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# **AVEVA PDMS**

## **and associated products**

# **Release 12.0**

## **User Bulletin**

Service Pack 5

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## Revision History

November 2007	First issue for PDMS 12.0
April-July 2008 (12.0.SP2.1)	<p>Additional information on AutoCAD compatibility, AutoDRAFT, DRAFT picture file folders, Support of Windows 2000 and old Hangers &amp; Supports application.</p> <p>Some updated information &amp; illustrations on Admin tools. Various updates related to the release of additional interfaces – with changes to version numbers etc.</p> <p>Notes about future use of Unicode and PDMS plot files</p> <p>New Chapter 17 on ISODRAFT enhancements</p> <p>Added section 25.1.3 – information on defect correction</p>
December 2008 (12.0.SP3.1)	<p>Minor updates for 12.0.SP3.</p> <p>Added information about updated manual set, Schematic 3D Integrator – new chapter 18.</p>
March 2009 (12.0.SP4)	<p>Added new chapter 15 on Cable Design. Updates to cover enhancements to Global, P&amp;ID Manager &amp; Schematic 3D Integrator, release of AVEVA Diagrams for Plant (replaces and expands scope of Cable Diagrams). Minor enhancements such as improved grid control and search tool and Draft output to DWG &amp; DGNv8 formats.</p> <p>Minor amendments, including updated note about Access, Stairs &amp; Ladders. Cross-referencing amended. Sections on Access Control Assistant and Catalogue GUI simplified – refer to user manuals. Summary details of defect corrections.</p> <p>Information about Windows Vista and FlexMan 4.1 licensing.</p> <p>Notes about pre-requisites for Excel import; Issues with Russian PML add-ins</p>
May 2009 (12.0.SP4)	<p>Updated Integrator information; details of known limitations, details of corrections, enhancements (Chapter 21).</p> <p>Added details of AVEVA Global (chapter 7, additions to section 6.8 and 21.4).</p> <p>Amended information about support on Windows Vista and 7.</p>
September 2009 (12.0.SP5)	<p>Added information about SP5 features:</p> <ul style="list-style-type: none"> <li>• Section 2.6: Upgrading from earlier 12.0 releases</li> <li>• Section 4.6.3 &amp; 6.9 – 6.11: Improved Password Security</li> <li>• Chapter 19: Schematic Model Manager – replaces and extends P&amp;ID Manager</li> <li>• Chapter 20: AVEVA Diagrams – enhancements</li> <li>• Chapter 21: Status Control – Control &amp; monitoring of 2D &amp; 3D object status</li> <li>• Chapter 22: Support of new primitives (GENPRI &amp; GENCUR) for Mechanical Equipment Interface - import &amp; export in STEP AP203 format</li> <li>• Piping - Production support, Wall thickness, Flange Offsets</li> <li>• Nuclear Applications – Concrete Design, Room Manager, Concrete Quantities</li> </ul> <p>Updates on Installation, Schematic database licensing, Review Export, Design Drawlist &amp; Explorer, ASL, DICE error reporting &amp; Isometric ADP availability. Brief note about ImPLANT-I 2 for DGN v8. Updated list of new manuals. AVEVA P&amp;ID now included on DVD – some details updated.</p> <p>Minor improvements to wording &amp; layout.</p> <p>Removed:</p> <ul style="list-style-type: none"> <li>• Details of Hole Management – now in Common Functionality manual</li> <li>• Notes about GENSEC limitations – now resolved.</li> </ul>

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# 1 Introduction

## 1.1 About this software release

**\*12.0.sp5\***

PDMS 12.0 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.

A number of Service Packs (SP1... SP5 – see section 1.7) have been released to improve the original release. It is strongly recommended that the latest one is used.

Please note that PDMS 12.0.SP3 onwards requires Flexman 4.1 and an appropriate license – they will not work with Flexman 3.1. For further details of Flexman License Server 4.1, please see [http://support.aveva.com/support/United\\_Kingdom/index.htm](http://support.aveva.com/support/United_Kingdom/index.htm).

## 1.2 About this manual

**\*12.0.sp5\***

This manual gives an overview of changes since the previous major release: PDMS 11.6. It is primarily aimed at users upgrading from that release, though it also contains information about changes since the earlier releases of PDMS 12.

It has been updated for each Service Pack (SP) of PDMS 12.0, with the significant changes flagged in the section titles as appropriate.

Additional chapters have been added at some service packs for the associated products. In particular, details for AVEVA Cable Design and Global have been added at SP4 and for Status Control, Mechanical Equipment Interface and for some of the Schematics products at SP5.

## 1.3 Software distribution & installation

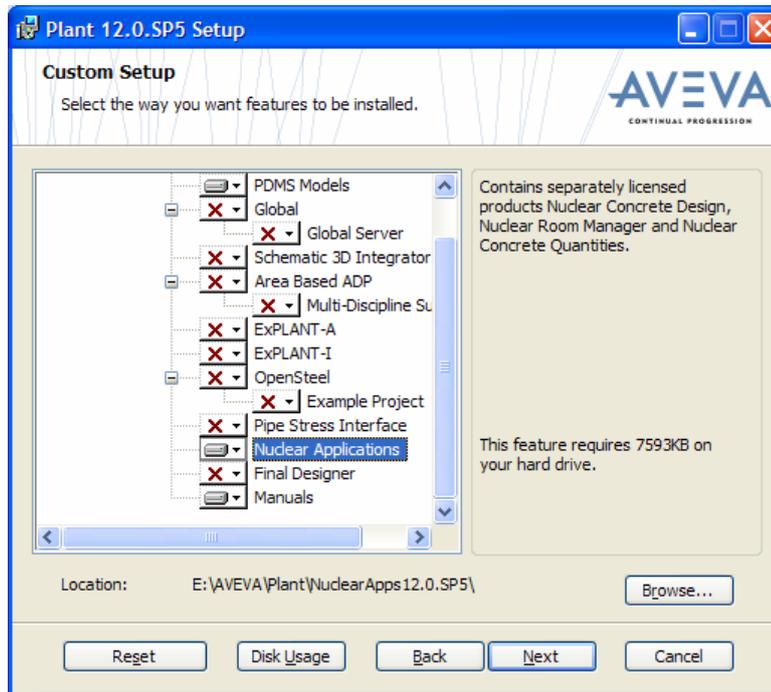
**\*12.0.sp5\***

Please note that the installation process has been changed for PDMS 12.0.SP4 onwards. The installers now use standard Microsoft Installer (MSI) technology, which facilitates silent installations through standard MSI means. They are usually triggered by use of a setup.exe file.

There are fewer separate installers, each corresponding to an AVEVA ‘release’, on the DVD. The PDMS/Plant installer now includes options to install many of the associated products, although, for various reasons, some products still use a separate installer.

This means that a selection of products can easily be installed together – please see diagram over. It is recommended that the Global option(s) are installed this way, though there is a separate installer for use on a separate machine, such as a server, which does not have PDMS.

Please note that there is no ‘thin client’ installation option as this is no longer supported.



Target location or ROOTDRIVE can be specified when running each installer. By default, those performed using setup.exe will be loaded on C:\ and will stop with an error if there is no C: drive. Alternatively, the .msi file (e.g. Plant12.05.msi) can be run directly; this will by default use the local drive (that can be written to) having the most free space. For more details, see [http://msdn.microsoft.com/en-us/library/aa371372\(VS.85\).aspx](http://msdn.microsoft.com/en-us/library/aa371372(VS.85).aspx).

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. It is therefore important to use the Plant/PDMS installer to apply a fix to Global if that is the way it was installed. A Fix release for the Global installation will not patch the Global program installed by the Plant installer. The use of the latest fix release is recommended: this includes any previous fixes for that installer.

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

## 1.4 AVEVA Plant

AVEVA Plant is the new name for the VANTAGE Plant product portfolio and encompasses the Plant Engineering, Plant Design and Project Resource Management aspects. It shares a lot of technology with the new AVEVA Marine portfolio: both are based on much enhanced version of the tried and tested PDMS design platform.

Most of the Plant products have been updated and given a 12.0 version number, to clarify their compatibility. Since this is a major change to PDMS, many older versions of interfaces such as OpenSteel will no longer work with PDMS 12.0, though there are some exceptions. Conversely, version 12.0 of the Model Management products is also compatible with some older versions of PDMS and other products.

## 1.5 AVEVA Design Platform

The AVEVA Design Platform provides a fully interactive, easy-to-use 3D environment for every designer on the project, supported by an Office-style user interface based on Microsoft's .NET technology and the latest in 3D graphical interaction tools. It is based on the globally distributed database used on countless PDMS projects for over 20 years.

It provides the basis for both the Plant and Marine products, including catalogue, administration, clash and integrity checking and reporting. It is highly configurable and includes a powerful programmable macro language (PML) that can be used to customise the system and automate key activities across all areas of the product.

The new platform will facilitate many further developments to both the Plant and Marine products over the next few years. Following on from the introduction of Microsoft's .NET Framework at PDMS 11.6, we are making more use of it to improve the user interface and also to provide a common look – and better integration – across the AVEVA products.

## 1.6 AVEVA Plant Product portfolio

### 1.6.1 AVEVA Plant Version 12.0

Most of the Plant Design products have been updated and re-branded as Version 12.0 to simplify the question of compatibility. All Version 12.0 products are designed to work together; in some cases they may also work with earlier versions.

### 1.6.2 Major Plant Design Products

**\*12.0.sp5\***

AVEVA PDMS is of course the major AVEVA Plant Design product: it includes the AVEVA Design Platform and engineering applications for piping and equipment, structural, ducting, cable trays and supports, including drafting. [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 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 Multi-Discipline Supports	Highly productive application for the design of all kinds of supports, from a complicated framework encompassing integral

(MDS)	hangers to a simple U-bolt. Use of 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. Fully dimensioned manufacturing drawings are produced automatically with all the necessary data for fabrication and erection of the support, including Material Take Offs and cut lengths.
AVEVA Laser Model Interface (LMI)	Laser Model Interface enables the use of as-built 3D model data by interfacing with point cloud data from laser scanning systems.
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 Area-based Automatic Drawing Production (ABA ADP)	Automates the production of volumetric drawings using specified templates, thus simplifying their update after a change to the PDMS model. This 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 HVAC, including a bill of materials. <i>This has not yet been updated to PDMS 12 but is planned for release at PDMS 12.1. Customers using the PDMS 11.6 version could adapt this to provide a basic level of function – see section 25.1.5.</i>
AVEVA Final Designer	Produces drawings directly from the PDMS model and allows them to be edited in an AutoCAD environment, with access to PDMS data for annotation and dimensioning.
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.
AVEVA OpenSteel	Allows import and export of files in Structural Detailing Neutral Format (SDNF) format to and from PDMS. Used for transferring data between 3D steel detailing packages and PDMS.
AVEVA ImPLANT-I	Converts MicroStation 3D geometric model (.DGN) files for input to PDMS or REVIEW; can also translate any associated Design Review (.DRV) files. Version 2 ( <i>new with *12.0.sp5*</i> ) is a major update and can translate DGN v8 files.
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. This 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. This can be used to import 3D geometric models into MicroStation or other systems such as Intergraph's PDS.
AVEVA Pipe Stress Interface	Provides a two-way interface for the data exchange between PDMS and the CAESAR II pipe stress system. Piping designers and stress engineers can exchange design and stress information.
AVEVA Mechanical Equipment Interface – import and export	<b>New at *12.0.SP5*</b> . These interfaces import and export geometric models using the standard STEP AP203 format; other PDMS objects may also be exported in the same format. The Mechanical Equipment geometry is stored in new geometric primitives – the solid GENPRIM and the curve GENCUR. See chapter 22.
AVEVA PML Publisher	Allows encryption of PML scripts, thereby enabling the use but not the modification of users' PDMS applications.
AVEVA Diagrams	<b>New at *12.0.SP4*</b> . Used for creating P&IDs and HVAC diagrams. It saves both the diagram and the engineering objects in the model database.
AVEVA Schematic Model Manager (formerly P&ID Manager)	Provides unrivalled features for the consolidation of all P&ID data for a project, independently of the P&ID authoring tool.
AVEVA Schematic 3D Integrator (formerly P&ID 3D Integrator)	Provides an integrated Schematic / 3D environment that allows customers to build their 3D model in a controlled manner, directly from the information on a P&ID, and enables consistency checks between the Schematic model and the 3D model.
AVEVA P&ID (formerly VPE P&ID)	A P&ID design system which stores intelligent engineering data onto graphical entities in an AutoCAD drawing while the designer draws and annotates the P&IDs. These intelligent P&IDs, containing tagged items, quantities and connectivity data, can be loaded into the AVEVA schematic model via AVEVA Schematics Manager, or synchronised with the AVEVA VPE Workbench. It supports different engineering standards, individual company working methods, and complex projects containing many hundreds of P&IDs – and is now included on the main Plant DVD, as from 12.0.SP5.
AVEVA VPE Workbench	An integrated engineering database which manages the evolving engineering descriptions of all tagged items in a plant.
AVEVA VPRM	Allows the effective management of materials, vendor documents, design documents, progress and costs through all phases of a project from inception to handover. It receives data from VPE to

	keep materials aligned with the engineering data, and also includes a management information system for project management.
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## 1.7 Summary of PDMS 12.0 Service Packs

Please note that changes or additions made to this document for each service pack are flagged as below.

### 1.7.1 Service Pack 1 (\*12.0.SP1\*)

This was the initial general release.

### 1.7.2 Service Pack 2 (\*12.0.SP2\*)

PDMS 12.0.SP2.1 replaced all previous PDMS 12.0 releases and included a new Cable Design application and a major update to the Access platforms, Stairs and Ladders application. The DVD release also included additional interface products, completing the new Plant Suite.

### 1.7.3 Service Pack 3 (\*12.0.SP3\*)

PDMS 12.0.SP3 added schematic (such as P&ID) model data to its integrated environment. A new Schematic 3D Integrator product enables quick and easy browsing and reporting on those data. It can also link 3D objects with their corresponding schematic objects, or even build them from the schematic, to ensure consistency. See chapter 18 Schematic 3D Integrator.

In addition, SP3 consolidates enhancements and corrections made in the light of early usage of PDMS 12.0.

### 1.7.4 Service Pack 4 (\*12.0.SP4\*)

Enhancements to the associated products Global, P&ID Manager & Schematic 3D Integrator, many of which require changes to PDMS itself. In particular, PDMS Admin has been enhanced to cover the new functions in Global and the GUI improved. The Schematics database has been enhanced for the improved Schematics functions.

SP4 sees the release of the new associated product AVEVA Diagrams, which replaces and expands the scope of Cable Diagrams to enable its use for P&IDs and HVAC diagrams.

It also includes many minor enhancements and corrections to defects. This includes an improved grid gadget.

The sample projects have also had many significant enhancements to provide sample data for new applications such as Cable Design and to correct defects.

### 1.7.5 Service Pack 5 (\*12.0.SP5\*)

In addition to numerous minor enhancements and corrections, this Service Pack makes provision for Schematics enhancements and adds GENPRIM and GENCUR (solid & curve) geometric primitives for the new AVEVA Mechanical Equipment interfaces – see brief description in section 1.6.2 and an overview in Chapter 22.

A new Status Control concept has been introduced – this covers the Control and Monitoring of both 2D & 3D object status in the appropriate applications.

There are also improvements to the PDMS Piping application (Production support, Wall thickness, Flange Offsets) and enhanced password security in command windows and files. New at PDMS 12.0.SP5 are the specialised Nuclear Applications – AVEVA Nuclear Concrete Design, AVEVA Nuclear Room Manager and AVEVA Nuclear Concrete Quantities.

There are significant changes to the associated Schematics products, including enhancements to the Schematics database schema. Access to this database is now licensed, which may have some implications for the way these products are used – see section 6.12.

The AVEVA Schematic Model Manager replaces and extends P&ID Manager and there are enhancements, mostly related to instrumentation, in AVEVA Diagrams.

The obsolete SAINT module has been removed.

## 2 PDMS 12.0

PDMS 12.0 is a major update – the biggest ever – that includes significant enhancements to the database structure and the underlying system technology as well the new Design Platform. In addition, there is improved workflow support for many engineering design disciplines, including some new to PDMS. The main reason for all these changes is to provide a more productive environment for all disciplines, both old and new.

There are of course many additions to the database to provide new functions and new applications – including the new engineering disciplines. In addition, there are options for alternative hierarchies – for example, to present a view more suited to fabrication or assembly. Further flexibility is provided by an ability to group objects across the usual database boundaries.

The design applications for each discipline have been much improved to incorporate all these changes and to further enhance their users' productivity by improving their ease of use.

Integration within and between disciplines within PDMS is improved by a new concept of 'associations' which allows rules to store relationships between objects – these rules are stored separately to provide flexibility of access and can be checked to ensure that relationships are not compromised during design changes.

An overview of all these changes is included in this bulletin with the details documented in a completely updated set of manuals.

### 2.1 Overview of enhancements

PDMS 12.0 is the first version of a new generation of Plant Design products based on the new AVEVA Design Platform. This platform has been designed to provide a solid technical foundation for both Marine and Plant design for the next ten years.

The first release of the system in late 2007 included all the major products; the second release in mid 2008 completes the full suite, with a few exceptions. It includes most of the interfaces and some new applications.

This section highlights the major enhancements provided in PDMS 12.0. The upgraded Design Platform includes an extended and more flexible database, with improved facilities for reporting and customisation, including PML. It provides a common Administration and Catalogue for all the relevant products. Many system limits have been relaxed and the User Interface has been extensively improved. In addition, all the PDMS engineering applications have been updated and extended – with provision for some new ones.

#### 2.1.1 User interface

The new Design Platform is based on Microsoft's .NET Framework 2.0, which provides excellent compatibility with Windows XP (and future versions of Windows) and simplifies integration with other Windows software. It provides an environment similar to Microsoft Office, which can be configured to suit the individual user. Increasing use is made of standard system components for operations such as printing and file browsing.

Changes are obvious from initial login, where there is now an option to use the Windows login authentication to bypass the PDMS login and password.

To provide the tools needed for wider use of the platform, it is now possible to have a wider variety of Explorers and Graphical displays and a database search facility is provided. Results from this search are shown in a new tabular grid gadget and can be manipulated in a manner similar to a spreadsheet.

### 2.1.2 Customisation

The rich and powerful user interface tools provided by .NET are being used to provide better integration and a more sophisticated user interface. They can now be accessed from users' and potentially third parties' PML programs using the new PML.NET tools. In addition the PML user interface tools have been enhanced – for example, the command line window has been completely overhauled and provides facilities for running macros and extensive cut-and-paste capabilities. For details, please refer to the new *.Net Customisation User Guide*.

### 2.1.3 Database

**\*12.0.sp4\***

There are new database types to cater for new applications, such as schematics, and extensive enhancements to existing databases to cater for all the new functions. The database now provides a User-defined Element Type (UDET) that can be used to provide more specific applications. This means, for example, that different types of Equipment may be more readily distinguished in users' own specialist tools.

*Please note that PDMS and the AVEVA Marine Hull & Outfitting products are built on common database technology. This means that some Hull database elements may be visible in the PDMS hierarchy, although it is not possible to access or build them. Hull data may be built only when Hull products are used; Outfitting products can access but not build Hull data. Please note that this also applies if Marine databases are copied or referenced into a Plant project.*

Database objects may also be grouped together in a more flexible way and even placed in different hierarchies for different applications. A new concept of 'Associations' provides a mechanism to store relationships such as connectivity between objects, both within and between disciplines. A similar concept may be used to link design objects with documents, either internal (such as Draft drawings) or external (PDF files).

In addition, several database limits, such as the number of current databases and the maximum size of each, have been relaxed. Number storage is now accurate enough for the largest plant coordinates to be used and manipulated with ease.

### 2.1.4 Administration

The Admin user interface has been extensively updated to cater for new functions and simplify the administrative role. In particular, a new access control assistant provides a much simpler way of defining the required access to data for different users.

There is a completely new Lexicon user interface to cover the dictionary database used for User-Defined Attributes (UDAs) and User-Defined Element Types (UDET's).

For details, see Chapter 6.

### 2.1.5 Catalogues & Specifications

A completely new application provides access to all aspects of the Cats & Specs environment, including Catalogue, Specification and material properties. It also covers new facilities such as 2D symbols for Schematics (for future development) and for certain types of 3D drawings. A new

Explorer provides suitable access to the data. Objects may now have connections for other disciplines such as Electrical and HVAC ducting.

The scope of the catalogue has been further increased to cover aspects of materials management with the introduction of part families. Each piping part has its own SCOM element, and all members of the family share the same geometry, connection and user defined property definitions. There are now branch and wall thickness tables to assist in the selection of appropriate piping components. There is also a new selection table mechanism for disciplines other than piping.

## **2.1.6 Engineering applications**

**\*12.0.sp2\***

The applications for each engineering discipline have been extensively updated and enhanced, in addition to the improved multi-discipline aspects such as associations and penetration management.

Of particular note are the improvements to design templates for Equipment, new tools for revising and splitting Piping, a much-extended HVAC catalogue and a completely new application for Access Platforms, Stairs & Ladders. At PDMS 12.0.sp2, PDMS includes new applications for Cableways (cable routes for spatial reservation) and Cable Trays. A new add-on product covers the Cables themselves, including both schematic diagrams and 3D.

### **Equipment**

There are many enhancements to the Equipment application, with the emphasis on ease-of-use.

Design templates can now be selected via a specification, with changes in the template easily propagated to all instances in the project. These specifications may reference components (SCOM) containing parameters for a family of equipment components.

Parameterised obstruction volumes and maintenance volumes can of course be incorporated into the template definition. Users can specify parametric or non-parametric equipment assemblies in an intelligent manner, using a variety of common parts for reuse, without the need to write bespoke PML applications.

