8.Text == "!Error")
        label8.Text = "";
}
```

### Reporting document fails to attach to the mail

This occurs for PDF files only when you have a Unicode character in the filename; it does the save but doesn't send it to Outlook. The workaround is to attach to email or right click the file to send it manually

### Quick Report exception thrown

Doing a quick report and then using the HTML VIEW tab throws an exception.




This occurs only with a large number of columns, so the report cannot accommodate them within the visible area.

### Large length Reports fail to export at certain formats

A 509 page report exports as PDF, CSV and TEXT, but fails for all other formats. If you run the Excel (XLS) export it warns you and says use (XLSX) but fails on doing so. It can export to the CSV version that can then be loaded into Excel. Even if you select single page versions of the image export it fails.

### Reporting output differs for different Excel formats

Exporting the output from Reporting, the data exported differs between XLS and XLSX. The XLSX format creates #VALUE! (errors in the cells that are PDMS REFs in the DBViews); whereas the XLS format creates the data correctly.

This issue arises because export to XLSX format considers the data in Value (object) mode by default. The workaround is to use the Text export mode: please see below:

# 17.2 Corrections & Minor Enhancements

Corrections have been made for a number of defects, as reported by customers in service incidents. Particular attention has been paid to some of the newer areas of the system, such as Schematics and Cable Design. This section is not a complete list; some of the most significant improvements are listed elsewhere in this document. Late changes and those made after the initial release will be listed on the appropriate release letters.

In addition to those incidents resolved in AVEVA Plant 12.1.1, the first release is generally up-to-date with defect fixes in 12.0.SP6.25.

## 17.2.1 Global

A large number of improvements have been made to improve robustness; this list does not include all the internally identified defects.

| *Incident number* | *Defect number* | *Product* | *Description* |
|---|---|---|---|
| HPD 28918 | P-9737 | Global | Global Claim commands reported as successful when they contain failed claims |
| - | P-14829 | Global | Synchronise causes daemon crash trying to access Global DB when it is already in use by the daemon |
| SI-18399 | P-26569 | Global | Satellite Extract creation screen – limitation on length of name and description |
| SI-22674 | P-31952 | Global | Global Location screen : Check button does not work (for non-English locale) |
| - | P-34013<br>P-34432<br>P-37495 | Global | Intermittent daemon crashes caused by internal memory problems and other issues |
| - | P-34555 | Global | Daemon memory leak when using WCF |
| - | P-36005 | Global | PDMS cannot access Global configuration files if Read Only (WCF only) |
| SI-31829 | P-36038 | Global | Problem with transactions to a deleted satellite |
| SI-37204 | P-39821 | Global | Allocating NSEQ DB to Satellite is not working (Also fixed in 12.0.SP6.25) |

# 17.3 Sample Model Changes since PDMS 12.0

The following list details each separate change have been made to the standard projects supplied with PDMS 12.1. A summary is given in section 2.5.

| *Reference* | *Description* |
|---|---|
| 692 | Modified XML required for - 12.1 only. |
| 694 | d065mar.xml file creation - 12.1 only |
| 817 | DEPT & REGI XYZ pos format -12.1 only. |
| 830 | HVAC Weights |