Templates can also manage multiple repeat elements, such as the rungs on a ladder, as part of their core capability.

### **Piping**

Enhancements in the piping applications include a simpler but better way of specifying mitred bends and utilities for re-organising pipes, for example splitting them or changing the bore and/or piping specification.

There are new facilities for defining and using commonly-used piping assemblies such as vents, drains, control sets etc.

In common with other disciplines, pipes may be organised into systems in addition to their normal geographical hierarchy.

A major enhancement is to include the automatic Pipe Router as a standard part of PDMS. This, in combination with the interactive Pipe Editor, provides a truly productive piping design environment.

### **Ducting / HVAC**

The HVAC application also includes improved modelling utilities for splitting and data checking. Its catalogue is extended with a range of flexible ductwork and it is now easier for the user to define

joints. In addition, there is a new type of automated deliverable – detailed spool sketches for fabrication.

### **Structures – new Access platforms, Stairs and Ladders (ASL)**

PDMS 12 incorporates a completely new application for the design and detailing of access platforms, stairs and ladders. Its user interface is designed to be fast, powerful & easy to use and has high levels of 3D graphical interaction.

The new application is highly configurable so that it can easily be adapted to structural standards (DIN, ANSI etc) as required.

It uses fully parameterised definitions for the various components (Stair Tower, Stair Flight, Stair Landing, Platform, Ladder, Cage, Handrail) and stores the design intent so that the design is quick and easy to modify. It covers all stages of design from concept to detail: default configurations and simple routing options enable a fast initial definition, which may be refined as more data becomes available.

The use of standard structural sections for the detail design enables a detailed material take-off (MTO) and assessment of weight etc.

Please note that some parts of the application are not yet fully complete. For details, please see section 13.1.

### **Electrical Cabling Applications**

There are three components of the new applications for cabling: Cableways (volumes), Cable trays and the cables themselves. Cableways and Cable trays are included in PDMS but Cable Design is an add-on product.

Extensive catalogues for rectangular and circular cableways, together with over 22000 cables are included. VANTRUNK and ØGLÆND cable trays are also covered.

Cableways are used to reserve space and provide routing points, obeying the various rules according to cable classification.

Cable trays have new spec capabilities and can be automatically or manually created. Existing catalogues can be used but need upgrading to take advantage of the new functions.

Cable design takes the connectivity model, which can be imported from a diagram or CSV file or manually input, and determines the route. The system can output single line or core diagrams, lengths, mark points.

### **Nuclear Applications**

There are 3 new applications, earlier versions of which are also available for PDMS 11.6:

AVEVA Nuclear Concrete Design – a highly productive, specialised application for the design of complex concrete structures for nuclear power plant.

AVEVA Nuclear Concrete Quantities – specialised reporting for the nuclear power plant

AVEVA Nuclear Room Manager – a specialised application for managing nuclear power plant design by Room, Volume or Area.

### **2.1.7 Drawing Production**

Additional representation options in Draft – for aspects such as line-styles – make it easier to comply with industry standards. The use of colour has been improved to cover a wider range of colours, including the standard AutoCAD colours, and colour may now be selected independently of line style. TrueType text fonts may be used in place of the standard PDMS ones, which are expected to be phased out in due course.

Draft's drawings of the 3D model may now include a symbolic representation of an object, scaled to suit, rather than the full 3D representation. This is expected to be of great use, particularly the in new engineering applications such as electrical.

New output formats such as Adobe's PDF, Windows meta file and various image formats including TIFF are now available from Draft.

## **2.1.8 Schematics**

**\*12.0.SP5\***

The availability of tightly integrated Schematics products based on the AVEVA Design platform, and using a dedicated Schematics database, marks a major change at the PDMS 12.0 release. Significant improvements have been made at each service pack. These products now include AVEVA Diagrams, AVEVA Schematic 3D Integrator, and AVEVA Schematic Model Manager as well as AVEVA P&ID. Changes at SP5 include improved handling of instrumentation aimed particularly at improved integration with the new AVEVA Instrumentation product. These associated products are noted in the next section but have their own manuals and are not fully covered in this document.

## **2.1.9 Status Control**

**\*12.0.SP5\***

Status Control is a set of new functions that provide the ability to control and report on the status of individual model objects as they progress through their lifecycles. It can be applied to any model objects, e.g. tagged items, catalogue components, drawings, etc. A brief overview is given in chapter 20 and a new manual provides full details.

## **2.2 Documentation**

**\*12.0.sp5\***

The entire documentation set has been revised and updated; it is now available in both PDF and installed Help versions.

Some manuals have been withdrawn or renamed to reflect a different emphasis; there are also many new manuals for PDMS 12. They now include:

- Minimum System Requirements Plant – gives advice on hardware and operating environment required for PDMS & Associated products
- Database Management Reference Manual  
General information about database philosophy and navigation
- Data Model Reference Manual  
Information about database elements & attributes (Plant & Marine) – replaces DESIGN Reference Manual part 3.
- Design Common Functionality User Guide
- Lexicon User Guide
- Catview User Guide

- Drawing Production User Guide
- Catalogues and Specifications User Guide
- Catalogues and Specifications Reference Manual
- Equipment User Guide
- Structural Design
- Status Control
- AVEVA .NET Customization User Guide  
Using C# & Visual Studio for development of .NET add-ins for PDMS & Marine

Installing PDMS also installs the manuals for some of the associated products so that they are all listed in one index. This includes Area Based ADP, Cable Design, Diagrams, Final Designer, MDS, Nuclear Applications, Schematic Model Manager, Schematic 3D Integrator, PML Publisher, SQL-Direct and a number of interfaces. Installing the manuals does not mean that the products themselves are available; a separate license file entry and in some cases separate installation is required.

## 2.3 Associated products

### 2.3.1 AVEVA Global 12.0

Global has been enhanced to cater for the largest projects, to give better diagnostics and to cater for the enhancements made in PDMS 12, including:

- Propagation of Schematics and other new Marine database types and drawing files
- Removal of the limit of 500 drawing picture files per database
- Support for multiple drawing picture sub-folders
- Improved updates for Extract operations
- Enhanced diagnostics, including more information on remote copy operations
- Better reliability of REMOTE MERGE operations, in order to prevent unnecessary secondary merges
- Improved support for drawing files in extract databases – prevention of deletion when two extracts use the same file

In addition, the licensing method has been changed to allow a Global Satellite to use a Hub license if no satellite license is available.

#### **AVEVA Global 12.0.SP4**

**\*12.0.sp4\***

PDMS 12.0.SP4 supports the use of this new release of Global; use with earlier versions of Global is not supported. This new release uses additional features in the Global daemon to allow a number of significant enhancements, similar to those in Global 2.5 for PDMS 11.6.SP5. These include significant improvements in update speed and several enhancements aimed at providing better feedback to users, as well as some giving additional control of Global functions. The robustness of the daemon itself has been improved to minimize the number of occasions it needs to be re-started.

The new features in Global are documented in this release bulletin and updated versions of its other manuals.

*Please see the AVEVA Global User guide for detailed information.*

### 2.3.2 AVEVA Multi-Discipline Supports (MDS) 12.0

A number of enhancements have been made since the initial release of MDS version 11.6; some were also included in later service packs.

A major change for PDMS 12 is that MDS parameters are now stored in the catalogue database, thus allowing a much faster start-up time. In addition, it is easier for users to define their own standards for ancillary types and reports may now be directed direct to Excel rather than via a CSV file.

Other new features include:

- Ancillary Clearance Values
- Health Check Utility – to check integrity of support data
- Snipes on steelwork frameworks
- Framework Bracing
- Automatic Steelwork Orientation
- Lighting Supports

Please see the *AVEVA MDS User bulletin* for detailed information.

### 2.3.3 AVEVA Area-Based ADP (ABA)

**\*12.0.sp2\***

Major updates have been made to Area-Based Automated Drawing Production for compatibility with PDMS 12.0 and to improve its robustness. Appropriate changes have also been made to the manuals and to MDS; users will need to make adjustments to any other use of the system – see section 0. Major updates cover the following:

- The new line style and colour changes
- List Column gadget replaced by a .net GRIDCONTROL
- The implementation of True-Type fonts
- Spaces in file names

Please see the *Area Based ADP Administrator Guide* and *User Guide* for detailed information.

### 2.3.4 AVEVA Laser Model Interface (LMI) 12.0

LMI has been updated for compatibility with PDMS 12.0 but there is no major change at this release.

### 2.3.5 AVEVA Model Management 12.0

Model Management 12.0 is compatible with both PDMS 12.0 and 11.6.

Clash Manager may now be used *in stand-alone mode only* (i.e. without connecting to VPE) with a SQL-Server database as an alternative to Oracle.

*For details, please see the Model Management User Bulletin.*

### 2.3.6 AVEVA SQL-Direct 12.0

SQL-Direct has been extended to work with MSDE, and thus with multi-threaded applications.

### 2.3.7 AVEVA QUERY 12.0

QUERY is loaded with PDMS 12.0 and works in the same manner as earlier releases.

### 2.3.8 AVEVA Diagrams

**\*12.0.sp5\***

AVEVA Diagrams, used for creating P&IDs and HVAC diagrams, saves both the diagram and the engineering objects in the Schematic model database. The product and its data model have been improved at SP5 for advanced instrumentation diagrams. This enables users to define separate lines and instrumentation loops which are clearly differentiated from Pipelines and the main flows. Details of updates at SP5 are given in Chapter 20.

### 2.3.9 AVEVA Schematic 3D Integrator

**\*12.0.sp4\***

This is a new product at PDMS 12.0, initially called P&ID 3D Integrator. The Integrator provides an integrated environment for both schematic and 3D models, enabling quick and easy browsing and reporting on the data. Integrator can also link 3D objects with their corresponding schematic objects, or even build them from the schematic, to ensure consistency.

Schematic Integrator has been further extended at the 12.0.SP4 release in the light of feedback from early adopters. In particular, the same object name can now be used for an element in a schematics database as is used in a design database for the equivalent 3D element.

See Chapter 18 – Schematic 3D Integrator. Full details can be found in the *AVEVA SCHEMATIC 3D Integrator User Guide*.

### 2.3.10 AVEVA Schematic Model Manager

**\*12.0.sp5\***

AVEVA Schematic Model Manager is a new product at PDMS 12.0.SP5, which replaces AVEVA P&ID Manager and is used to import P&ID data into PDMS Schematic databases. The P&ID data is imported from an XML file, the content of which complies with ISO 15926. The ISO 15926 data may be exported from AVEVA P&ID and from other supported P&ID systems. Schematic Model Manager, unlike its forerunner P&ID Manager, is accessed via the Plant and Marine login dialogue or by the module change mechanism.

Full details can be found in Chapter 19 and the *AVEVA SCHEMATIC Model Manager User Guide*.

### 2.3.11 AVEVA Review 6.4 & 12.0 – and ReviewShare

#### AVEVA ReviewShare

ReviewShare is a new, freely downloadable application designed to be particularly easy to install and use. It offers a threaded document based collaboration with an integrated streaming 3D viewer for easy 3D navigation. It includes mark-up capabilities, together with the option to include other graphics as bit-maps, to provide a simple but effective medium for discussion based around the 3D model.

#### AVEVA Review 6.4

- Supports the publishing of models to the ReviewShare server and the preparation of ReviewShare documents

- Has additional VizStream ZGL translators
- Extends the Laser Model Interface (LMI) API to enable enhanced interaction with as-built models
- Provides enhanced Section Planes and Clip Volumes
- Introduces a new Quick Find facility and the Export of Textures

## **AVEVA Review 12.0**

**\*12.0.sp5\***

Review 12.0 enables direct access to live PDMS 12.0.SP3 data, together with further ReviewShare integration and support for further 3D model formats, and Workspace Management. Later service packs of Review 12.0 are available for later service packs of PDMS.

## **2.3.12 AVEVA P&ID 12.0.SP1**

**\*12.0.sp5\***

AVEVA P&ID 12.0.SP1.0 is now available for install from the AVEVA Plant Design (and AVEVA Marine Design) Product DVD. After installing AVEVA P&ID 12.0.SP1.0 please download and install the Partial Fix Release 90130, AVEVA P&ID 12.0.SP1.1. Fix Releases can be downloaded from AVEVA Support website.

## **2.3.13 AVEVA Interface products**

**\*12.0.sp5\***

The following interface products are available for release with PDMS 12.0.

### **AVEVA Open Steel 12.0**

### **AVEVA Pipe Stress Interface (PSI) 12.0**

### **AVEVA ImPLANT-I 2.1**

### **AVEVA ImPLANT-STL 1.2**

### **AVEVA ExPLANT-I 1.3**

### **AVEVA ExPLANT-A 1.1**

### **AVEVA Final Designer 1.3**

This is compatible with AutoCAD 2006 and is largely unchanged since PDMS 11.6. However, changes have been made to DRAFT to support PDMS 12.0 functions.

## **2.3.14 Catview**

**\*12.0.sp4\***

Catview is an unsupported 'freeware' application for piping catalogues. It has been updated for PDMS 12.0 but is no longer distributed on the release DVDs. Copies are available on the AVEVA web-site or by request from your local AVEVA office.

## **2.4 Operating Environment**

## 2.4.1 PC hardware configuration

A minimum of 1 GB of memory is recommended for this release. 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 display. For details, please refer to the *Minimum Systems Requirements* manual.

## 2.4.2 Microsoft Windows

**\*12.0.sp4\***

### Desktop

PDMS 12.0 is supported for use on Microsoft Windows XP Professional Service Pack (SP) 2 or 3, with appropriate patches. It is not yet supported on Windows Vista – please see section 2.9.2 below. Limited support for PDMS – but NOT Global – is available on Windows 2000 Professional; please note that Microsoft no longer offers mainstream support for this. This limited support will be withdrawn at PDMS 12.1 (see section 2.9.3).

Windows XP SP2 or 3 require changes to the default settings. The Internet Connection Firewall (ICF) should be turned off or configured to enable access to the database & license servers. In addition, Group Policy changes (which alter the registry) are required for users of Global projects to ensure that RPC requests do not require authentication. Details are given in the *Installation Guide*.

### Server

PDMS does not usually run on the server but relies on it for file-handling. The license server software may be installed on the server or on any accessible desktop. The server operating system should be Windows 2000 Server or Windows 2003 Server, with the latest service packs and patches. (The Global daemon requires Windows 2003 (or XP) or later to support its extended diagnostics.)

Please note that AVEVA no longer supports the use of Samba on IRIX servers for use with PDMS.

## 2.4.3 Microsoft .NET Framework & fonts

PDMS 12.0 requires Microsoft's .NET Framework 2.0, which is supplied on the DVD and installed if required. This is used for the PDMS graphical user interface. It should be noted that it is possible to install multiple versions of .NET in order to support other applications – such as PDMS 11.6, which requires .NET 1.1.

### Serialization

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

C:\Documents and Settings\\Local Settings\Application Data\Aveva\PDMS

## 2.4.4 Microsoft Office

**\*12.0.sp4\***

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

### 2.4.5 Graphics cards

Due to the rapidly changing list of hardware-accelerated OpenGL graphics cards commercially available, an up-to-date list of supported graphics cards is not included in the documentation released with PDMS. The AVEVA Web-site (<http://www.aveva.com>) – Product Support section – contains a list of tested and supported graphics cards.

## 2.5 Upgrading from PDMS 11

PDMS 12.0 is a major update from earlier releases of PDMS but every effort has been made to simplify the upgrade process. Most of the database updates are automatically applied when using PDMS 12. **Please note that once a database has been written using PDMS 12, it will no longer be accessible by PDMS 11.** Upgrade scripts are provided to upgrade projects from PDMS 11.6. It is strongly recommended that projects are backed up before commencing the upgrade process.

Global projects should be upgraded at all sites simultaneously; the recommended procedure is to consolidate them at the hub, perform the upgrade and re-distribute as required.

It should be noted that PDMS 12.0 databases will not be accessible by PDMS 11.x due to format changes. **However, the inconvenience should be minimal as PDMS 12.0 can access PDMS 11.6 databases (in read mode) from a 'foreign' project.**

Users' own PML applications from PDMS 11.4 onwards should continue to work, after being amended to use the new application switching mechanism. Please see Chapter 23. It is possible that some form layouts will be adversely affected by the change at PDMS 11.6 to the standard Windows proportional screen fonts, though this depends on the way the forms have been defined. There is also scope for enhancement by using the new facilities offered by PML, such as toolbars and docking forms. Many of the AVEVA applications have been upgraded in this way, so users who have revised the AVEVA applications should review their changes in the light of this work.

*Any Data Access Routines (DARs) programs must be re-compiled – please see note below.*

### 2.5.1 Summary of project upgrade process

**\*12.0.SP5\***

There are major changes to PDMS databases between PDMS 11 and PDMS 12, including many extensions, more accurate (double precision) numbers and changes to Draft pens. There are also changes to the system database to enable many of the new functions in PDMS 12.

Draft Picture files are now stored in a more complex directory structure to cope better with very large volumes of drawings – for details, please see section 16.7. The Picture files also need to be upgraded to cope with the more accurate coordinates.

The upgrade to increase accuracy is performed ‘on-the-fly’ by changing data as it is updated in the normal course of design work. It is not necessary to use the database Reconfigurer function but it is necessary to perform some major upgrades on the DRAFT (Paddle) databases. A script is provided – see section 2.5.2 below.

The upgrade process is initiated by a Free User, who is allowed to enter PDMS 12 Monitor and Admin in a PDMS 11.6 Project in order to run the main script upgradeMac. Before doing this, the following actions should be performed:

- Ensure that there are no extracts on PADD databases and that they have been synchronised at the hub for Global projects
- Run the upgrade script, which works on both Global projects (see note below) and non-Global projects. Please note that it may be simpler to consolidate a project at the hub and then re-distribute after performing the upgrade.

Please note that any attempt to access a constructor module before completing the upgrade will result in an error message:

```

AVEVA Plant Monitor Mk12.0.0.Test22 (WINDOWS-NT 5.1) (3 Oct 2007 : 16:34)
(c) Copyright 1974 to 2007 AVEVA Solutions Limited
Pre-release Test version - NOT for Production use
*IGNORE STRING* This is BETA2, Patch 7, Build 7

Non Graphics Device (Appware will not be loaded).
* /SAMPLE
* design
<143,60> You are trying to open a pre 12 project without first upgrading to 12.
If you wish to upgrade please follow the upgrade procedure described in the
product manuals.
-----
ERROR CONDITION OCCURRED WHILST MODULE SWITCHING
<41,55> No databases to work from.
In line 2 of Command/Form Forced Input
design
-----

```

*Error attempting to access a PDMS 11 project using PDMS 12*

Among other things, the upgrade process will:

- Enter Admin
  - Delete and re-create the COMMS elements to allow larger MDBs
  - Mark the project as a PDMS 12 project
  - Update the module definitions, including removal of the obsolete DESCOMP module and its COMP databases
- Enter DRAFT
  - Create a new DRAFT (PADD) database (MASTER/STYLWL) with a STYLWL and add it to relevant MDBs
  - Read %pdmsdf1ts%/dra-pens and dra-lindef and create definitions of user defined pens if necessary
  - Run the command UPDATE STYLEATTS on all current PADD Databases
  - Create a new directory structure for DRAFT Picture Files
  - Optionally regenerate the picture files to cater for increased accuracy (this is the time-consuming step)

Notes:

- DRAFT databases that do not belong to an MDB will be missed, as the process upgrades each MDB containing one or more PADD databases. Users are advised to create a temporary MDB for all such ‘orphan’ databases, if any.
- For a Global project the sequence should be:-
  - At the Hub (where the STYLWL should be created) go through all PADD databases (those that are primary at the Hub will be writeable, those that are non-primary at the Hub will be read-only); add all necessary pen information to the new STYLWL (which is writeable at this location)
  - Propagate the db containing the STYLWL to all locations.
  - At each location go to each PADD db and run the Update Style Attributes command.
- If applicable, the user should delete and re-create all Isodraft symbol files.
- TrueType fonts are available in PDMS 12 but may not be mixed with the older PDMS fonts (font families 1 to 4) in any way. If you wish to upgrade libraries or drawings, it is therefore necessary to output them to a Data Listing, edit it to change the fonts and then re-input: libraries and then drawings. Before re-input, the receiving project should have suitable fonts created as new font families (from 5 onwards).
- It is advisable to update the spatial map after upgrading a project to PDMS12. This can be achieved using the command MAP BUILD MDB.

## 2.5.2 Performing the upgrade process

**\*12.0.sp4\***

### Upgrade macro files

Five Macro files are included with the PDMS 12.0 DRAFT user interface (default location C:\AVEVA\plant\PDMS12.0.SP4\pdmsui\dra\upgrade)

The location of these files is referenced by a global variable in the main Upgrade macro UpgradeMac (!!upgradeDirectory = '%PDMSUI%\DRA\upgrade')

The upgrade uses a function called tstAllocRecdPM.pmlfnc which will need to be enabled using the command:

```
PML REHASH ALL
```

As part of the upgrade process, the project is locked to prevent new users from accessing it. There is no User prompt. All Users are expunged, and all entries in the COMMS database are deleted. This is in order to increase the number of DBs in an MDB from 300 to 1000.

### Non-Global projects

If the project is not Global, the process is very simple. The upgrade is initiated by running the upgradeMac macro from the Monitor command window, either by typing:

```
$m/C:\AVEVA\plant\PDMS12.0.SP4\pdmsui\dra\upgrade\upgradeMac
```

or by dropping the upgrade macro on to the command pane.

The process is tracked by writing 2 files in %PDMSUSER% as it progresses:-

1. Logfile<proj code>                   ALPHA LOG file: echo of the console window
2. UpgradeLog<proj code>            Upgrade results file reporting success/failures

If these log files show no problems, the project itself should be reviewed to check that all is well. It might also be worthwhile checking the database integrity using DICE. The project should now be ready for use with PDMS 12.

## Global projects

Global projects require a little more work – it may be easier to bring all the data back to the hub for the upgrade. However, this is not always possible so the upgrade process can be carried out globally if a few additional steps are taken – note that all sites must be upgraded before the project is used.

When upgrading a Global project, the daemon must be stopped at all locations. Upgrading from an earlier release of PDMS 12.0 is straightforward; the new daemons should be installed at each location and then restarted. Upgrading from PDMS 11 needs the upgrade script to be run at the HUB and the Global database copied to all Satellite locations.

If upgrading from PDMS 11.2 or 11.3 (Global 1), the transaction database for each satellite should also be copied to the satellite. (It is not necessary to copy the transaction databases when upgrading from Global 2.1.0 or later.)

The upgrade script should then be run at each satellite. All the projects associated with the global set-up must be upgraded before the upgrade is complete. Daemons can then be restarted and you should INITIALISE each satellite.

Please see the *AVEVA PDMS Installation Guide* and the *AVEVA Global Installation Guide*.

## Summary process for upgrading Global projects from PDMS 11 to PDMS 12

Preliminary checks:

Ensure that the HUB has an up-to-date view of every non-propagating PADD database which is primary elsewhere. This is necessary to gather all required pen data at the project HUB.

- This may mean issuing manual UPDATE DB commands for non-propagating PADD databases which are primary at satellites
- EXTRACT FLUSH DB for all PADD working extracts at satellites (if any)
- All locations must have their old daemons stopped, and their new Global 12.0 Daemons restarted prior to starting the upgrade process.  
***Make certain that the Daemons are running***
- Stop any update events

Upgrade process:

### 1. Run the upgrade at the HUB

As above, enter Monitor and run:

```
$m/C:\AVEVA\plant\PDMS12.0.SP4\pdmsui\dra\upgrade\upgradeMac
```

This performs the upgrade and propagates a PADD database MASTER/STYLWL to satellites. Log files are written as above. It is best to wait for the whole hub upgrade to finish before attempting to upgrade the satellite locations.

### 2. Review the results

3. **Run the upgrade at each SATELLITE**, after checking that the propagated STYLWL database has arrived:

```
$m/C:\AVEVA\plant\PDMS12.0.SP4\pdmsui\dra\upgrade\upgradeMac
```

This performs the upgrade and allocates a PADD db to satellites

4. Final review of the results – check the project at each site!

**Please note:**

*The Global Daemon is no longer supported on Windows 2000 or Windows 2000 Server. The daemon will no longer run on this operating system, as it now makes use of some diagnostic functions that are not available on Windows 2000.*

### 2.5.3 Upgrading Area-Based ADP tasks

**\*12.0.sp2\***

At version 12.0, there have been changes to the way in which Task elements are modified.

If you have created any of your own Tasks that have an associated form, for example as with the system task \*Arrange\_Labels and its form !!abaArrange, then you will need to make the following modifications to the form definition file.

1. Add two new form members in the setup form section as follows;

```
member .task      is ABATASK
member .form      is FORM
```

The member .task will hold the object definition for the task being modified and the .form method will hold details of the form that called the form being used to modify the parameters.

2. The method .apply() (or whatever your call back is named) must now carry out the two following actions;

```
-- Reset the task object
!this.task.paramVal = !parameters
-- Transfer the modified task back to the calling form
!this.form.receiveTask(!this.task)
```

The first action is to reset the task object held in the form member .task with the values for the modified parameters, hence the variable !parameters is significant.

The second action returns the modified task object to the calling form. Consequently, all forms that allow the modification of Task parameters now contain the method .receiveTask(ABATASK).

### 2.5.4 Mixing PDMS 12 and PDMS 11.6 projects

PDMS 12.0 projects may continue to use PDMS 11.6 databases as foreign databases, so there should be no need to maintain two versions of shared corporate catalogues until all projects have been upgraded and the corporate catalogue projects are done last. Any foreign projects that contain Draft Admin elements, for example Back Sheets, etc must be upgraded first. However, PDMS 11.6 projects cannot use PDMS 12 databases, so this does need to be planned carefully.

Once the database includes elements that use the newly increased accuracy, its use in PDMS 11.6 will be incorrect and unpredictable, so this is prevented. Any attempt to enter an upgraded project (or a newly created PDMS 12 project) using PDMS 11.6 will result in an error message:

```

Monitor Mk11.6.SP4.0 - VANTAGE PDMS Console
This version of PDMS was issued to lsw2k CRO26 Terminal Service Enabled Session
and will only operate on registered hardware

VANTAGE PDMS Monitor Mk11.6.SP4.0 <WINDOWS-NT 5.1> <? Feb 2007 : 18:53>
(c) Copyright 1974 to 2007 AVEVA Solutions Limited
Issued to lsw2k CRO26 Terminal Service Enabled Session

Non Graphics Device (Appware will not be loaded).
*proj sam
(43,59) Unable to open system DB for project SAM. Is your environment variable se
t correctly?
(43,45) Unable to open DB System DB, dabacon error 549
In line 1 of Command/Form Input
proj sam
(43,45) Unable to open DB System DB, dabacon error 549
*

```

*Error attempting to access a PDMS 12 project using PDMS 11*

## 2.5.5 Features removed at PDMS 12

The syntax in the project creation program MAKE no longer has the command for specifying pathnames for database schema files. This has been obsolete since PDMS 11.3, when these files were moved to PDMSEXE, but was retained through the PDMS 11 lifecycle for upwards compatibility.

The COMP database has been removed as the DESIGN COMPARE option is no longer available: it has been replaced by the new SCHEMATIC 3D Integrator.

## 2.6 Upgrading from earlier PDMS 12.0 releases \*12.0.SP5\*

### 2.6.1 Upgrade from P&ID Manager to Schematic Model Manager

Users who have been running a project using PDMS 12.0.SP3 or 12.0.SP4 will need to upgrade it, using a macro supplied.

The main reason is to ensure that the new Schematic Model Manager module is loaded into the module list. The process will also remove any references to the Cable Diagrams and Marine Diagrams modules and replace them with the Diagrams module. If this has already been done, perhaps at 12.0.SP4, the macro will ignore this part and continue.

Schematic data already stored in SCHE databases, if any, will also be upgraded:

At 12.0.SP5, schematic off-line instruments (SCOINS) can have an array of references stored in a SCIREF attribute. In previous versions, the SCOINS could only have a single reference stored in a CREF attribute. The macro collects all the SCOINS from all the SCHE databases and moves any existing CREF attribute onto the first array connection of the SCIREF attribute.

To perform the upgrade, the user must have FREE access to the project and there should be no users accessing the project. If a project has no schematic data, the macro should still be run for any project that will use any of the above modules to ensure they are correctly set up. Foreign SCHE databases will be ignored, so the upgrade must be done on each project.

Any extra schematic databases must have all data issued to the parent. Only the parent databases will be upgraded, not the extracts. In addition, only the original schematic databases will be upgraded, any copy databases will be ignored.

To run the macro, enter the project and type the following:

```
$M/%PDMSUI%/ADM/ADMIN/UPGRADESP5.PMLMAC
```

It does not matter which module the macro is run from; it will leave the user in the ADMIN module. After the macro has been run the user should inspect the following log file:

```
%PDMSUSER%/upgradeLog<proj code>
```

Any warnings or errors are logged in this file. As an example, it might not be possible to update a SCOINS object, perhaps because it is locked. This will be logged so that the user can take corrective action – in this instance, the user could unlock the SCOINS objects and re-run the macro.

## 2.6.2 Setting Schematic Model Manager options

### For projects upgrading from 12.0.SP4

Schematic Model Manager will automatically copy its options files from the P&ID Manager folder, e.g. C:\Aveva\Projects\xxx\xxxdfmts\P&ID Manager\Options,

to the new project defaults schematic configuration folder, e.g. C:\Aveva\Projects\xxx\xxxdfmts\Schematic\Configuration

### For projects upgrading from earlier versions

The options files must be manually copied over from their location in the installed executable folder, e.g. C:\Aveva\Plant\Pdms12.0.SP3\P&ID Manager\Options,

to the project defaults schematic configuration folder, e.g. C:\Aveva\Projects\xxx\xxxdfmts\Schematic\Configuration

### In all cases

Check that all mandatory UDAs have been made available. Enter Lexicon, click on Schematic Model Manager > UDA Catalogue, make any changes needed to the selection, and press Apply.

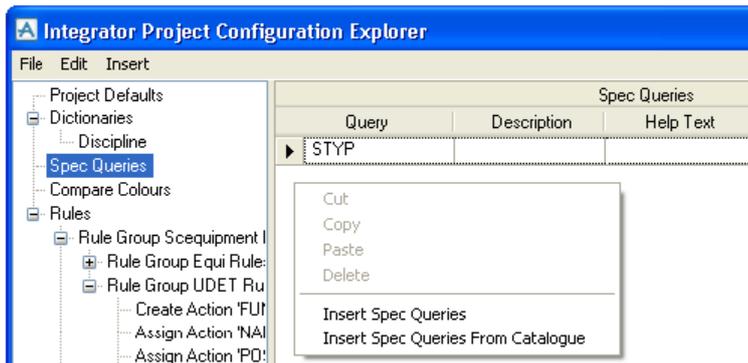
## 2.6.3 Upgrading Existing 3D Integrator Projects

The SP5 version of Integrator has a new ProjectConfiguration.xml file in the installed executable folder. There are only minor changes in this version.

Existing projects may copy the new ProjectConfiguration.xml file to the <project>dfmts\ModelManagement folder and then modify it according to their own requirements.

Alternatively, the existing file may be modified if required. Administrators should ensure the appropriate environment variable, e.g. xxxdfmts, is set.

If syntax errors are reported following **Integrator > Show** from the main menu, the ProjectConfiguration.xml file is an old version and must be modified or replaced. The probable reason is that there are rules defined using selectors that have not been entered in the Spec Queries section. Here is an example with STYP added.



If existing projects have their own copy of the the HVACStypeTable.xml file in the <project>dfmts\ModelManagement folder, this should be deleted. Integrator will then look for this file in the installed executable folder. This file should only be copied to the <project>dfmts\ModelManagement folder if it is to be modified to suit project requirements.

## 2.6.4 Change to policy for .NET assembly versions

Customers who have written PML.NET applications for earlier releases are advised to refer to section 23.1.1 in the Customisation chapter.

## 2.7 Compatibility

### 2.7.1 AutoCAD

**\*12.0.sp2\***

PDMS 12.0 AutoDRAFT and DXF output functions have been designed and tested with AutoCAD® 2006 and 2007. No later version of AutoCAD is supported,

Final Designer (version 1.3.SP2, available on the PDMS 12.0 DVD) is compatible with PDMS 12.0 and AutoCAD® 2006, but not 2007 or later, and is unchanged since PDMS11.6. PDMS 12.0 is not compatible with earlier versions of AutoCAD.

### 2.7.2 Data Access Routines (DARs)

Any Data Access Routines (DARs) programs must be re-compiled in Double Precision (/real-size:64) to work with PDMS 12, using a (different) IFORT compiler. There is no change to the C compiler.

In addition, changes to the Property database made at PDMS 11.6.SP4 may also require minor changes to be made to DARs programs. Prior to this, a DARs program had to navigate to the relevant

CMPD or TUBD element and then query the real attribute, in order to obtain a property for a piping component or similar. DARS has been updated so that this still works for either existing data or for simple expressions; however, it will give the wrong answer if more complex expressions are used.

*The type of expression that will not work is one which uses PARA or DESP while a simple expression is similar to (33.5 \* 8.6)*

To upgrade any such DARS applications, use the pseudo attribute PROPRE of the Design element, with the qualifier of the property required.

## **2.8 Notice of change in support status \*12.0.sp5\***

The support status for all full releases of PDMS is shown on the AVEVA web-site. The release of PDMS 12.0 has now triggered a change of status for PDMS 11.4 and 11.5 to ‘Withdrawn’ and ‘Limited’.

## **2.9 Future considerations**

### **2.9.1 Withdrawal of old design applications**

#### **Access, Stairs & Ladders (ASL)**

**\*12.0.SP5\***

At PDMS 12.0, there is a completely new Access platforms, Stairs & Ladders application (see section 13.1). However, this still has some limitations, so use of the old ASL application is recommended, even though it will be removed at a future release. It is available, hidden, at PDMS 12.0 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
```

#### **Hangers & Supports**

At PDMS 12.0, 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 12.0. 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
```

### **2.9.2 Windows Vista & Windows 7**

**\*12.0.sp5\***

Microsoft released the Windows Vista in late 2006, followed by the first service pack in Spring 2008. This is a major upgrade and requires some significant changes, including some to the installation procedures. AVEVA has investigated the implications and commenced preparation for its support with the release of an updated license server, FlexMan 4.1, which can also be used by older products.

The successor to Vista, Windows 7, is now expected to be released in October 2009 and seems likely to achieve a more rapid acceptance. Many customers have indicated that they plan to move directly from Windows XP to the Windows 7 operating system.

PDMS 12.1 will be delivered in 2010 and will enable AVEVA to provide full support on Windows 7. To support the limited number of customers intending to use Windows Vista, AVEVA will be following Microsoft's best practice guidance to ensure that the 12.1 release will be fully compatible with both Vista (Business and Enterprise) and Windows 7.

Please note that almost all development at AVEVA is currently carried out using Windows XP (service pack 2 or 3), which is at present the preferred option. PDMS 12.1 will remain supported on Windows XP, with the then latest service pack.

### 2.9.3 Windows 2000

**\*12.0.sp4\***

With the advent of support for Windows Vista and 7, support for Windows 2000, which is no longer supported by Microsoft, will be discontinued at PDMS 12.1.

### 2.9.4 PML features

There are many new features of PML listed in chapter 23. The following features are obsolescent and will be removed at a later release.

#### File browser

There is a new file browser included in the core capability of PDMS 12.0. The use of the old PML based one will be phased out; it will then be removed from PMLLIB at a future release.

#### RGROUP gadget

The RGROUP gadget, which replaced the withdrawn RADIO gadget, has itself been superseded by the radio group capability of the FRAME gadget in conjunction with RTOGGLE gadgets. It still exists in PDMS 12.0 and continues to work, but its use is discouraged; it will be removed in a future release.

#### Cursor Functions

Cursor Functions e.g. ID@, are deprecated and will be phased out.

These functions are an input mechanism that is inappropriate to the current look and feel. It is also becoming increasingly difficult and expensive to maintain these demand driven input facilities in an event driven world.

It is proposed to replace them by Event Driven Graphical interactions (EDG). AVEVA expects to provide and document a set of atomic event modes, which can be assigned to views, to allow a similar degree of interaction.

Cursor functions have the following specific problems:

- They are demand driven. The entire user interface, apart from graphical view gadgets, has to be greyed-out while they are in progress in order to prevent the user attempting to perform other operations. This is both constricting and visually obtrusive.
- This is very slow because it has to be performed at the individual gadget level for each displayed form because any of them may contain one or more graphical view gadgets.

- Interaction is not view specific, as the cursor function might be implemented in any of the views. If it is not, any attempted interaction with inappropriate views must alert an error.
- The user cannot be prompted in a specific view because its gadgets are greyed-out, and the interaction is potentially not view specific. The alternative is the status line, which is usually remote from the required interaction and hence not very helpful to users.

### 2.9.5 Unicode characters

**\*12.0.sp2\***

PDMS has supported the use of a range of character sets for many years. This involves setting the character set (CHARSET) in Admin and ensuring that appropriate font files are used for the drawing production modules, Draft and Isodraft. A newer standard, Unicode, has the potential to support most world languages in a simpler manner and is used by the current versions of many other applications, as well as Windows. Since PDMS 11.6, it has also been used for the PDMS GUI.

The use of Unicode should make it rather simpler to support additional languages and to exchange data with other applications in a variety of different languages. In combination with the use of TrueType text, it will also open up the use of a large range of high-quality fonts for drawing production. In addition, it will assist the removal of some limitations in the use of the various character sets.

It is planned to use Unicode for the storage of names and text attributes in PDMS. At PDMS 12.1, this will be an option, in order to allow continued use of existing databases and avoid the need to reconfiguration. It is likely that the use of the older ‘internal’ format will be phased out at some point in the future.

### 2.9.6 PDMS Plotfiles

**\*12.0.sp2**

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 12.0 can output Adobe’s PDF, the Windows enhanced meta-file (EMF) and a variety of bit-map formats such as TIFF. ***It is proposed to drop the plotfile option at some point during the life of PDMS 12.1.***

In effect, its use 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.

## 3 Database Enhancements

There are very many changes to the database system and structure for PDMS 12.0. The most important are listed here. Full details are given in the new *Data Model Reference Manual*, which contains details of all the database types, listing their elements, their positions in the hierarchy and their attributes.

### 3.1 New database types

#### 3.1.1 Schematic

A new **SCHEmatic** database is provided for storage of schematics data, which is used by the new *AVEVA Diagrams*, *Schematic Model Manager* and *Schematic 3D Integrator* products. This contains a complete definition of the logical structure of the Plant for comparison with the 3D design. License files for each of these products include licenses for access to the database itself.

#### 3.1.2 Manufacturing & Name Sequence

In addition, new databases are provided for **MANUFACTuring** and **NameSEQUence**. These will not usually be used in PDMS but are used in AVEVA Marine.

### 3.2 Database top level elements

A number of new top level elements, including many types of **WORLD**, have been added. This list includes all such elements in PDMS 12.0, including the new ones, with additions indicated by an asterisk\*.

#### 3.2.1 Catalogue (CATA) database top level elements

- Group World Element (GPWLD)
- Nominal Bore World Element (NBRWLD)
- \* Part World Element (PRTWLD)
- Specification World Element (SPWLD)
- \* Table World Element (TABWLD)
- Connection Compatibility Table Element (CCTABLE)
- Catalogue DB Element (CATALOGUE)
- Units Element (UNIT)
- Bolt Table Element (BLTABLE)

#### 3.2.2 Design (DESI) database top level elements

- Group World Element (GPWLD),
- Site (SITE),

Template World Element (TPWLD),  
 Rule World Element (RLWLD),  
 \* Document World Element (DOWLD),  
 Area World Element (AREAWLD),  
 Fabrication Machine World Element (FMWLD),  
 Grid World Element (GRIDWLD),  
 Weld Table World Element (MWLWLD),  
 Standard World Element (STDWLD),  
 \* Association Instance World Element (ASSOWL),  
 \* Association Definition World Element (ASDFWL),  
 \* Application Data World Element (APPLDWORLD),  
 \* System Group World Element (SYGPWL),  
 \* Integrator World Element (CYMWRL),  
 \* Link Document Element (LINKWLD),

The following elements are present and may be visible in some circumstances but are used only for the Marine products:

Hull Block World Element (HBLWLD),  
 (Hull) Surface World Element (SSOWLD),  
 (Hull) Reference Surface World Element (RSOWLD),  
 (Hull) Compartment World Element (COMWLD),  
 (Hull) Mog World Element (MOGWLD),  
 (Hull) Block Element (BLOCK),  
 Hull Curved Model World Element (HCMWLD)  
 Building Block (BBLOCK),  
 Assembly World Element (ASWLD)

### **3.2.3 DRAFT (PADD) database top level elements**

LIBY, DEPT, PTWLD, \* STYLWL

### **3.2.4 Property (PROP) database top level elements**

Group World Element (GPWLD),  
 MATWORLD, CASWORLD, RUNWORLD, CMPWORLD, CONWORLD

### **3.2.5 Schematic (SCHE) database top level elements**

Schematic Group Element (SCGROUP)

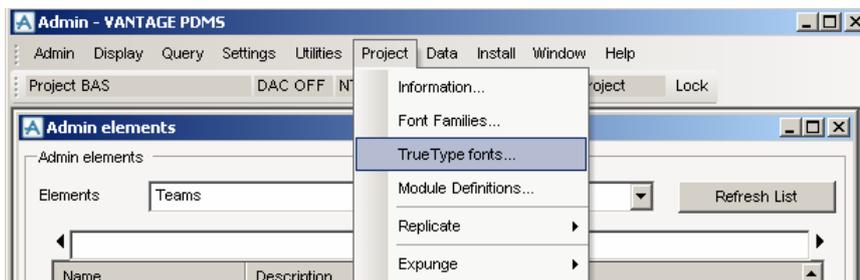
### 3.2.6 Spooler (ISOD) database top level elements

Isometrics Department Element (ISODEPT)

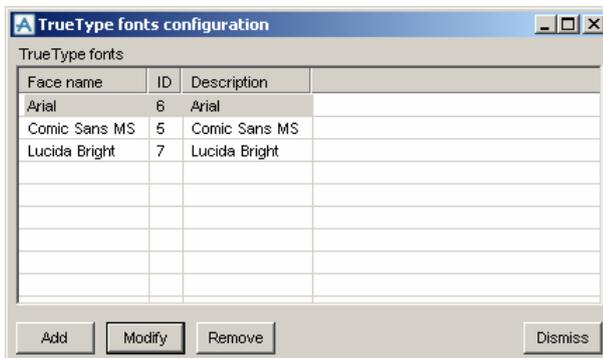
## 3.3 System database

### 3.3.1 TrueType fonts

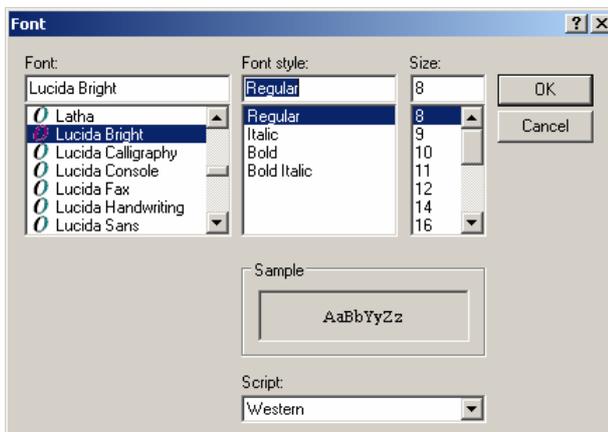
The System database has been updated to include TrueType font information for use in DRAFT. The information about the fonts is stored under the Font World element (FTWL) in a TTFONT element, which stores the font family number, a name and a description. Setting them is by a new menu item:



This enables the setting up of the new families:



**Add** enables a font to be picked using the standard font browser:



The Font family ID (5 onwards) is automatically allocated by the system.