| 829 | MAR Project - Additional Bending Machine |
| 845 | Template element DESC spelling mistakes |
| 854 | Re-Reference Associations (SAM only) |
| 858 | SMM UDA Upgrade/Configuration (db MASTER/DICT) |
| 860 | Add Open Steel Project TST test data to BAS (enable Lev2 tests) |
| 870 | Remove spurious SPWL (in marine BAS - from TTP project) |
| 871 | Clean DIAGRAMS drwg data - Plant BAS project |
| 852 | HVAC Cata - PBOR on RECT Grilles SFM and SCOM Ver |
| 853 | HVAC Cata - New Reducing Profile for SQRD SCTN |
| 861 | HVAC Insulation Spec |
| 882 | Nuclear Handrailing Fix |
| 872 | Make Master Project DBs UTF-8 (UNICODE) Internal Format |
| 959 | Rebuild Master Proj DBs UTF-8  Internal Format |
| 960 | Add CTBATEST DBs as PDMS Internal Format (LEGACY) |
| 961 | Rebuild CTBATEST DBs as PDMS Internal Format (LEGACY) |
| 909 | Remove MASTER/PIPEOLD from all MAR mdbs |
| 911 | HVAC 7 Segment Bend |
| 912 | HVAC Cata additions for ISO ADP |
| 914 | Function additions for Elec ZONES in HTEST |
| 918 | Correction of GPARTS which have incorrect CATREFs |
| 919 | New UDA for MASTER/MDSDICT |
| 920 | Flat bar added to MASTER/STLCATA |
| 926 | Stud Bolt Description Correction for /SP/DR07C |
| 927 | Correction of Room Design Rules |
| 928 | Create Bolt Spec for /A1A, /A3B, and /F1C |
| 929 | Unset PURP on /PSI Spec (removal from SPEC form) |
| 930 | COCO for /SP/DR07C and /DR07C (for Wafer FITT/ings) |
| 931 | Incorrect heading order fix for SPECs in MASTER/PIPECATA |
| 938 | MAR - Area /3M_OUTFITSTEEL rebuilt for PPM examples |
| 939 | TRCLIN & SFCODE settings for Steel Profiles (enable PPM) |
| 941 | Material not set on new components |
| 942 | Update Master Catalogue with DIN Weights |
| 958 | d065 file change (all marine projects) SB_SETTINGS_DB |
| 962 | SUBS Appended to the reflist of /MDS-UDA_MDSBRENCHES |
| 963 | MAR - Add User SUPP to 3 additional Teams (for MDS) |

| | |
|---|---|
| 964 | Tapped / Boss Connection correction to DIN Standards |
| 965 | HOLD Catalogue for GSC Use |
| 967 | SPECs /DRO7C /SP/DR07C Invalid INST deletion |
| 968 | Detail Text for ANSI Schedule Thickness |
| 969 | ANSI KG Weight Additions |
| 970 | ANSI KG Weight Update for ANSI Components |
| 971 | ANSI Pipe Spec Update for KG Weight |
| 972 | SPEC /A150 Bends Weight Addition |
| 973 | Correction to hierarchy position for SCOM |
| 974 | PPM, Raw Profile file update |
| 975 | Remove Module 94 (MARINEDIAGRAMS) - all projects |
| 976 | Modified Pipe Sketch Opt file (STD) |
| 977 | Fix /A3B/EV50 and /A3B/MBEND:50 error from MC906 |
| 978 | Add RRULs for Cabling |
| 979 | Mod to SAMPLE_HTEST.DTL to include MC 830 |
| 981 | Add OLET to UDA ISOShipCoord |
| 952 | Nuclear Apps: Replacement Sam and Imp default files |
| 980 | MAR - 'sbh_sketch_restrict.def' NAME_METHOD=4 mod |
| 985 | Convert XXXCOM and XXXMIS dbs to UTF-8 Format |
| 986 | Add ENGI mode to all Module definitions |
| 987 | Rename Mod 91 to MARINEDRAFTING (ex-HULLDRAFTING) |
| 866 | Remove Assembly ADP Library from Plant project sets |
| 983 | Isometric ADP Data |
| 966 | MDS UDA mods for CSUPP element |
| 982 | MAR - Unset SPRE on SCINST |
| 986(2) | Add ENGI mode to all Module definitions |
| 992 | Corrections to /SP/DR07C |
| 993 | Modified pipespool.met file (mariso/STD) |
| 947 | Nuclear Apps: Screeds - Mat'l options/Var Concrete SCTN |
| 956 | Instrumentation Update UDAs |
| 988 | LSWL elements in system dbs |
| 989 | Toe radius fix for AISC taper flange channel |
| 990 | HVAC Ppoint fix |
| 994 | Modification and recovery (LIMBO) of Centre Flange Spec |