## 3.4 Dictionary (Lexicon) database

The flexibility of the PDMS database has been enormously increased by the addition of User-defined Element Types and new facilities for User-Defined Attributes.

### 3.4.1 User-Defined Element Types

User-defined element types (UDET) may now be created: they must be based on an existing element type in the Design, Draft, Catalogue or Property database. The BASETY attribute indicates from which system type the UDET is derived.

This allows users to distinguish between variants of each element type, filtering its attributes, specifying User Defined Attributes (UDAs), and modifying its allowed member types etc. This permits, for example, different types of EQUIPMENT such as pumps and towers to be distinguished in reports etc. It also allows specifications to be made more specific for different components. Local languages may be used if required.

UDETs also allow extra levels of administration element at the ZONE level.

In PML, the UDET is recognised wherever an element type is allowed. For example, you would be able to do a collection based on a specific UDET.

UDET elements are created in a UDET world (UDETWL), either directly or in a UDET group (UDETGR) in a UDETWL. For details, refer to section 6.6.

### 3.4.2 User-Defined Attributes

A number of enhancements allow much more control over the customisation of the PDMS data structures.

#### Category for a UDA

#### Text and Numerical Value validation

A UDA definition may now contain an acceptable set of valid values for a text UDA or an acceptable set of ranges for an **int** or **real** UDA, which are used to verify its value on entry. These are defined in the dictionary DB by adding UVALID and UVALID elements below the UDA, one for each valid value or range.

#### Remove existing limits

The limits on numbers of UDA definitions and UDAs per element type have been removed

#### External links

A UDA may refer to ‘documents’ such as web and email addresses, external WORD documents or drawings. The links may be shown in the GUI and the appropriate editor invoked by clicking the link.

### Hidden UDAs

UDAs may be hidden from the command ‘Q ATT’ and the attribute form, though the individual UDA may still be queried. It may be hidden for all users, or visible to specific teams. This is controlled by two new attributes UHIDE and UTEAM on a UDA element.

### Connection flag

A new UCONN attribute on a UDA element signals that it is a connection: if set, the UDA value will appear in the reference List form.

### Pseudo user-defined attributes

A UDA may now be marked, using the new attribute UPSEUD, as a pseudo attribute, for which the values are calculated as needed rather than being stored. The code to evaluate the attribute must be plugged in by the user through the C# API.

If the calculation of the pseudo attribute relies on other element attributes, and the pseudo attribute is to be used in a dynamic rule, then it is possible to denote what real attributes the pseudo attribute uses. For example, to add a UDA :VOLUME to a box, the code multiplies XLEN\*YLEN\*ZLEN, therefore :VOLUME is dependent on those 3 attributes. This should be indicated by setting the UDPEND attribute to ‘XLEN YLEN ZLEN’. If :VOLUME is subsequently included in a dynamic rule, any revision of XLEN, YLEN, ZLEN will be reflected in the result.

### Enhancements to system attributes

For system attributes, the user may define Valid values and Limits, and also specify a Category. In addition, it is also possible to specify that the attribute is hidden on forms.

Valid values and limits may be varied according to element type; they are defined by creating a USDA element in the dictionary DB. A USDA owns ULIMIT and UVALID elements that denote the limits and valid values. For example, to restrict the setting of the FUNC attribute on EQUIPMENT to be ‘HeatX’ or ‘Pump’, you could create a USDA as follows:

```
new usda /UFUNC
desc 'set restriction on FUNC attribute on EQUI'
usysty FUNC
ELELIST ADD EQUI
new UVALID
UVAL 'PUMP'
new UVALID
UVAL 'HEATX'
```

### Enhancements to ATTDEF command

The existing ATTDEF command has been enhanced to take the following fields:

PROTEC – Protection on/off

HYPERL – hyperlink flag

CONNEX – connection flag

CATEG – category

For example:

```
VAR !A ATTDEF XLEN CATEG
```

## New PML objects

There are new PML objects to represent element types and attributes. These are:

- Attribute class – To represent attributes
- ElementType class – To represent Element types

Instances of these classes is limited to querying details of the attributes and element types. Direct usage of the new objects in existing syntax is not supported.

### Attribute class

An attribute instance may be created for a system attribute or a UDA, for example:

```
!AXLEN = object attribute('XLEN')
!UINT = object attribute(':UINT')
```

Methods on an Attribute object are:

- String Type()
- String Name()
- String Description()
- Int Hash()
- Int Length()
- Bool IsPseudo()
- Bool IsUda()
- String querytext() – string
- String units – string (either BORE, DISTANCE or NONE)
- Bool Noclaim() – bool
- ElementType array ElementTypes – this will work for UDAs only
- Real array limits – only valid for real/int types
- String array ValidValues(ElementType) – The list may vary with element type.
- String DefaultValue(ElementType) – Only valid for UDAs initially.
- String Category()
- Bool hyperlink() – attribute denotes an external file if true
- Bool connection()
- Bool hidden()
- Bool protected()

### ElementType class

An ElementType instance may be created for a system Element type or a UDET. For example,

```
!EQUI = object elementtype('EQUI')
!UEQUI = object elementtype(':MYEQUI')
```

Methods on an ElementType object are:

- string Name()
- string Description()
- int Hash()
- bool IsUdet()
- Attribute array systemAttributes()
- string array DbType(s)
- string ChangeType()
- ElementType SystemType()- for UDETs
- ElementType array udets() – UDETs derived from this type
- bool Primary()
- ElementType array MemberTypes()
- ElementType array ParentTypes()

## 3.5 Property database

### 3.5.1 Parameterised Property attributes

Various Property attributes can now be parameterised (since PDMS 11.6.SP4). This makes it much easier to prepare and report on attributes such as weight.

For CMPD & TUBD elements:

CWEI, CIWE, UWEI, UIWE, ACBO, BTOL, WTOL, WDIA, SHAP, PRFC, CORA, EFAC, PWAS, BFLE & OUTD

These can be set with standard expression syntax such as:

```
Cweight ( ATTRIB PARA[2 ] + ATTRIB PARA[3 ] )
Outdiameter ( ATTRIB PARA[1 ] + ATTRIB DESP[1 ] )
```

Existing syntax is still valid, for example:

```
UWEI 2.5
```

The following pseudo attributes have been updated to use the parameterised properties:

```
BRWEIG BRANCH WEIGHT
BRIWEI BRANCH INSULATED WEIGHT
BRWWEI BRANCH WET WEIGHT
BRWIWE BRANCH WET INSULATED WEIGHT
BRIARE BRANCH INTERNAL SURFACE AREA
BREARE BRANCH EXTERNAL SURFACE AREA
WALLTH TUBE WALL THICKNESS
```

A new pseudo attribute, PROPRE, has been added to query of the calculated result of the property attribute. This is a valid attribute at the element, such as a branch or hanger member, which indirectly references the property component. It has a qualifier of the property attribute to be evaluated and can be queried using the syntax:

```
Q PROPRE OUTD
```

This also impacts on DARs programs – please see 2.7.2 Data Access Routines (DARs).

## 3.6 Design database

### 3.6.1 Accuracy of large coordinates

The accuracy of large numbers, notably coordinates, has been increased for PDMS 12.0. This is primarily to simplify project administration by allowing the use of large coordinates without having to work relative to a local datum. Coordinates should now be accurate up to the limit of the spatial map (100 km) – but please note that there is currently a limit of 21 km for Isodraft.

This accuracy has been achieved by changing from *Single* to *Double Precision*. [In detail *Real Numbers* are now represented by 8 bytes rather than 4, with that part used for the *mantissa* increased from 24 to 53.] The main effect of this change will be that the number of accurate digits will increase from about 6 or 7 to around 15. This should be more than enough to allow coordinates up to 100 km to be accurate to 1/10000 mm – and also allow them to be converted to accurate measurements in feet and inches!

All data written to the database using PDMS 12 will be stored in this form, including any elements in upgraded projects. Database elements are converted as necessary – no special upgrade or reconfiguration is necessary. However, such converted projects may also have elements or previous session data that have not been changed – and of course the original data may be less accurate.

Please note that *DRAFT* picture files will need to be regenerated to contain Double Precision Data. The upgrade process can manage this or leave it to the user to do as required.

### 3.6.2 New Application Data world (APPLDW)

This new storage area provides a means to store information used by the various engineering design applications. User applications could also make use of this data structure.

### 3.6.3 Associations

A new data structure, for storing Associations or constraints between objects in the database, represents a step change in the information stored in the PDMS Model. It allows the user to store another dimension of detail in order to capture the design intent, and then use it to ensure that the model continues to match these constraints throughout the design process.

These associations may be used by applications to apply rules as data is entered – and then checked against these rules later on in the design process. A good example is the new Hole Management application.

There is scope for browsing the model using new user defined routes via the associations in the model rather than just system provided relationships such as the ownership hierarchy, the steelwork joint connection structure etc. User productivity can be greatly improved by the use of these features.

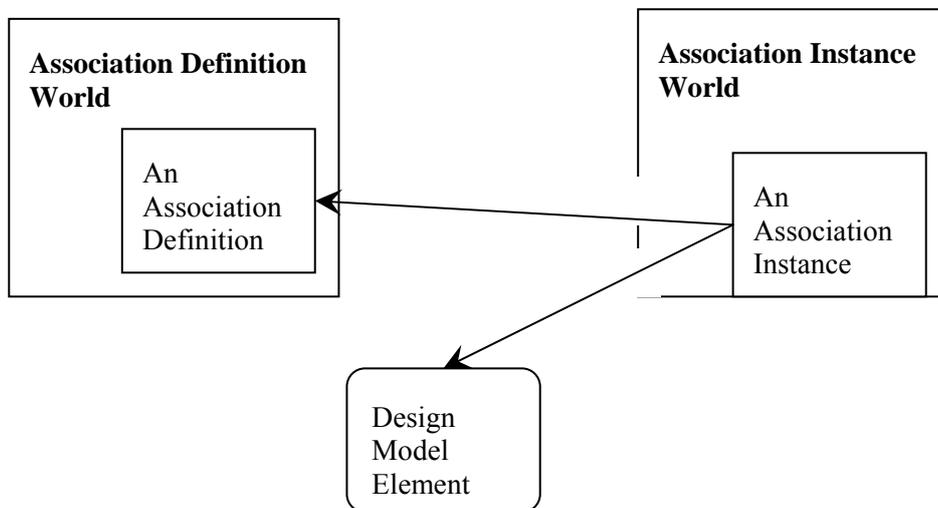
Associations can be quantitative using data such as positions and directions. A particular form of this is the restriction that performs a check on its associated elements and exposes a Boolean result.

Each Association references one or more database elements. No back reference is written to these elements, so users do not need write access to the database containing elements they wish to be associated with or connect to. Note that this also makes it simple for an element to participate in any number of such Associations.

Associations are stored in a DESI database but remain independent of the objects that they link. They may therefore be stored in an independent DESI database, with no design data, that is accessible for writing to all users who can create Associations.

Each Association references a master Association Definition, which defines the type of Association and the rules under which they operate. They are also in a separate database, to which the users may not have write access.

The diagram shows the relationship between Association Definitions, Association (Instances), and Design elements participating in Associations. All references are one way. A design element may be referenced by many Association Instances; an Association Definition may be referenced by many Association Instances.



### 3.6.4 Extended Design Templates

Templates now include a simple method to manage multiple repeat elements, such as the rungs on a ladder, as part of their core capability. This is based on the new Rule Repeat element (TMRREL) element owned by a Rule Repeat set (TMRPSE).

All primitive elements that can be owned by a TMPL have an additional TMRREF attribute that can point to a TMRREL. Repeats can be Cartesian, linear or radial.

The Design Templates application is very much improved and can allow Design Templates with no geometry to be created. Please see section 11.1.

### 3.6.5 Secondary hierarchies & groups

A major extension to the PDMS database enables data to be organised in a variety of ways in addition to the standard SITE > ZONE... hierarchy. This enables, for example, Equipment, Piping and HVAC to be organised by system and for objects to be organised for assembly. There is also the option to display multiple Explorers to access these new capabilities.

One important use of these new features is to provide a capability to group objects in a persistent manner across normal database boundaries. This has been implemented using a new SYGPWL

element at the top level of the DESI database. It owns System Area (SYGPAR) elements to allow a structuring of the various systems, which are represented by SYSGRP elements below SYGPAR.

Membership of a SYSGRP is achieved not by hierarchical ownership but by elements that reference it or any (sub) SYSGRP elements, using the MDSYSF (model system reference) attribute. This allows membership to be defined by the discipline engineers without the need to write to the SYSGRP elements themselves.

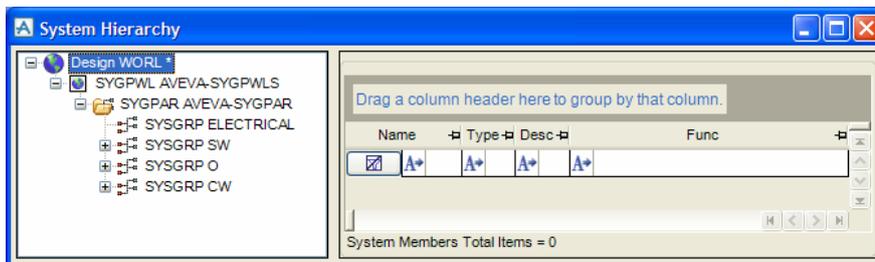
A model element can be a ‘member’ of a number of systems, because the MDSYSF attribute is a reference array. The first member of this array is used to denote the Primary System of the component.

SYSGRP elements have pseudo attributes SMEMB (secondary member) and SEXPND (expanded secondary members). These return all design elements referencing them (via MDSYSF). Since SYSGRPs do not reference each other, SEXPND will return the same result as SMEMB in all cases.

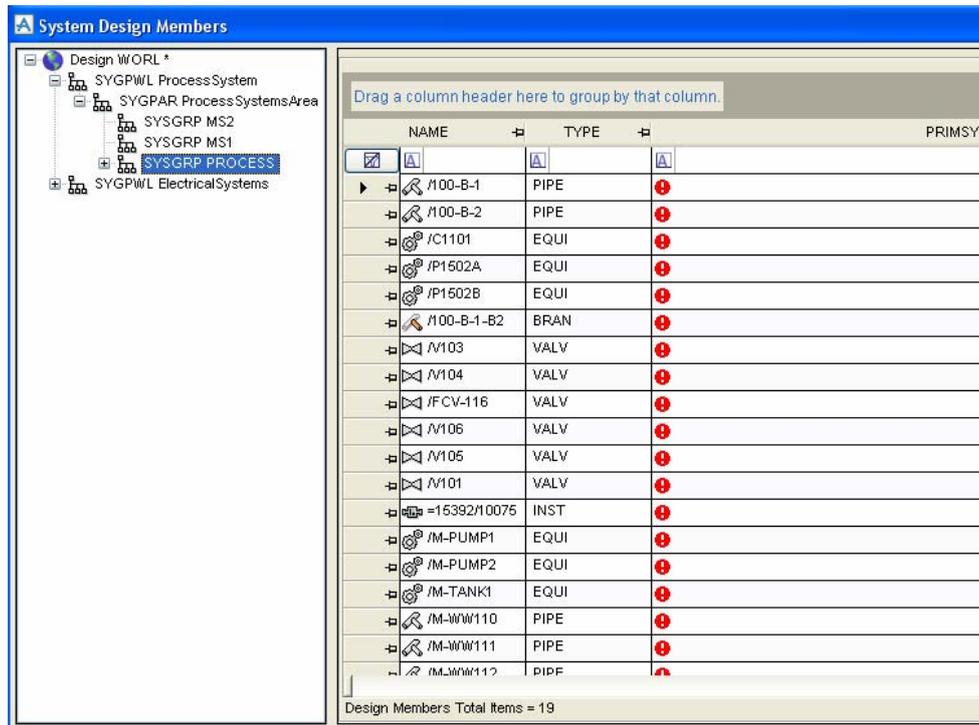
The members of a SYSGRP element are displayed in the tree view as the combination of its LIST and those listed in its SMEMB/SEXPND pseudo attribute. This will not include TUBI or BOXI elements.

## Secondary hierarchies

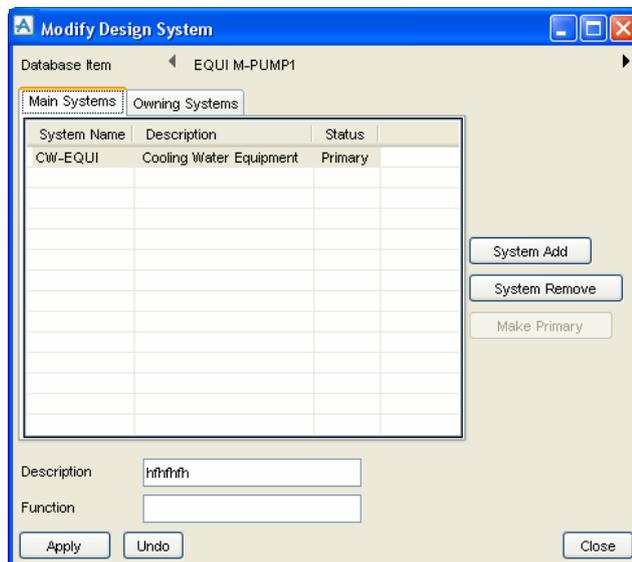
The Equipment, Piping and HVAC disciplines can now be organised by System in addition to the standard (SITE, ZONE...) hierarchy. The creation of the System is performed by the administrator using a new System Hierarchy option on the Create menu. Attributes can be modified through a Tabular Grid gadget (similar to a spreadsheet); the popup menu options change depending upon the current selection in the Explorer.



The System Explorer displays the hierarchy and shows the design contents in a grid control.



The Systems entry on the Utilities menu gives access to the Modify system form:

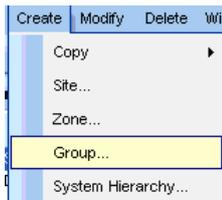


## Groups

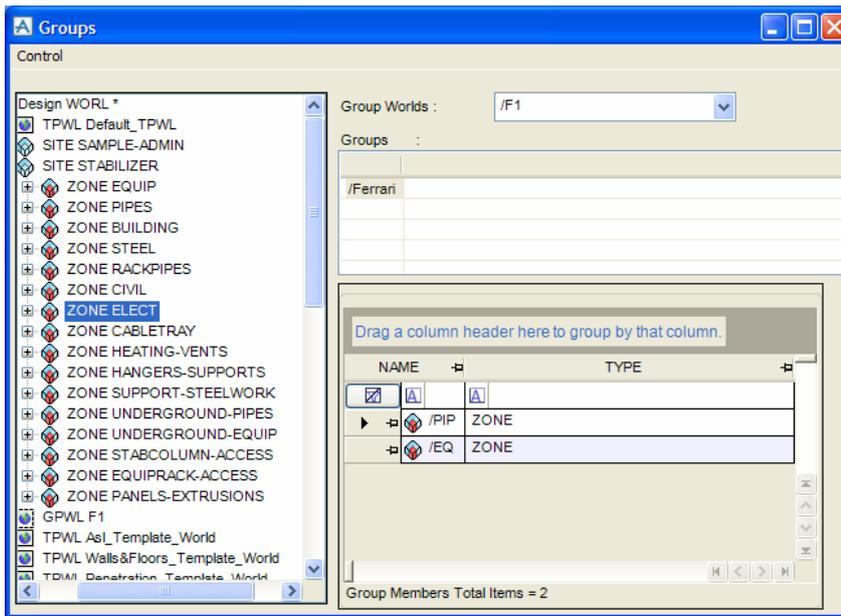
A new type of Group element, which will supersede the existing GROUP element, has been introduced. They behave in much the same way but have several advantages: they can group elements from different databases; they can include implied tube (TUBI) and are generally more visible as every element has a pseudo attribute GROUPS which lists all GPSET groups to which it belongs. The GADD and GREM commands now work on GPSET items, as well as GROUPS.

These new GPSET groups, like GROUPs, are owned by the Group World element (GPWL), and have the attributes NAME, DESCription and FUNCTION. They can own group items (GPITEM) which have the attributes NAME, DESC, and the pseudo attribute SITEM, which sets system attributes GPREF, GPRFTY. These describe the group hierarchy, which does permit a GPSET to own other GPSETs but not a GPWL, GROU or GPITEM.

The new group manipulation form is shown from the bar menu of Design:



This displays the Groups forma that shows the GPWLs and GPSETs in the current MDB and also enables you to create and manipulate them.



Elements may be added or removed by using the popup menus on the Explorer or the tabular control on the Groups form.

### 3.6.6 Volume Models

The volume (VOLModel) element allows geometric models to be inserted into the project model. This element represents an object in the model space that is not an equipment item. They behave in a very similar manner to EQUIPMENT elements and can own the normal primitive shapes – but may not own NOZZLES or SUBEQUIPMENT.

The sub-volume (SVOLModel) element is similar to the VOLM element, except that it is owned by a VOLM element and cannot itself own SVOLM elements.

These elements can be displayed, used in interference checks, and drawn on hidden-line drawings. They may have user specified weight and centre of gravity, and user defined attributes.

They can be created using **Utilities>General>Create**, which offers Volume Model, Subvolume and also Primitives to populate them. However, it is anticipated that users will also use Volume Models to store 3D models imported from other CAD systems (see chapter 22 - AVEVA Mechanical Equipment Interfaces).

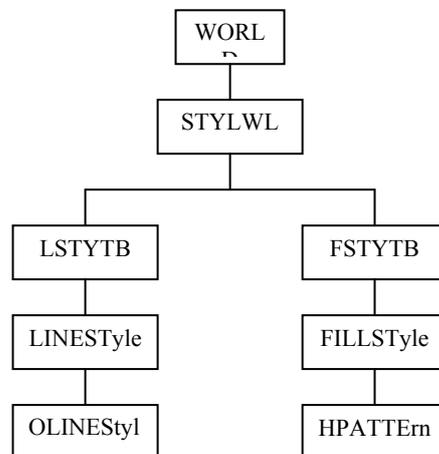
Picking the Primitives option leads to the primitive creation form – see section 11.2.

## 3.7 Drawing (PADD) database

### 3.7.1 User-defined Line Styles and Fill Styles

The major change to the PADD database is to implement the splitting of colour from style for lines and fill, instead of bundling them together in the pen attribute. A new top-level Style world element (STYLWL) can own Linestyle and Fillstyle Tables (LSTYTB, FSTYTB) beneath which the definitions of user-defined Linestyles and Fillstyles are stored, as shown below.

STYLWL, LSTYTB, and FSTYTB are all classified as ‘primary’ elements and can thus be claimed. It is envisaged that the creation and maintenance of STYLWL hierarchies will be the responsibility of the DRAFT Administrator (rather than general users) as is currently the case with the existing user-defined pens.



### 3.7.2 User-defined Line Styles

At its simplest, the definition of a LINEST is provided by a width and a pattern description. Line width is defined by the LWIDTH attribute (maximum value 2.0mm). The pattern can be defined by a pattern repeat distance (attribute PATREP) and one of:

- PATNAM attribute: a system pattern name (i.e. one of the standard 10 PDMS or 5 Tribon linestyle names such as DASHED or DASHDOT);

- PATDEF attribute. This is a sequence of integer numbers that define the relative lengths of the pattern's alternating dashes and gaps. The sequence must start with a dash; gaps are denoted by a negative number.

PATNAM and PATDEF are mutually exclusive: setting one will unset the other.

### 3.7.3 User-defined Fill Styles

A user-defined FillStyle will generally be defined by 1 or 2 HPATTE elements (Hatch Patterns). If more than 2 are created the third and subsequent ones (in database list order) will be ignored. Each HPATTE is defined by four attributes:

- HANGLE: the angle of the hatching lines on the Sheet (degrees measured counter-clockwise from the horizontal)
- HSEPAR: the separation of the hatching lines: 0 for a solid fill. (specified value is used on hard-copy output; on screen, spacing is device-dependent but related to the value)
- HOFFSE: the offset of the hatching lines from the origin of the Sheet
- HSTYLE: the linestyle used to draw the hatching lines. (Currently only 'Solid' is supported, any other value is ignored)

The FILLST element also has a SOLFILLED logical attribute. If set TRUE, the FILLST represents Solid Fill and the definitions of any HPATTE elements are ignored. Of course there is already a 'SOLIDFILLED' system hatch-pattern: this option has been included so that the FILLST can be referenced by the ALTDEF of another.

## 3.8 Links to documents & external data

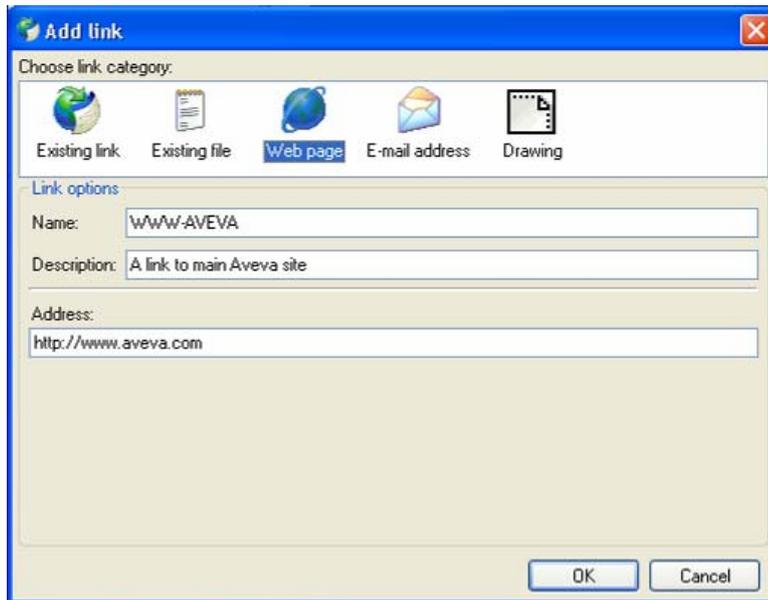
A new database hierarchy under a Link World (LINKWL) links external and internal documents to design objects, and allows these linked documents to be opened from the Explorer. This enables the user to locate all the relevant drawings, documentation or vendor data.

The links are defined by LNDESC elements that can optionally be grouped in LNFOLD folders and classified using LNCLAS classes.

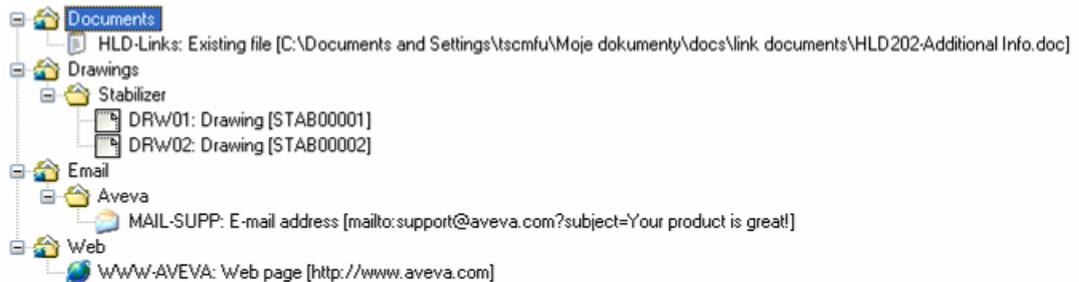
Normal access will be via the links user interface or other applications.

### 3.8.1 Manipulating Links

Documents may be linked to Design objects by clicking **Display>Link Documents>Add Link**. This starts an Add-in that allows you to create various types of links and set their options. An example is shown below:



You can enter a link's name and description and category-specific information. The category also determines how links of this category are presented, including their text representation and icons (see below).



Links may also be manipulated from the command line, using the DLADD & DLREMOVE syntax:

```
DLADD <selatt>
```

For example, to assign Link Descriptors /MYDOC1 and /MYDOC2 to the current design element:

```
DLADD /MYDOC1 /MYDOC2
```

Alternatively, if current element is a Link Descriptor, the following command assigns this LNDESC to /PANEL1 and /PUMP1:

```
DLADD /PANEL1 /PUMP1
```

Link Descriptors are created and their attributes set in the usual manner. To link to an external resource you should set the URL thus:

```
URL 'file:///Docsys/MyDocument.doc'
```

You can use the LNKREF to set a link to an internal database reference e.g. a drawing:

```
LNKREF /DRAWING1
```

The whole process of linking a document to /PUMP1 might look like this:

```
NEW LNDESC /MYDOC
URL 'http://aveva.com/all_about_vm12_link_documents.pdf'
```

DLADD /PUMP1

The DLREMOVE command is similar. it is possible to remove an association both by removing a link from a LNDESC to a database element or by removing a link from a database element to a LNDESC.

### 3.8.2 Classifying links

Each LNDESC can have a number of Link Classes assigned. To classify a link you have to:

- Create a Link Class element (LNCLAS) somewhere in the links hierarchy.
- Assign the class to the LNDESC with a DLADD command.

If current element is a LNDESC, the following command classifies it as a /MYCLASS1 and /MYCLASS2 document:

DLADD /MYCLASS1 /MYCLASS2

To remove classification information from a LNDESC, you can use the DLREMOVE command.

### 3.8.3 Related pseudo attributes

A number of pseudo attributes allow the retrieval of information on relations between Link Descriptors, Link Classes and model elements:

LNKDOC	Link Descriptors (e.g. documents) linked to a database element
LNKELE	Database elements linked to a Link Descriptor
LNKCLS	Classes assigned to a Link Descriptor
LNKDOC	Links classified with a specific Link Class

## 3.9 Robust Merging

The database system has been overhauled to improve reliability and eliminate database corruption, especially when merging changes. Related faults reported by users have also been addressed. Care has been taken to minimise disk space usage and allow for future developments.

## 4 General System Enhancements

### 4.1 Enhanced COPY command

The COPY command has been enhanced to make it easier to copy moderately large quantities of data. A particular requirement is to copy several tree structures and maintain the reference attributes between the copied items. This might be used, for example, to:

- Copy a piping zone and an equipment zone, while maintaining the references between the nozzles and the branches.
- Copy within the catalogue where the referenced items are not under the same hierarchy. (An SCOM can be owned by a CATE but reference GMSE and PTSE items which are elsewhere in the catalogue.)

To simplify this sort of operation, it is now possible to group COPY commands, using the commands:

```
COPY START
COPY (as many as required)
COPY END
```

The renaming option has also been improved by adding two new options:

- PREPEND adds a string at the start of the name
- SAMENAME allows the same name if copying to a different database

The new syntax is:

```
COPY START
COPY ALL OF <gid> -- RENAME <name> <name> ---TO <gid>
                        |- PREPEND <name>-----|
                        |- SAMENAME -----|
COPY MEM OF <gid> -- RENAME <name> <name> ---TO <gid>
                        |- PREPEND <name>-----|
                        |- SAMENAME -----|
COPY ATT OF <gid> -- RENAME <name> <name> ---TO <gid>
                        |- PREPEND <name>-----|
                        |- SAMENAME -----|
COPY LIKE OF <gid>-- RENAME <name> <name> ---TO <gid>
                        |- PREPEND <name>-----|
                        |- SAMENAME -----|
COPY ADJ <selatt> -- RENAME <name> <name> --->
                        |- PREPEND <name>-----|
                        |- SAMENAME -----|
COPY END
```

Note that the COPY ADJacent command does not have a TO <gid> as it is not required.

## 4.2 Extended UNDO/REDO functions

The system now allows the user to UNDO and REDO a wider range of commands in DESIGN and DRAFT. However, these functions are not available in PARAGON.

## 4.3 Enhanced pseudo attribute queries

Queries for pseudo attributes may have a qualifier. This qualifier was limited to:

- An integer and a reference for POS/ORI/DIR attributes
- An integer for all other types

The qualifier is now much more flexible, in order to allow for more sophisticated queries.

For more information, refer to section 23.4 on PML.

## 4.4 Increased system limits

Various constraints, throughout the system, have been relaxed during the PDMS 12 overhaul.

### 4.4.1 Database size

The maximum size of a PDMS database has very rarely been reached but has been increased to just less than 4,000GB. This is an increase by a factor of 2048 and larger than most, if not all, current physical media. The change has necessitated a change to the internal file pointers used for locking – and is one reason why **data may not be written to any database using PDMS 11 and PDMS 12 simultaneously!**

### 4.4.2 Number of Databases in a Multiple Database

The number of databases (DBs) per MDB has increased over the years from 5 to 300; this has now been increased to 1000.

Please note that, with the use of Extracts, there may no longer be only one file associated with each DB. The total number of files that PDMS can handle has been increased from 512 to 4096. This means that an MDB with all 1000 DBs will be able to open an *average* of 4 Extract files per DB – probably with some DBs using more, and many using no, Extracts.

### 4.4.3 File names

PDMS filenames may now be longer and contain the space and the dollar (\$) characters.

The length of the filename is currently 260 characters but it is intended to raise this to 1024 in PDMS 12.1, when it will also be extended to handle filenames including Unicode (non-Latin) characters.

The dollar character is used by Windows for the default share name for a drive – older versions of PDMS require it to be entered as '\$\$'. This is no longer necessary if the filename is specified in the appropriate manner.

#### Note for command line users:

The use of spaces and dollars has been implemented using a new **filename** atom, as the **name** atom is delimited by a space. The **filename** atom is delimited by a double-quote (") character at each end in

order to permit the use of spaces. Where this is not required, the existing **name** atom may also be used.

For example:

```
slist "C:\Program Notes.txt"
```

#### 4.4.4 File width

PDMS can now read/write a line containing up to 1024 characters from a text file; the limit was previously 255.

Lines of a file read using a FILE object and .readrecord() are read into PML variables, which in turn can be used for input. The limit on the contents of PML variables has now increased from 254 to 1023 characters. The limit on FILE objects has been increased from 10 to 20, though it's still important to use .closefile() as soon as possible!

#### 4.4.5 Tabs in Macros

<TAB> characters may now be used in PDMS macros in place of spaces, whereas formerly they were allowed only within a <text> atom. This should simplify import of data and make for more readable PML applications.

#### 4.4.6 Searchpaths

Searchpaths can also now contain spaces, as long as the semi-colon ';' is used instead as a delimiter.

For example, the following (all on one line):

```
set PDMSUI=C:\Local PDMS\AppData;M:\Project PDMS\AppData;
Q:\Company PDMS\AppData
```

will search in turn for:

```
C:\Local PDMS\AppData/macro
M:\Project PDMS\AppData/macro
Q:\Company PDMS\AppData/macro
```

Searchpaths defined using the space delimiter will continue to work as before; a search path with just **one** entry that includes a space needs a terminating ';', for example:

```
set PDMSUI=C:\Program Files\AVEVA\VPD\PDMS12.0\PDMSUI;
```

**Note:** this may need changes to PML applications if they need to handle the new format searchpaths.

#### 4.4.7 Environment variables

The limit on the length of Environment variables containing a searchpath has been increased from 1024 to 5120 characters. If this limit is exceeded, nothing will ever be found in the final path! This has caused problems in the past for users with extensive additions to PDMSUI. Note that excessively long paths will also adversely affect performance.

Environment variables are now expanded recursively, so a searchpath can itself contain references to other environment variables.

For example, the following (on one line):

```
set MYPATH=%ROOT%\Standard Version; %ROOT%\Update Version;
%ROOT%\Latest Version
set ROOT=C:\Program Files\AVEVA;
```

may be referenced in PDMS:

```
$m%MYPATH%\mac
```

which will check in turn for:

```
C:\Program Files\AVEVA\Standard Version\mac
C:\Program Files\AVEVA\Update Version\mac
C:\Program Files\AVEVA\Latest Version\mac
```

Note that two successive % characters within a filename are now both removed – as % is not a valid part of a pathname.

## 4.5 Data Access Routines & Compilers

Users of Data Access Routines (DARs) are warned that system changes such as increased accuracy in PDMS 12.0 have necessitated changes to the compile options and the FORTRAN compiler, though the C compiler is unchanged. Any DARs programs will need to be rebuilt.

*Warning: Users' DARS and PML applications will need upgrading if parameterised properties are used.*

Prior to PDMS 11.6.SP4, a DARs program had to navigate to the relevant CMPD or TUBD element and then query the real attribute, in order to obtain a property for a piping component or similar. DARs has been updated so that this still works for existing data or for simple expressions; however, it will give the wrong answer if more complex expressions are used.

*The type of expression that will not work is one which uses PARA or DESP while a simple expression is similar to (33.5 \* 8.6).*

To upgrade any such DARs applications, use the pseudo attribute PROPRES of the Design element, with the qualifier of the property required.

## 4.6 Logging in to PDMS

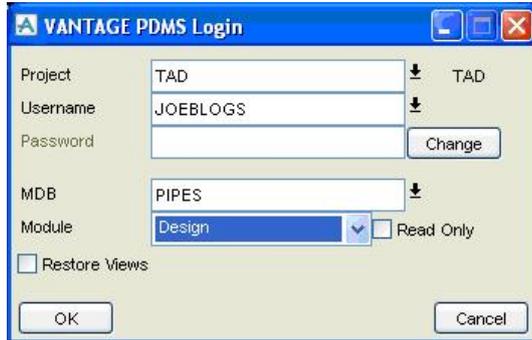
### 4.6.1 More flexible username

A PDMS username may now be longer and contain a much wider selection of characters (up to fifteen characters, excluding |'@\$/\*). This does mean that its entry is case-sensitive; old-style (word) usernames may continue to work on the command line, but not using the entry form.

### 4.6.2 Windows NT authentication

PDMS projects can now be set up to allow users to be validated using their Windows Login (NT authentication). Please refer to the Admin chapter.

The PDMS login form has been modified so that if the project is running authentication and the user is an authenticated user with general access, no password is required.



The Project, Username and MDB forms have all been enhanced and now include column headings and additional information. If the project is running authentication and the user is authenticated the username form is only populated with the authenticated user names.

The login process remains unchanged for FREE Users and projects not running with authentication on. The Login form has been modified to allow users to change their PDMS passwords from the Login form.

### 4.6.3 Passwords

updated \*12.0.SP5\*

Users can now change their passwords from the PDMS Login form, with these conditions:

- A GENERAL user in a project using NT authentication can modify his password without having to specify the password in the login form.
- A FREE user must always specify his password to highlight the change button and change his password even if NT authentication is on.
- The Change Password form now asks for confirmation of the new password:

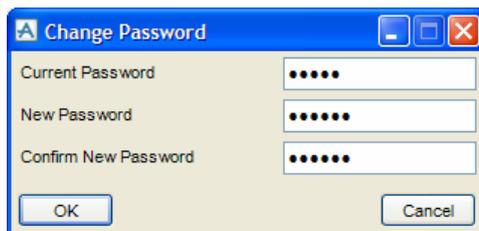
If NT authentication is not in use for this project, all users must enter their password before the change password button is highlighted.

The password change function in Monitor has been modified similarly.

From PDMS 12.0.SP5, user passwords are no longer visible in any part of the system.

Support has been provided for generation of encrypted PML scripts that perform project entry such that user credentials cannot be read or edited. In addition execution of these generated scripts can be restricted to a set of Windows users, host computers, and to a time period. Please see section 6.9.

As an additional security feature it is now necessary to confirm the Change Password dialog is shown below:



All modules provide the ability to query project users via menu Query > Project > User. This form does not show the user password text even if the current user has Free privilege.

A new pseudo-attribute `PassQuality` is available to users with Free privilege; it returns an integer value, with the following interpretation:

0	User has no password set
1	User has legacy password (very unlikely to appear)
2	User has pre 12.0 SP5 encrypted password, limited length.
3 or more	User has newly encrypted password. Higher numbers suggest more secure passwords.

Stricter login security at 12.0.SP5 also affects PDMS Admin and Software Customisation. In particular, it is expected that some problems will occur where customer's applications expect to obtain user password text when running as a Free user. Please refer to updated manuals – *Administrator User Guide*, *Administrator Command Reference Manual*, *Monitor Reference Manual*, *Software Customisation Reference Manual* – and to section of this document.

#### 4.6.4 Project Identifiers

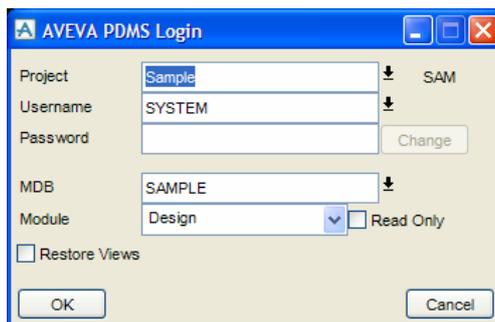
A longer project identifier (the project 'number') of up to 8 alpha-numeric characters can be used in PDMS as an alternative to the 3-letter Project code. The project number can be used wherever the Project code is currently valid, but must be a text string:

```
PROJECT text           Long Project identifier (<8 char.)
PROJECT word          Project code only (3 char.)
```

This includes the following syntax:

```
PROJECT <project>           For project selection
COPY <dbname> FROM <project> ...
INCLUDE <dbname> FROM <project> ...
REPLICATE <project>
```

The Project Creation wizard allows projects to be created using a project number, although the underlying `make.exe` program still uses the Project Code. The PDMS Login form has been modified to accept the project number:



The Project Code is displayed as a paragraph gadget to the right of the Project Number. The Project text field will accept either the project number **Sample** or the project code SAM and is case independent. If the project code is input the display will show the project number.

Other forms associated with project login have also been revised to suit.

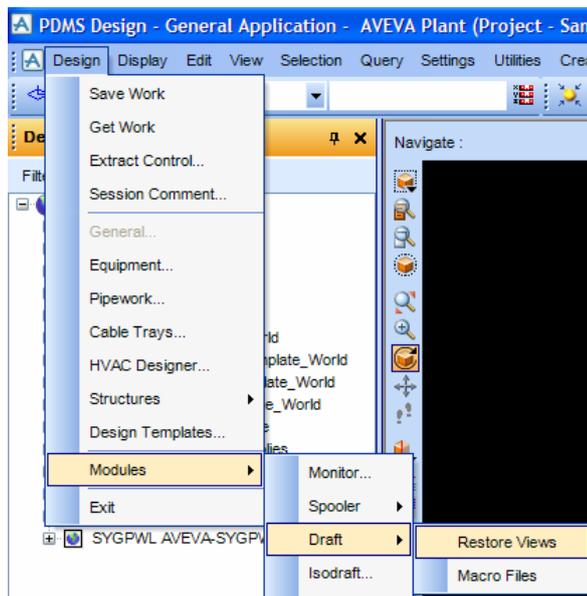
**Note:** The Project Code must still be used with Data Access Routines and the Global Daemon (`admind`).

#### 4.6.5 Restoring views

The use of the binary files (.bin and .disp) for string screen layout has been removed, along with the relevant user syntax to save and restore them. New mechanisms save the contents of graphical view gadgets automatically at session close and allow users to (optionally) restore them at start up.