| 995 | Re-add ALLP to MDS UDAs MDSCp1 to 3 ELE |
| 997 | Enable DAC in standard plant model deliveries |
| 999 | Std Model Library Feature UDET + Rem Mar Specific UDET |
| 1000 | MAR - Re-input Cable and Cabletrays |
| 1001 | Update to spec /A1A - allow router to autoselect bends |
| 1002 | HVAC Area & weight properties - PTYP settings |
| 1003 | Nuclear Apps - Replacement (IMP) Defaults file ESCALIER |
| 1004 | Password details for supplied projects |
| 996 | Add ENGI Data for TAGS module |
| 1006 | MAR - Update sheet /2MZ_SF_02/1-ISO/S1 |
| 1007 | Areas addition to HTEST/STABILIZER |

| | |
|---|---|
| 1008 | Nuclear Apps - Replacement Defaults file NOMMER |
| 1009 | Remove Plant Project xxxMAR folders |
| 1010 | Set Password for NUCLEAR User |
| 1011 | Update Supplied Password details |
| 1012 | MAS - Recovery from LIMBO of Stub-In Components |
| 1013 | Correct DETRE for STUB-IN.PRTWLD/BFTWXXT |
| 1014 | Weights for DIN Set-On Tees and Latrolets |
| 1015 | Source ISO Options Folder correction |
| 1016 | Global AAA project - enable Linked Documents |
| 1017 | Reconfigure using hybrid exe to remove excessive TYPEX |
| 1018 | Change DB SYSGRP/PROCESS to be DESI Reference DB |
| 1019 | Remove BAS folder from AAA and AUT INFO folders |
| 1020 | Stabilizer HVAC Weights set with Units |
| 1021 | Zone /ELEC-CABLEWAY VWID fix for SAM |
| 1024 | DB CTBHTEST/PPROJDICT for BAS (PPROJECT/DICT for SAM) |
| 1025 | Update Pipe Data Tables for Stock Length |
| 1023 | Rebuilt MAR project |
| 1026 | MAS additions to support rebuilt MAR project |
| 1028 | Re-execution of changes to new MAR project |
| 1029 | SAM/BAS Project mods to enable installation changes |
| 1031 | Project Upgrade - PROJ NEW |
| 1032 | Flange OBST was 0 so did not clash |
| 1033 | Fixes to MAP/DICE Errors reported on MC 1023 MAR Model |
| 1034 | HVAC Default Data was simple numeric - now with UNITs |
| 1036 | Changes to SMM Default UDAs needed in Master project |
| 991 | MAS UDA Update for MASTER/MDSDICT |
| 1005 | Assembly Orientation Workaround - Library Update |
| 1022 | Update Isometric ADP library |
| 1027 | Complete re-work of ENGI Data for TAGS module |
| 1037 | CATA and SPEC Data to enable Sloping Pipes |
| 1038 | Map Build errors in Marine AUT project (/WELDPLANNING) |
| 1039 | STAWLD and DBVWWLD elements for Reporting feature |
| 1040 | Remove duplicate ASWL in MAR project |
| 1041 | DB order correction to mdb /CTBHTEST |
| 1042 | AVEVANETADMIN Team for Reporting Feature |
| 1043 | Spelling Mistake in Project MAR |
| 1044 | SAM Project /Sample-Sheet Graphics Update |
| 1045 | Re-Order ELBO SPEC Selectors |
| 1046 | Modifications to TAGS Data (see MC 1027) |
| 1047 | DB MULTIW access for SAM and IMP projects |
| 1050 | Upgrade TTP Project to include MATW |
| 1051 | Fix to ELBO SPEC Defaults |
| 1052 | Update OD of bends in Pipe Spec A1A |
| 1048 | HVAC 7 Segment Bend Correction |
| 1053 | Default Stress Groups for Pipe Stress Interface (PSI) |

| | |
|---|---|
| 1055 | MAR project correction for module mode settings |
| 1035 | DIAGRAMS Major Update - Plant and Marine |
| 1049 | Change to default purpose of elec cable zones |
| 1054 | MAR Project deficiency correction |
| 1056 | PSI System UDA ULEN modification for large group |
| 1058 | Environment variables in d065nnn.xml & project.bat files |
| 1059 | Project Description update for TAGS and PSI changes |
| 1060 | MAR - sbd_def1.def file - remove redundant settings |
| 1061 | Correct Compile error on TAGS UDAs with incorrect UTYP |
| 1062 | Recreate cables under /ELEC-CABLES for missing attributes |