The pull down menu for restoring the layout has been replaced with a toggle that highlights if the user's view file for a relevant module has been located. Ticking the toggle will restore the views after entering the module.

The **Modules** menu now highlights the **Restore Views** option if the appropriate user's view file exists for the appropriate module; if it does not exist, the option is greyed out.



#### 4.6.6 PDMS Console window

**\*PDMS 12.0.SP5\***

PDMS uses DOS-style command windows for certain output, both an echo of the batch file on initial start-up and the 'console' when changing module.

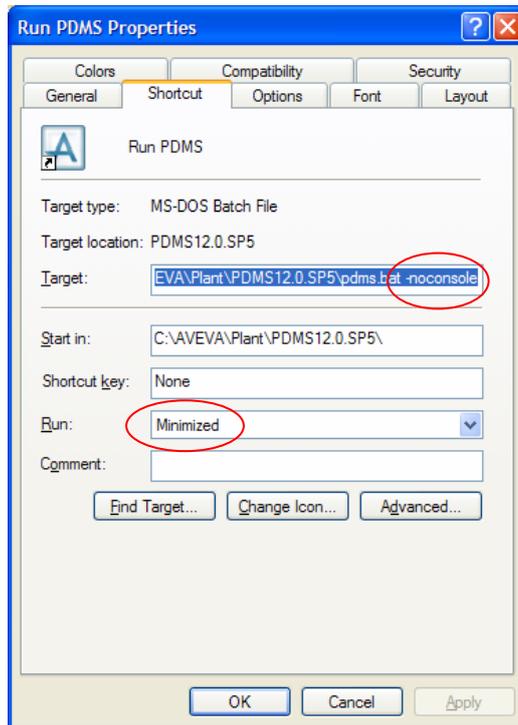
The default icon for PDMS, as used in the Start menu, has been changed at SP5 to start minimized as its contents are not usually of interest. It may of course be shown using the task bar if required, as might be the case if the system does not initialise correctly.

The console may also be suppressed if required. However, it is currently used for certain output such as that during module changes and for the obsolescent SPECON module. Users who wish to suppress it can use the `-noconsole` switch as follows:

Option 1: revise the line in the BAT file to start PDMS Monitor thus:

```
cmd/c "%monexe%\mon" %args% -noconsole
```

Option 2: revise the shortcut used to start the bat file by adding the `-noconsole` argument.



## 5 User Interface

### 5.1 Common Application Framework

The Common Application Framework (CAF), based on Microsoft .NET Framework and used in PDMS since version 11.6, has been enhanced to support the definition of application menus and toolbars from an XML file. This is a more flexible approach for product add-ins that makes it possible to reduce the dependence on PML and improve the start-up performance. It is possible to implement its command objects in C#, PML and unmanaged code and there is a GUI to support the creation and modification of the XML menu and toolbar definitions.

PDMS menus and toolbars have been replaced with an XML definition and the necessary PML command objects have been implemented. The appearance is slightly different but the behaviour should be very similar. Customisation will necessarily be somewhat different.

Note that not all menus and toolbars have been converted to use the new system at PDMS 12.0.

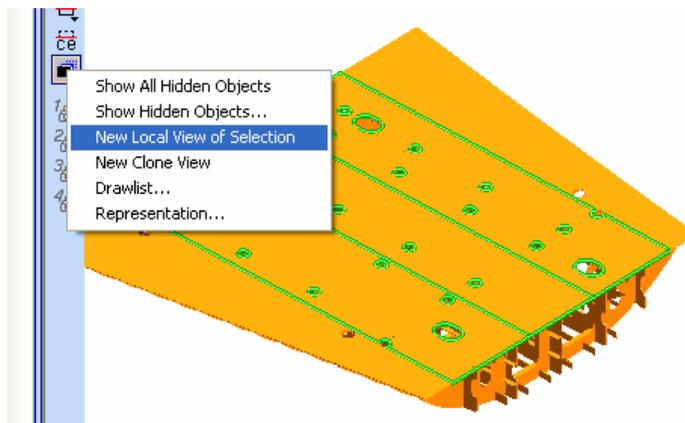
### 5.2 Drawlists

It is now possible to create additional drawlists in order to display different content in different views. By default, a newly created 3D view uses the global drawlist; however, it may instead be linked to a 'local' drawlist.

Graphical handles and model editing are available in both local and global views. The handle appears in all views that are linked to the same drawlist. Selection can take place in all views linked to the same drawlist but multi-selection cannot take place across views of different drawlists.

Current element highlighting and Clash graphical feedback appear in global views only.

A new button on the Design 3D View form provides access to the new drawlist functions. A secondary mouse click offers an option to create a new local view of the current graphical selection. The new view will be created with its own drawlist containing only those objects in the graphical selection, as highlighted in green.



Other options can:

- Create a clone of the current view, using the same draw-list, which may be either global or local

- Give further information about the draw-list and current graphical selection using a **Drawlist** form, which also enables items to be added and their visual representation to be changed
- Change view representation settings using a **Representation** form

It is now possible to add a primitive to a 3D view without adding the owning top level element.

The properties and contents of each view will be saved on exiting PDMS. On entering PDMS, the user will be given the option of restoring the views and their contents.

### 5.3 Colour table

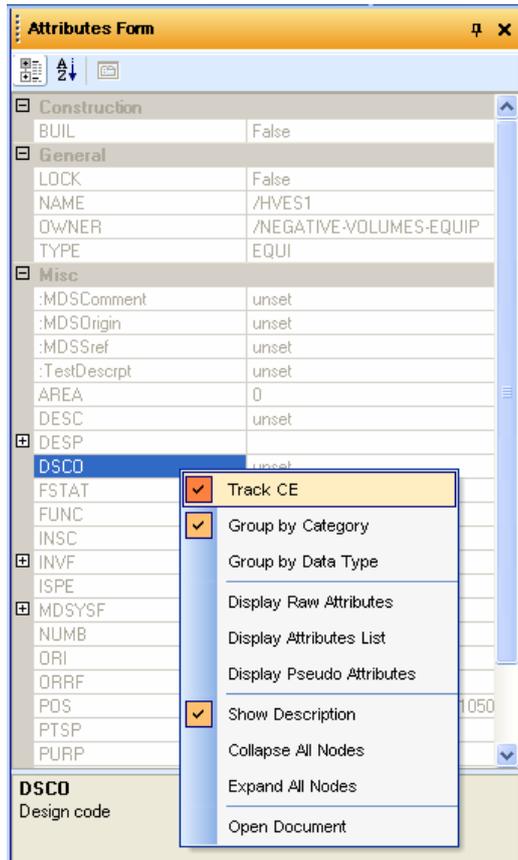
The PDMS colour table has been extended to provide the complete set of 256 (numbered) colours in the AutoCAD Color Index (ACI), in order to improve compatibility with AutoCAD. There are now 61 named colours, which use names from the X11 definitions and are now all mapped to ACI. This means that some of the PDMS named colours have changed somewhat; one or two are now indistinguishable as ACI has relatively few light colours. For details, please see Chapter 8 of the *DRAFT User Guide*.

### 5.4 Attributes form

A new attributes form, enabled using the **Attributes Utility** entry on the **Display** menu, displays them in categories and hides ‘invisible’ attributes. By default all attributes will be visible and there will be no categories set. Attributes without a category will be assigned a default categorisation. Attributes are read-only on the form: it is not currently possible to add or delete attributes using it.

The form can be docked, floated, and resized and tracks the current element by default. There are various options for the display: for example, it can be simplified by collapsing unwanted categories.

Attribute invisibility and categorisation options are set up in the Lexicon module.



An attribute of data type “hyperlink” displays the pathname of the hyperlink beside the attribute name. A pop-up menu option enables the referenced **url** to be accessed. Any document will be opened outside PDMS and will respect external access rights.

## 5.5 Search Utility

**\*12.0.sp4\***

The PDMS Search Facility enables the user to search for model items in all the graphical applications (DESIGN, DRAFT, etc) and list the search results in a table. To display the Search form select: Display>Search Utility.

The results of the searches are displayed in the new Grid gadget – see below. The *Export to Excel* menu option enables them to be saved for future use, in a specified file (.XLS format). These results have been made more useful at PDMS 12.0.SP4 by making them editable, in either a single cell or bulk edit mode. Movement around the grid and the selection of cells for editing follow the usual Windows conventions. In addition, the search form now has an option to save the search criteria for future use.

For details, please see the updated *Getting Started with PDMS* manual.

## 5.6 Tabular grid gadget

**\*12.0.sp4\***

There is a new GridControl gadget, which is a C# component based on the Infragistics UltraGrid control. This is widely used in the user interface, for example displaying the results of database searches. It may also be used by the user in any customisation, by using PML.NET facilities. It can be bound to different types of data sources (for example a list of database items and attributes) and used to import data from an Excel spreadsheet.

Once the data is in the grid, the user can select rows and columns in the grid, apply further filters to the list, and select items for action (for example, "Add to 3D View"). The methods used for navigation, filtering and selection within the table are similar to those used in Office applications, notably Excel.

The picture shows a set of PIPE and EQUIP items in the grid, with attributes: Name, Type, Position, Description, and PSPEC. A pop-up menu is displayed on the selected items. Notice that the attribute "Position" is invalid on PIPE items, and this is indicated in the grid with an appropriate icon. Similarly, PSPEC is invalid on EQUIP items.

Name	TYPE	POSITION	DESC	PSPEC
/COND-01	PIPE	⚠	unset	/ELEC
/80-B-7	PIPE	⚠	unset	/A3B
/CABLETRAY/M1	PIPE	⚠	unset	/SCTG
/CABLE_TRAY/M3	PIPE	⚠	unset	/MDCLG
/50-B-9	PIPE	⚠	unset	/A3B
/HVAC/RECT/M1	PIPE	⚠	unset	/RDUCT
/D1201	EQUI	E 31'7.18 N 174'0.	unset	⚠
/150-R-6	PIPE	⚠	unset	/A3B
		E 30'7.23/32 N 202'	unset	⚠
		⚠	unset	/A3B

Drag a column header here to group by that column.

Context menu options:

- Add to 3D View
- Remove from 3D View
- Enhance in 3D View
- Unenhance in 3D View

Several new methods are available for the Grid Control at PDMS 12.0.SP4, including the ability to edit attribute values, both in single edit mode and in bulk edit mode. This is particularly useful in conjunction with the expanded search facilities (see above).

For details, please see the updated *Getting Started with PDMS* manual.

## 5.7 Windows file browser

The standard Windows file dialog is now used for all file operations and may also be used in PML applications. For the latter, see section 23.5.1.

## 5.8 Windows printing

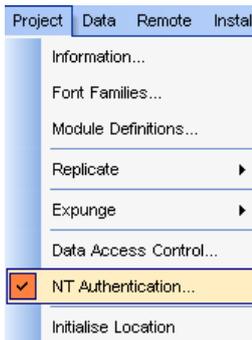
The standard Windows print dialog is now used for all print operations.

## 6 Administration

### 6.1 Admin user interface

#### 6.1.1 Admin menus

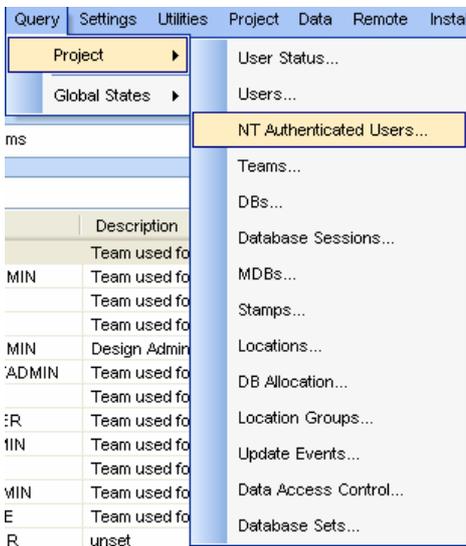
The project menu has been modified to include the ability to switch 'NT authentication' on or off: if on, the Windows login information will be used in place of any PDMS login.



The default bar has been modified to show the status of authentication:

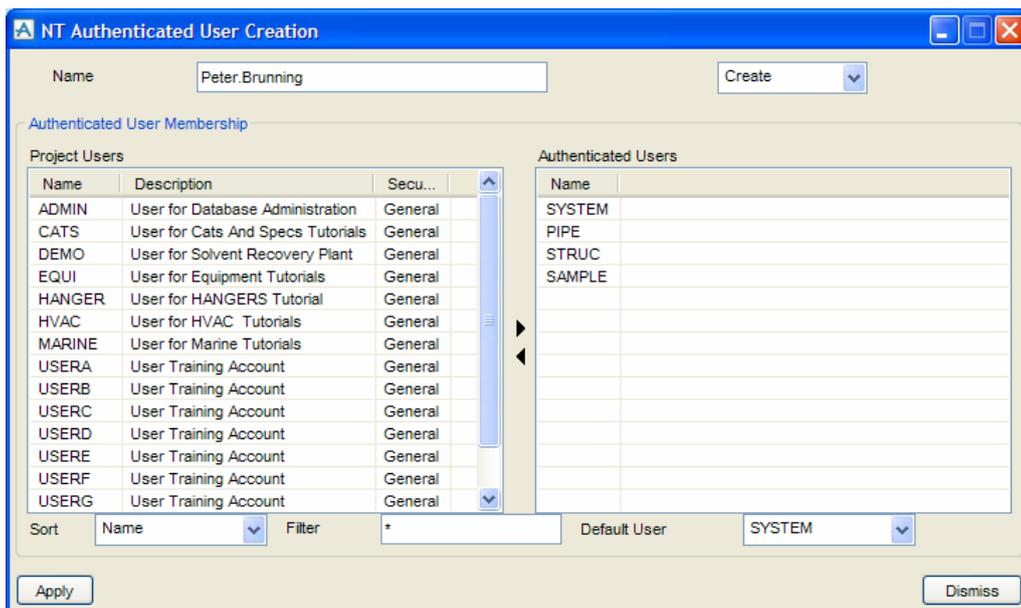
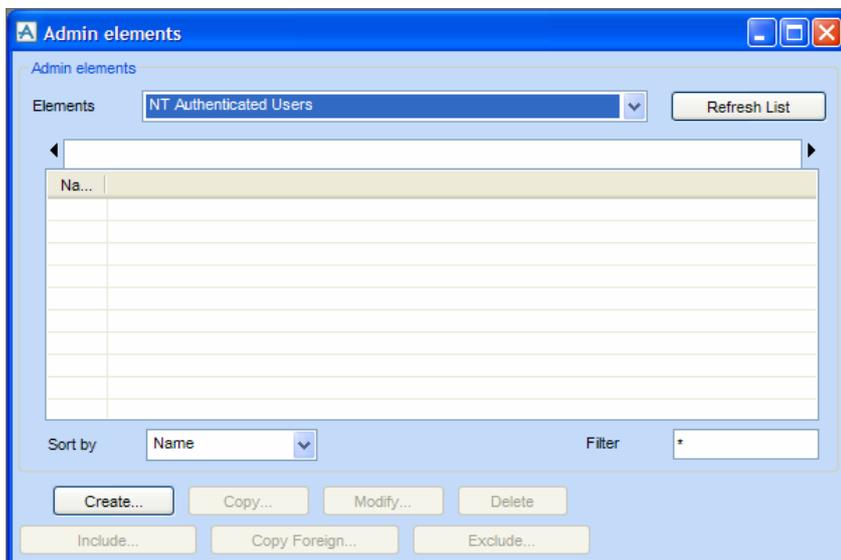
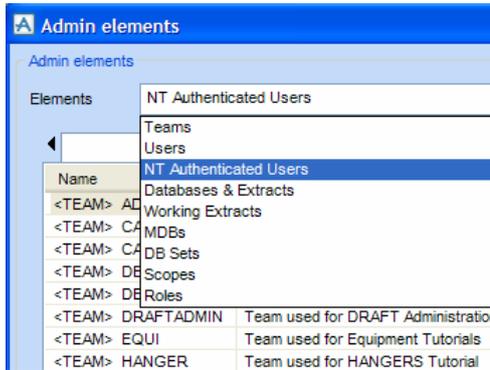


NT authorised users can be shown from the query menu; if NT authentication is not operating, the menu entry does not appear.



#### 6.1.2 Admin Elements form

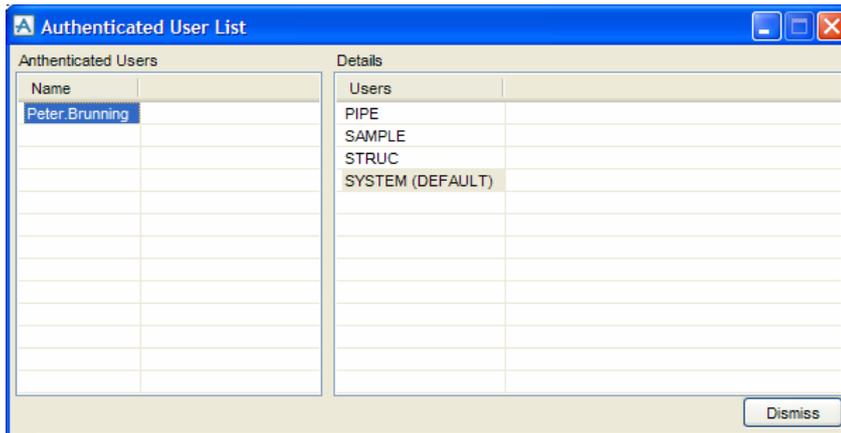
This form now allows the creation and modification of NT Authorised users if this is enabled for the project. Creation or modification allows you to pick the permissible PDMS user names set the default for that user.



The system will check to confirm deletion of an NT authenticated User:



NT Authenticated users can be listed, along with their details:



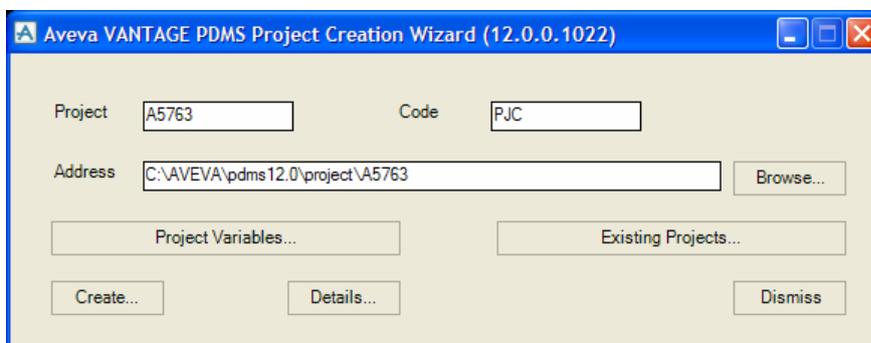
Please see later section on User Interface changes targeted at Global in 12.0.SP4.

## 6.2 Project Creation Wizard

**\*12.0.sp2\***

This new program simplifies the process of setting up PDMS projects by using a series of Wizards to aid the Project Administrator's job.

It is an additional .NET program (.exe), comprising a set of forms and DLLs, which simplifies the process of creating a new project from scratch. It uses the PDMSMAKE utility to create the initial systems databases in a specified project directory, and creates an example batch file that can be edited into the Users' evars.bat files.



If PDMS is installed to the default directory, the wizard is started by running the projectCreation.bat file in the PDMS 12.0 executable directory C:\AVEVA\pdms12.0.

## 6.3 Project Setup – Spreadsheet input

The process of setting-up a PDMS project has been simplified by allowing the Admin data to be imported from Excel spreadsheets. It is now possible to import and create the following Admin Elements:

- Project Users
- Project Databases
- Project Teams
- MDBs
- Data Access Controls

Excel Import is available from the main menu **Utilities > Import Admin Elements...**

The import form allows the user to select the Excel file to be imported using a file browser. After selecting the file, the user can use **Select Sheet** to pick a worksheet. Once this is done, the contents of the Excel Sheet are shown in the Grid.

#Team Name	DataBase Name	DB Type	Access	Claim Type	Description	DB Number
SP00L	MOMSPL	ISOD	MULTIWRITE	IMPLICIT	Spooling Exa...	25
MASTER	MOMDICT	DICT	UPDATE		Master Diction...	7000
MASTER	MOMPROP	PROP	UPDATE		Master Propert...	
PIPING	MOMPIPE	DESI	MULTIWRITE	EXPLICIT	Database for P...	

The form gadget has the following options:

- **Validate Sheet** – On Clicking the Validate Sheet button, the grid content is validated. The Import button is enabled only if the validations are successful. Note that the Excel file format is fixed and should be similar to the Sample spreadsheet provided.
- **Import** – Imports the grid contents: the sequence is as follows:
  1. Create the MDBs by selecting the MDB Sheet
  2. Create the Teams and Databases by selecting the CATALOGUE DBS sheet
  3. Create the Roles and PEROPS for all disciplines
  4. Create the Scopes from SCOPE sheet.

Scopes can be created before creating the Roles or Teams and Databases.

5. Create the ACRs by selecting the ACRS sheet
6. Create the login Users by selecting the LOGIN USERS sheet: this will assign the Access Control Rights for the users if the ACR elements are available.

## 6.4 Access Control Assistant

The purpose of the Access Control Assistant (ACA) is to assist administrators in defining and managing the control of users' access to data. It is simply accessed from the Admin menu bar.

Full details are given in the *Administrator User Guide* – Chapter 11 Data Access Control.

## 6.5 Permissible Database Operations

Data Access Control (DAC) roles have been extended with additional Permissible Operations (Perops) in order to allow users to protect the intellectual property (IPR) contained in their databases. These new operations are available to users when Access Control is enabled, unless they are specifically disabled; this is unlike the operations previously controlled with DACs, which are not available unless explicitly enabled for a user.

The new controls allow a user to issue data to a third party but control its use; they cover:

- Data Listing (the OUTPUT command)
- Copying elements between databases
- Export to Review (and other targets, accessed via the EXPORT command)
- External access via Data Access Routines (DARs), which cannot access data in a protected database

In addition, read access to certain attributes is restricted to obstruct an unauthorised user from writing their own data listing functions in PML

Protected databases are marked so that restricted users cannot copy data from that database into another project, even through a physical copy of the database file. It is also possible to set (or clear) an expiry date for a protected database.

These facilities can be controlled using the new Access Control Assistant (ACA) in the Admin module or by using the following commands.

The CHANGE command can now change the protection on a named database, and optionally control expiry by specifying a future date, using the standard date format used in existing commands. The new syntax is as follows:

```
CHANGE dbname PROTECTION [ ON | OFF ] [ EXPIRES future-date ]
```

The CREATE DB command has been similarly extended:

```
CREATE DB dbname dbtype PROTECTED [ EXPIRES future-date ]
```

The Admin GUI has also been extended to cover the new features.

## 6.6 User-Defined Element Types

A brief description of User-Defined Element Types (UDET) is given in section 3.4.1 in the chapter on Database Enhancements.

### 6.6.1 Creating a UDET definition

A UDET may be created in the dictionary database using LEXICON syntax. It must be created below a UDET world (UDETWL), or a UDET group (UDETGR). The database hierarchy is UDETWL > UDETGR > UDET.

For example:

```
NEW UDETWL /MYUDETWL1
NEW UDETGR /MYUDETGR1
NEW UDET /MYUDET
```

The only attributes on a UDETWL or UDETGR are name and description.

The new UDET must be based on any visible element type in the Design, Draft, Catalogue or Property databases. The BASETY attribute indicates the system type from which the UDET is derived, for example a UDET based on the equipment element is set thus:

```
BASETY EQUIP
```

Instances of this UDET will have all the system attributes of the base type, but not its UDAs unless specifically set.

Once instances exist, changing the BASETY will result in invalid UDET instances. DICE will output an error for such circumstances.

### 6.6.2 Allocating the UDET name

The UDNAME attribute is used to hold the UDET name, in a similar manner to UDAs. This name will then be used for identification in the constructor modules, for example a UDET set up thus:

```
UDNAME 'MYUDET'
```

will be identified by the syntax :MYUDET in constructor modules. The UDET identification always starts with a colon.

The UDNAME name may be up to 50 characters long; unlike UDAs there is no minimum abbreviation.

### 6.6.3 Redefine the allowed member list

By default, the UDET will have the same allowable member types (UDMLIS) and allowable owner types (UDOLIS) as its base type, but these lists may be reset. The types in the new list must be either:

- a system type allowed on the base type.
- a UDET derived from a system type allowed on the base type.

For example, a :MYBOX is defined based on a BOX and a :MYNBOX is defined based on an NBOX.

For :MYBOX:

The default owner list is: EQUI STRU PTRS SUBE SUBS TMPL

The default member list is: NBOX NPOLYH NCYL NSLC NSNO NDIS NCON NPYR NCTO NRTO NXTR NREV

The allowed member and owner lists may be redefined using the UDOLIST, UDMLIST attributes. The list may be completely redefined or the keywords ‘ADD’ or ‘REMOVE’ may be used to add to remove particular entries.

For example :

UDOLIST SITE ZONE	Define SITE, ZONE as the only valid owners
UDOLIST ADD SITE ZONE	Add SITE, ZONE as valid owners
UDMLIST REMOVE ALL	Remove all allowed member types

The allowed owner list and member list for a UDET may be any or all of the system types allowed on the BASETY and/or any UDET based on these system types. For example, for :MYBOX you could not add a ZONE to UDOLIST, or a EQUI to UDMLIST. It is up to the user to ensure that the UDOLIST and UDMLIST on different UDETs match up.

For example, if we decide that a :MYBOX can only go under a SUBE, and that a :MYNBOX can only go under a :MYBOX or a BOX. This is achieved as follows:

For :MYBOX

```
UDOLIST SUBE
UDMLIST :MYNBOX
```

For :MYNBOX the values will be reset as follows:

```
UDOLIST :MYBOX BOX
```

Changing the allowed owners/members for a UDET could invalidate some existing instances. These are reported as warnings in DICE.

#### 6.6.4 Extending the ZONE hierarchy

Zones may own UDETs based on a ZONE and vice versa, though recursive structures are not allowed.

For example, we can create two new UDETs based on a ZONE, called :PIPEZONE and :SMALLPIPES. We can then allow :PIPEZONE below a ZONE, and :SMALLPIPE below a :PIPEZONE.

Since :PIPEZONE, and :SMALLPIPES are both derived from ZONES, we have a three level hierarchy of zones.

#### 6.6.5 Changing allowed references

##### UDA reference attributes

The valid list of element types that a UDA may reference is held in the REFLIS attribute in its definition. This list may hold UDETs as well as system element types. For example, a UDA with a REFLIS holding EQUIP :PUMP may reference an EQUI or a :PUMP but not a :VESSEL, even if both the :PUMP and the :VESSEL are derived from the EQUI element.

##### System reference attributes

It is not possible to redefine the valid lists for system reference attributes. A system reference attribute may point to any UDET derived from a valid system type. For example, an HREF on a BRANCH can reference a :MYNOZZLE since this is derived from a NOZZLE.

### 6.6.6 Allocate UDAs to a UDET

UDAs may be added to the UDET in the same way that they are allocated to system element types. In other words, a UDET may appear in the ELELIST for a UDA definition.

For example, three distinct pipe UDETs have been derived as follows:

```

    UDET :PipeLagged
    UDET :PipePainted
    UDET :PipeHeated
  
```

The user can add allocate different UDAS to each UDET, such as :

```

    UDET :PipeLagged
      UDA :insulation
    UDET :PipePainted
      UDA :colour
    UDET :PipeHeated
      UDA :insulation
      UDA :colour
  
```

UDAs are allocated to UDETs using the ELEADD command in the UDA definition.

### 6.6.7 Hiding system attributes

The UDHLIS array will hold the list of system attributes to hide when displaying a UDET. For example, a UDET based on a branch needs to hide its iso-related attributes. This would be done as follows:

```

    UDHLIST BSTA HWRP TWRP BRLO RLSTOR TSFBR DELDSG
  
```

The ADD and REMOVE keyword can be used in association with UHDLIST, though there are some attributes that cannot be hidden, such as NAME, OWNER, LOCK.

### 6.6.8 Deleting a UDET definition

A UDET definition may be deleted, in which case object instances of this type will then no longer be recognised. They will default back to the original system type, and any extra UDAs will be lost.

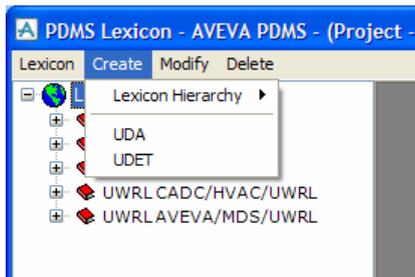
### 6.6.9 UDATLS pseudo-attribute on a UDET

An extra pseudo (read only) attribute on a UDET is the UDATLS, a list of all attributes (including UDAs) valid for this UDET.

## 6.7 Lexicon User interface

There is now a graphical user interface for Lexicon, with a Bar menu that enables the creation, modification and deletion of UWRL (UDA World), UGRO (Group of UDAs) , UDETWL (UDET World), UDETGR (Group of UDETs) elements.

These administrative elements enable the user to group together similar items. The UDA and UDET maintain the creation and modification of each item type.



The Lexicon Hierarchy form can maintain the whole hierarchy. The Explorer allows the administrator to navigate the Hierarchy and allows modification or deletion of administrative elements.

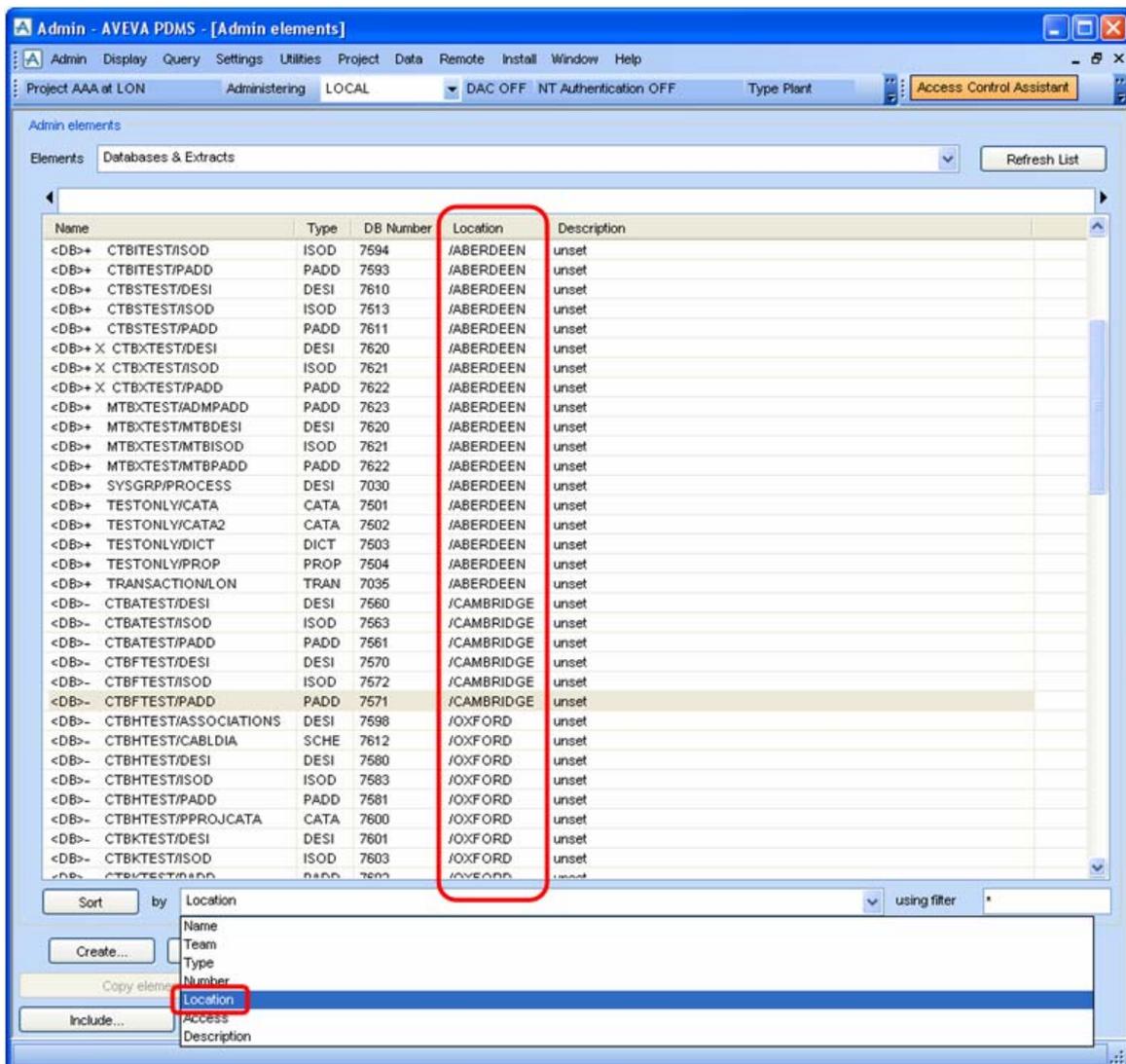
## 6.8 Global Admin user interface

\*12.0.sp4\*

Many improvements have been made to the ADMIN user interface, with additional information added to many of the forms when used on Global projects. These are summarised in this chapter.

### 6.8.1 Add locations to the Databases & Extracts form

The Admin Elements form (view Database & Extracts) has been modified to include the primary location. It is also possible to Sort on this field.



## 6.8.2 Changes to Create Databases form

The Create Database form has been modified to include a larger Description box, and also to clearly identify the underlying database type.

The screenshot shows the 'Create Database' dialog box with the following details:

- Database:** CTBUTEST
- Owning Team:** A list of teams including ASLADMIN (ASL Administration Team) and several CTB\*TEST teams.
- Name:** unset
- Description:** unset (highlighted with a red box)
- DB Element Name:** unset
- Database Type:** Design "DES" (highlighted with a red box)
- Access Mode:** Multiwrite, Implicit Claim
- Controlled:** unchecked
- Protected:** unchecked
- Expires:** 12 Mar 2009
- Area Number:** System
- DB Number:** System
- File Number:** System
- Primary Loc.:** LONDON
- Propagate:** Database (checked), Picture/Neutral Format Files (unchecked)

### 6.8.3 Changes to Create Location form

The Create Location form has been modified to use drop-down lists for selecting the Parent, Group and Administrating Location fields. A check button has also been provided to validate the hostname. Please note that validation is done by this testing the connectivity to the hostname.

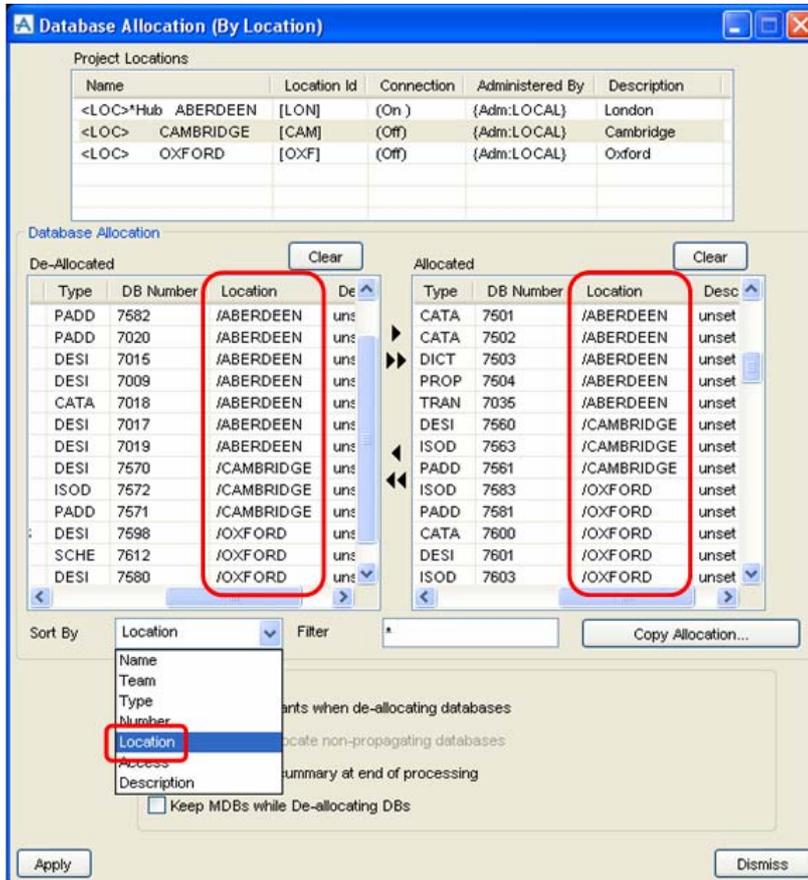
### 6.8.4 Changes to Create MDB form

The Create MDB Form has been modified to include the Primary location; it is possible to Sort on this field. The number of databases displayed has been increased and the form will also give feedback when data is changed.

Name	Type	DB Number	Location	Description
<DB>+ TESTONLY/DICT	DICT	7503	/ABERDEEN	unset
<DB>+ TESTONLY/PROP	PROP	7504	/ABERDEEN	unset
<DB>+ TRANSACTION/LON	TRAN	7036	/ABERDEEN	unset
<DB>- CTBATEST/DESI	DESI	7560	/CAMBRIDGE	unset
<DB>- CTBATEST/ISOD	ISOD	7563	/CAMBRIDGE	unset
<DB>- CTBATEST/PADD	PADD	7561	/CAMBRIDGE	unset
<DB>- CTBFTEST/DESI	DESI	7570	/CAMBRIDGE	unset
<DB>- CTBFTEST/ISOD	ISOD	7572	/CAMBRIDGE	unset
<DB>- CTBFTEST/PADD	PADD	7571	/CAMBRIDGE	unset
<DB>- CTBHTEST/ASSOCIATIONS	DESI	7598	/OXFORD	unset
<DB>- CTBHTEST/CABLDIA	SCHE	7612	/OXFORD	unset

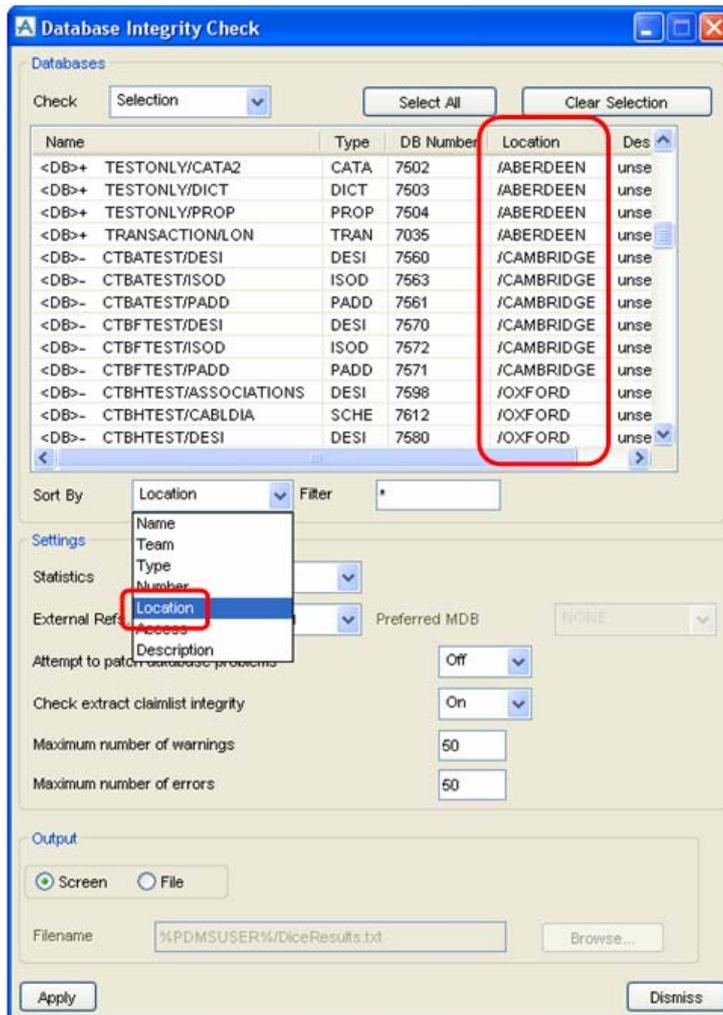
### 6.8.5 Changes to Database Allocation (By Location) form

The Database Allocation (By Location) form has been modified to include the Primary location. It is also possible to Sort on this field.



### 6.8.6 Changes to Database Integrity Check Form

The Database Integrity Check form has been modified to include the Primary location for each database; it is possible to Sort on this field. The number of databases displayed in the list has also been increased.



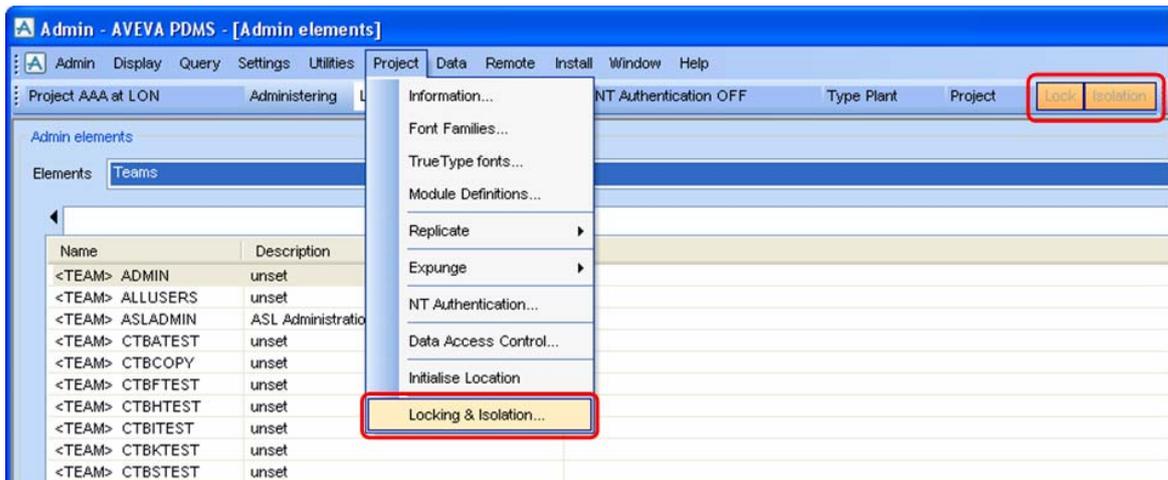
## 6.8.7 Changes to Extract Data Control form

The Test Project Communications form is available on the Extract Data Control Form in the Constructor modules so that Users can check that the daemon is running before undertaking Global Extract Operations.

The screenshot shows the 'Extract Data Control' window. At the top, there is a 'Get All Changes' button and two radio buttons: 'From parent extract only' (selected) and 'From all extract ancestors'. Below these are three buttons: 'Update CE', 'Extract Claimlists', and 'User Claimlists'. A list of elements is displayed in a scrollable area, with 'MDB CTBATEST' selected. Below the list are buttons for 'Extract', 'Status', 'Ping' (highlighted with a red box), and 'Prefix Info'. There are also sections for 'Change Highlighting' (with checkboxes for 'Outstanding in Extract' and 'Introduced by Get All Changes'), 'Extract DB Operations' (with radio buttons for 'Element Hierarchy' and 'Single Element'), and 'Rules & Connections' (with a checkbox for 'Always Issue/Flush Changed Rules/Connections'). At the bottom, there are buttons for 'Default', 'Resultant Additional Elements...', and a note that 'Flush/Issue/Drop will act on all changes made by all users in this element hierarchy' with corresponding buttons for 'Flush', 'Issue', and 'Drop'.