| 1063 | SMM Default UDAs |
| 1064 | Vantrunk and Oglaend CT SPEC PURP set to TRAY |
| 1065 | SAMDFLTS Model Management folder re-instatement |
| 1066 | Link TAGS to Design elements |
| 998 | New VANTRUNK Catalogue |
| 1030 | OGLAEND Catalogue Updates |
| 1057 | MAR - Bending Machine collision planes |
| 1067 | LDIM mods to aid DXF of multi-line Projline Text |
| 1068 | UDA Minor modifications - various |
| 1069 | MAR Project - Delete GBLOCK /SB_OGDB~JUMBO |
| 1070 | Modify Bolting Spec on /A1A, /A3B and /F1C |
| 1072 | Update UDAs for DESC and RPTX Attributes |
| 1073 | Master DBs in AUTO project with R/W access |
| 1074 | UDA Changes and SAMDFLTS Preliminary Lists for TAGS |
| 1075 | Delete unused MDS /RBPS-UDA/UGRO |
| 1076 | MAR - Module Definition DIAGRAMS - PADD R only |
| 1077 | MAR - Add HULLDRAFT/PADD DB to /SCHEMATICS MDB |
| 1078 | MAR - Pipe Assemblies - Reset Refs |
| 1079 | HVAC Joints Correction FJ8060 |
| 1080 | TAGS - Model Data Update (Lexicon and Tags) |
| 1081 | TAGS - Model Data Update (Lexicon Only) |
| 1082 | Add xxxDATA to supplied evars.bat files |
| 1083 | Line Stressing Data - re-input for TAGS (Update) |
| 1084 | Rename PSI Administration Elements (now PIPESTRESS) |
| 1086 | GTYP PENI now GTYP ATTA (HVAC Penetration ATTA's) |
| 1087 | Modifications to TAGS Data |
| 1088 | DIAGRAMS - Data Updates to HVAC and Cabling (Plant) |
| 1089 | Replacement options file for marine pipe sketches |
| 1090 | Units in cable properties data |
| 1091 | Legal Disclaimer mod to MAS Project Description Doc |
| 1092 | SAM Project Description Document modification |
| 1093 | /NOZZLE-DIN BLTP mods to BDIA |
| 1094 | ANSI Pipe Spec Update for KG Weight |
| 1095 | VANTRUNK Angle modifications |
| 1096 | Flange Bolting Hole Numbers / Diameters MAS ANSI CATA |

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| 1097 | CATA Update - allow New Bolting (SAMPLE and Training) |
| 1098 | Modify User-Facing <PROJ>ProjectDescription.pdfs |
| 1099 | Missing information in the /INSUL CATE |
| 1100 | OGLAEND CATA\SPEC\PROP Updates |
| 1101 | MAR - Default links |
| 1106 | Remove IMPERIAL (IMP) Project from Project delivery |
| 1107 | Correction to SPEC Headers for ELBOs |
| 1102 | Reset Bspe on /F1C to /ANSI_BOLTS |
| 1103 | Circ BRAN HSTU Pbore modifications |
| 1104 | TAGS - Model Data Update (Lexicon and Tags) |
| 1105 | Offtol on OLET pointsets |
| 1108 | Re-execute RC3 Upgrade to correct LSWID errors |
| 1109 | Extra Model folders under MAS project |
| 1110 | Replacement ISODRAFT pipespool.met file for Sloping Pipes |
| 1111 | Equipment Status in the Stabilizer Plant (SAM) |
| 1113 | MAR - Set db MPROJECT/SYSTEMS to be REFDESI |
| 1112 | MAR - Recreate FEMWLD (HULLRSO/FEMWLD) |
| 1114 | Rem AvevaNetExportConfigAddin.xml from project dflts |
| 1115 | SAM - Sample data Status Control setting |
| 1116 | Set /HEATING-VENTS ZONE attribute PURP to HVAC |
| 1117 | Re-input Modified TAGS Data |
| 1118 | MAR - Create DB MPROJECT/FABDATA |
| 1119 | Replacement Sample data lists |
| 1120 | PARAGON Module Definition change |
| 1121 | MAR - Add dxfinport.def file to def folder |
| 1122 | Field Duty in view Mechanical Tags + DSX - spelling mistake |
| 1123 | Modify TAGS DBVWs |
| 1124 | MAR - XPIWLD InstTagAttData & JBTagAttData in Tags DB |
| 1125 | MAR - Data>Lists Folder correction for MARDFLTS |
| 1126 | MAR - Remove tags_*.pmldat files from MARDFLTS |
| 1127 | SAM - Remove duplicate Lists folder from Dflts>Data |
| 1129 | Tags Sample Data UDA length correction UDA Type ‘Real’ |
| 1130 | SAM - Add Mechanical Tag Report |