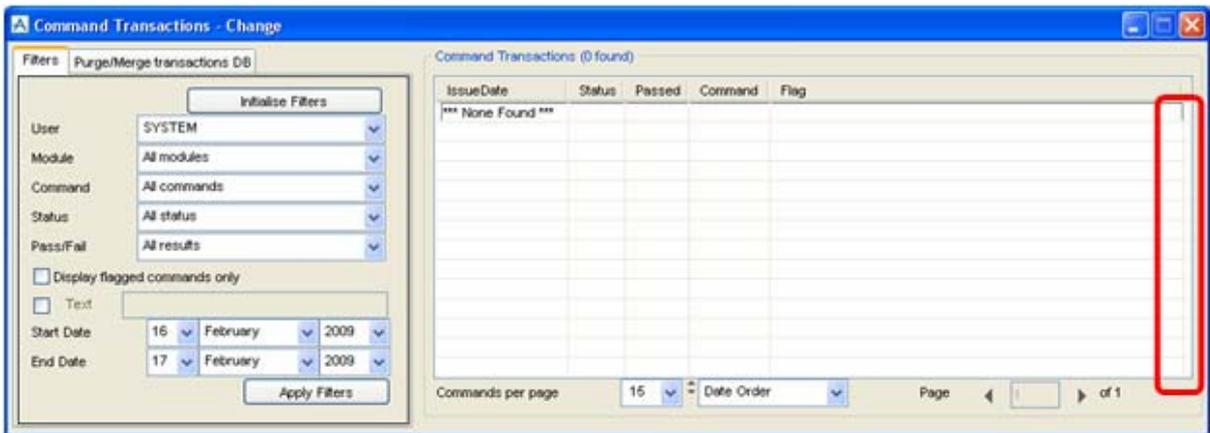
## 6.8.8 Changes to the main Admin form

The Locking and Isolation buttons on the main menu have been removed and replaced with status icons that cannot be accidentally clicked ON/OFF. The functionality is now available through the Project menu of the main form.



## 6.8.9 Changes to Command Transaction

The Number of transactions on the Command Transaction form has been increased to 15, removing the need to display a scroll bar to reveal 1 additional transaction.



## 6.9 Password Security

**\*12.0.SP5\***

User passwords are now not visible in any part of the software. As a result, any form or query that displayed passwords has been changed.

Restrictions on the length and content of passwords have been relaxed: it is now possible to have passwords of 15 characters (increased from 6) and including any characters except |'@\$/\*.

Support has been provided for generation of encrypted PML scripts that perform project entry such that user credentials cannot be read or edited. Execution of these generated scripts can be restricted to a set of Windows users, host computers, and to a specified time period.

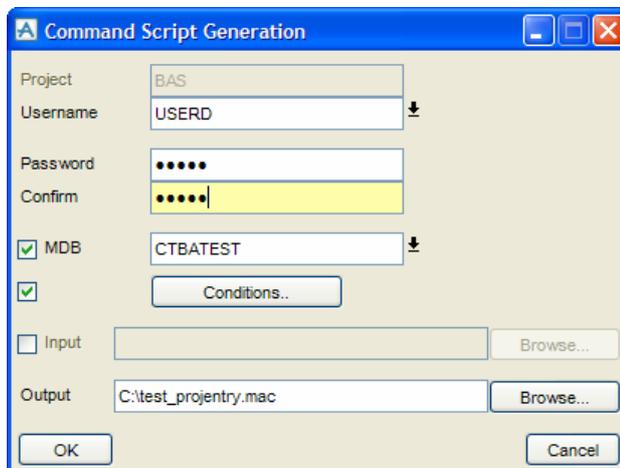
Key Points to note:

- Passwords are not recorded in any output of project users: in particular Admin export, replicate and data listing. If user details are imported into a new project, “copy” users will be created, but will not be able to log in until the administrator actively sets the passwords.
- Free users (project administrators) can no longer query the password of a project user. This means that the only action available if a user forgets their password is for the administrator to reset the password and inform the user of the new password.
- Existing appware that uses the Free user capability to query any user’s password (for example to automatically generate batch scripts, or to switch user without requiring password entry) will no longer work. New PML functions have been introduced to support this capability via automatic generation of encrypted PML scripts.
- Once a project user password has been set or reset at 12.0 SP5 it will not be possible for that user to log in to the project using earlier versions of PDMS.

## 6.10 Generation of command scripts

**\*12.0.SP5\***

An entirely new form has been introduced to allow generation of encrypted command scripts. This form, activated from a new button on the Admin main form, is shown below:



The screenshot shows a dialog box titled "Command Script Generation". It contains the following fields and controls:

- Project:** Text box containing "BAS".
- Username:** Text box containing "USERD".
- Password:** Text box containing masked characters (dots).
- Confirm:** Text box containing masked characters (dots).
- MDB:** Checked checkbox followed by a text box containing "CTBATEST".
- Conditions..:** Button below the MDB field.
- Input:** Unchecked checkbox followed by an empty text box and a "Browse..." button.
- Output:** Text box containing "C:\test\_projentry.mac" and a "Browse..." button.
- Buttons:** "OK" and "Cancel" buttons at the bottom.

If a User is selected in the main Admin form element list, that user will be specified in the Command Script Generation form; if an MDB element is selected, the MDB option will be checked and that MDB specified in the form.

The new form requires entry and confirmation of the correct password for the specified user, and requires entry or selection via Browse dialog of an output filename. MDB selection is optional, as is the selection of an input command script. The Input option is only available if a PML Publisher license is available, as this is used to generate the encrypted script.

A set of Windows usernames and a set of host computer names can be entered into the two lists. Optionally a full or partial time period can be specified using the Before and After checkboxes and date controls. Clicking OK in this form records the specified conditions to be applied or edited later.

On clicking OK in the Command Script Generation form, an encrypted command script is written to the output filename specified (with confirmation if that file exists). When executed in Monitor this command script will:

- Enter the current project
- Login as the given user with the given password (if correct)
- Optionally, select the given MDB
- Optionally, verify that the Windows user executing the batch script is in the set specified in the conditions. If this fails then the batch job will terminate immediately.
- Optionally, verify that the host computer name is in the set specified in the conditions.
- Optionally, verify that the current time falls within the time period specified in the conditions.
- Optionally, execute the command script given as Input.

## 6.11 Anticipated Customisation Issues \*12.0.SP5\*

It is expected that some problems may occur where a customer's application expects to be able to obtain user password text when running as a Free user. This section attempts to identify typical example scenarios where this is likely to arise, and in each case recommend an approach to resolving the problem using new alternative functions.

### 6.11.1 Automatic Generation of Command Scripts

The following PML script writes the project entry commands required for a batch job to enter the project as the selected user. This will no longer work due to a change in behaviour of the line marked in **bold**.

```
!proj = CURRENT PROJECT
!projcode = !proj.code()
!user = CURRENT SESSION.user()
!username = !user.name
!password = !user.password()
!contents = ARRAY()
!contents.append( |PROJ | & !projcode )
!contents.append( |USER | & !username & || & !pass )
!contents.appendArray( !body )
!file.writefile( 'OVERWRITE', !contents )
```

A free user would have run this successfully; otherwise an error would have been generated:  
 (2,203) Insufficient access rights for user defined attribute PASS  
 on element USER <username>

If the application was run by general users, it will already have been necessary to prompt for the required password. It will now be necessary to prompt for password text even for Free users, unless generating scripts for the current user only; in this case the PML object PMLUSERLOGIN can be used directly. Otherwise it is recommended that the PML object PMLSECURELOGIN be used as suggested below.

```
!proj = CURRENT PROJECT
!user = <select user name>
!password = <prompt for password text>
!scriptgen = object PMLSECURELOGIN()
!scriptgen.Project( !proj.code() )
!scriptgen.User( !user )
!scriptgen.Password( !password )
!filename = 'C:\temp\projectentry.mac'
!scriptgen.SaveToFile( !filename )
!contents = ARRAY()
!contents.append( |$M | & !filename )
!contents.appendArray( !body )
!file.writefile( 'OVERWRITE', !contents )
```

## 6.11.2 Switch Users Without Password Entry

The following PML records the current user name, switches to a Free user with a known username and password, and uses the Free user privilege to record the password for the original user. This allows the script to automatically return to the original user when the Free user actions are complete. This will no longer work due to a change in behaviour of the line marked in **bold**.

```
!!username = CURRENT SESSION.user().name
user SYSTEM/XXXXXX
admin
/$!!username
!!password = PASS
$* Admin actions ...
monitor
user $!!username$!!password
```

The recommended approach is to make use of the new PML object PMLUSERLOGIN as follows.

```
!usercontext = object PMLUSERLOGIN()
!!usercontextfile = 'C:\temp\currentuser.mac'
!usercontext.VerifyNonInteractive( FALSE )
!usercontext.SaveToFile( !!usercontextfile )
user SYSTEM/XXXXXX
$* Admin actions ...
monitor
$M /$!!usercontextfile
```

## 6.12 Schematic database licensing

**\*12.0.SP5\***

From PDMS 12.0.SP5, the use of the Schematic (SCHE) database requires a separate license feature, which is now included in all license files with the relevant schematics products as follows:

- AVEVA Diagrams
- AVEVA Schematic Model Manager (formerly known as P&ID Manager)
- AVEVA Schematic 3D Integrator (formerly known as P&ID 3D Integrator)

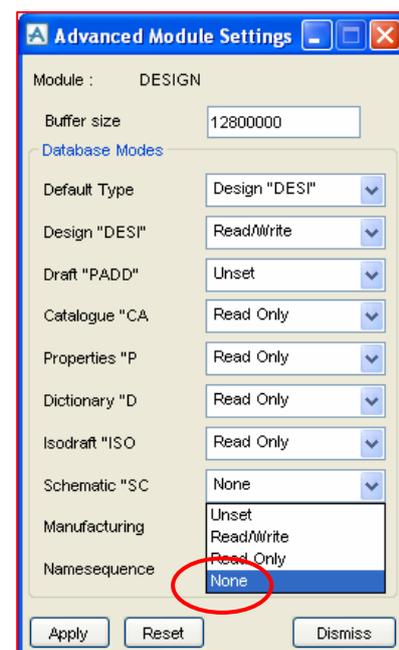
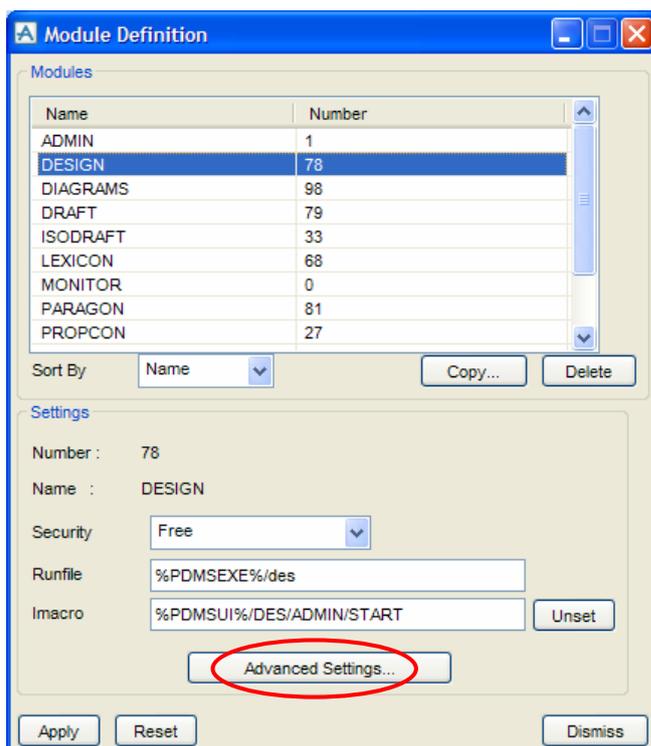
This change will not affect customers who make no use of these products, but those who do may require an updated license file for 12.0.SP5, in order to have continued access to the relevant schematics functions and related data. The database is not accessible without such a license.

One seat is required for each user reading or writing the Schematic database. The license is checked whenever an MDB containing one or more current Schematic databases is opened, whichever product or application is used. This means that if such an MDB is opened from a Design application, it will take out a license for Schematic database access, whether or not any Schematic function is to be used. If a license is not available, an error message will be given and the database will not be opened.

To ensure that Schematic database access licenses are used only when required, one of the following approaches should be adopted:

1. (*Recommended*) MDBs are structured in such a way that Schematic databases are only included in MDBs where they will be required. Users of other MDBs will therefore not take out a Schematic database license, leaving them for those who need them.
2. Schematic databases are deferred in the MDB and activated only when required using the Current command in Monitor or the MDB command mode.

If Integrator is not being used, an alternative is to revise the module definition for Design so that it does not access the Schematic databases. This can be achieved using the Admin **Project > Module Definitions > Advanced Settings** form:



## 7 Global Enhancements

**\*12.0.sp4\***

### 7.1 Improved Global Update operations

One of the main reasons for a new version of Global is to improve the Update algorithm for performance and functionality.

#### 7.1.1 Faster Updates

The performance of updates has been improved to shorten the time taken to propagate data between locations. This has been achieved by making 3 improvements to the updating algorithm:

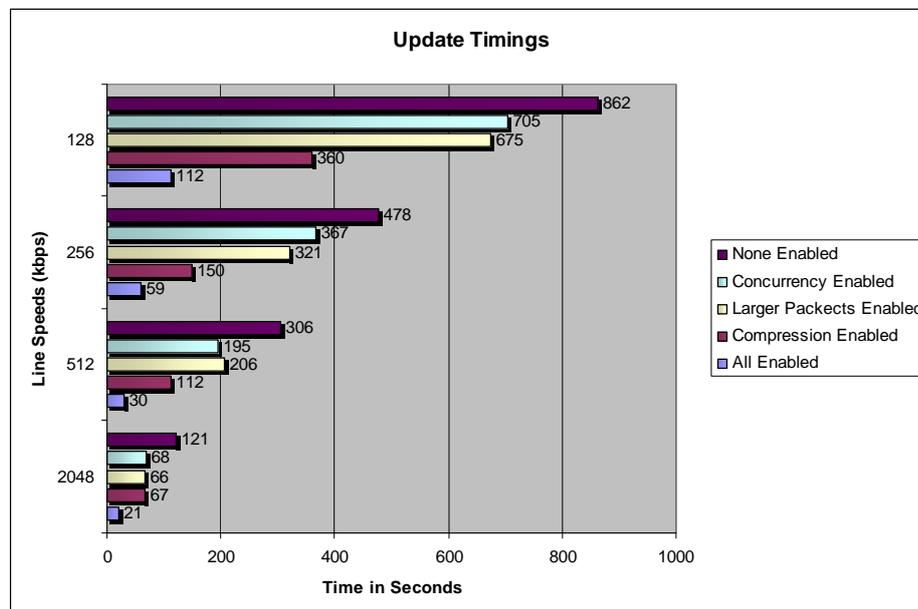
*Larger packets:* The network line speed is the key bottleneck when propagating data, access to disk (read/writing files) is relatively quick. Therefore data is handled in larger blocks (a factor of 10 has been applied).

*Compression:* Data is compressed / uncompressed into memory buffers before and after data is sent down a network connection.

*Concurrency:* Updates have in previous versions run sequentially, one database at a time. Databases are now propagated five at a time.

The net result of these changes is that bandwidth is more fully utilised and the length of time taken for updates has been reduced. The results of compression are more obvious on slower lines.

The chart below shows typical improvements over various line speeds. The bars marked 'None' give an indication of the performance of earlier releases; those marked 'All Enabled' show the improved version.



**Please note:** These results are taken over a clean line, with no error, delay, or extra loading. Therefore it is possible that actual timings may not reflect those shown here.

The times shown above are based on a realistic customer scenario. The project used contained 839 databases (with 807 databases containing changes). A total of 2,818 sessions have been spread out

unevenly amongst the databases. A total of 277758 pages (542Mbytes) of data have been sent with one particular database containing 120 Mbytes of data.

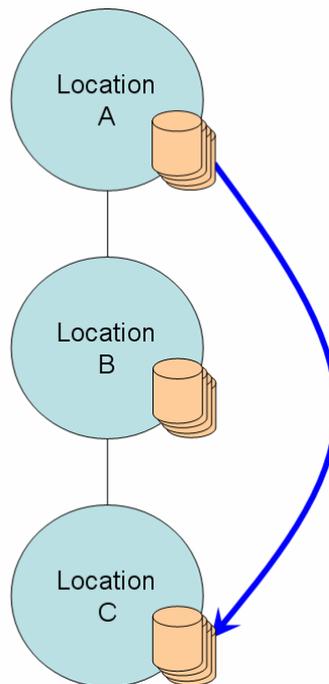
## 7.1.2 Overlapping Updates

Scheduled Updates to the **same** location will not start if the previous update has not completed. In previous versions it was possible for daemons to become overloaded with update events if one or more daemons were not running. This could lead to an overloading of commands that caused a bottleneck in Daemon operations. Preventing updates from overlapping will stop the build-up of updates and allow the daemon to run more smoothly.

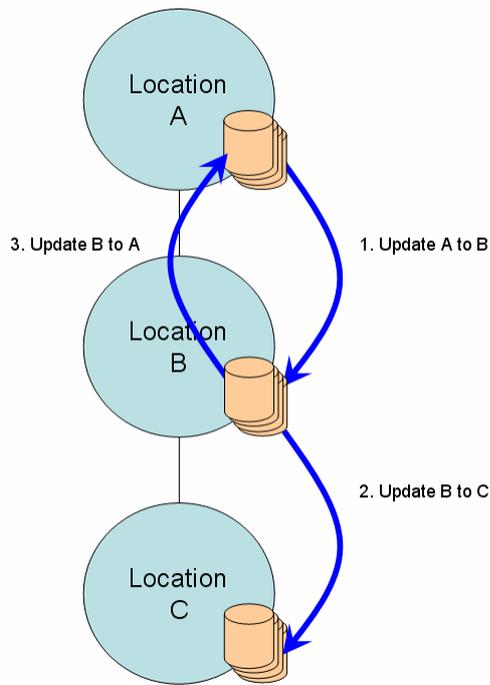
Duplicate Updates will no longer be possible; however, the performance improvement for concurrency should remove the need for this. This only affects updates between identical pairs; updates to other locations are not affected.

## 7.1.3 Non-Direct Scheduled Updates

In previous releases of Global, scheduled update events happened directly between 2 locations and ignored the network hierarchy. Thus, if a scheduled update was created at location A to update with location C, the update process would ignore Location B (as shown in the diagram below):



Scheduled update events will now include Location B as it is on the route to Location C. In this example, 3 actual updates will now commence in turn. Location A will update with Location B; Location B with Location C; and then once more Location B will update to Location A, thus ensuring that Location A, B and C are as up to date as possible (as shown in the diagram below). This is extended to incorporate as many locations as defined between the location initiating the update event, and its target location.



## 7.1.4 Update/Synchronise a subset of databases

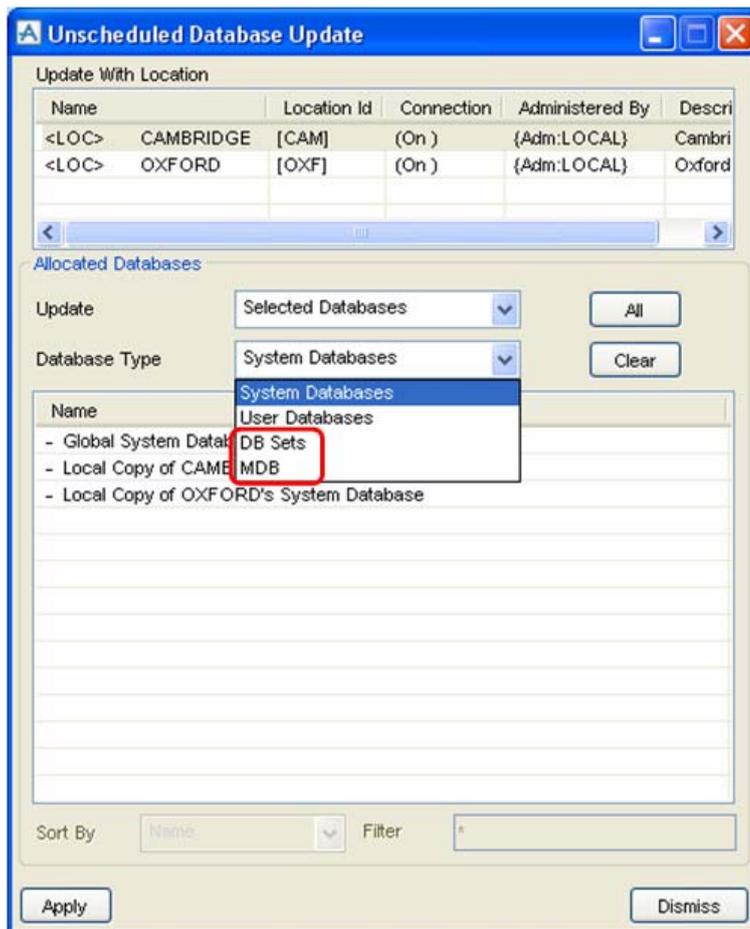
It is possible to update or synchronise a subset of databases rather than an individual, or all databases. These selections can be based on a list, a DBSET, a MDB or a Location.

New Syntax:

```
UPDATE DBLIST <update-list> WITH <loc>
SYNCHR DBLIST <update-list>
SYNCHR DBLIST <update-list> AT <loc>
```

DBLIST may include several items, including one or more MDB, DBSET DB or various other options.

For full details, please refer to the PDMS 12.0.SP4 *ADMIN Command Reference Manual*.



## 7.2 Improved Recover functionality

### 7.2.1 New Recover TO ALL locations

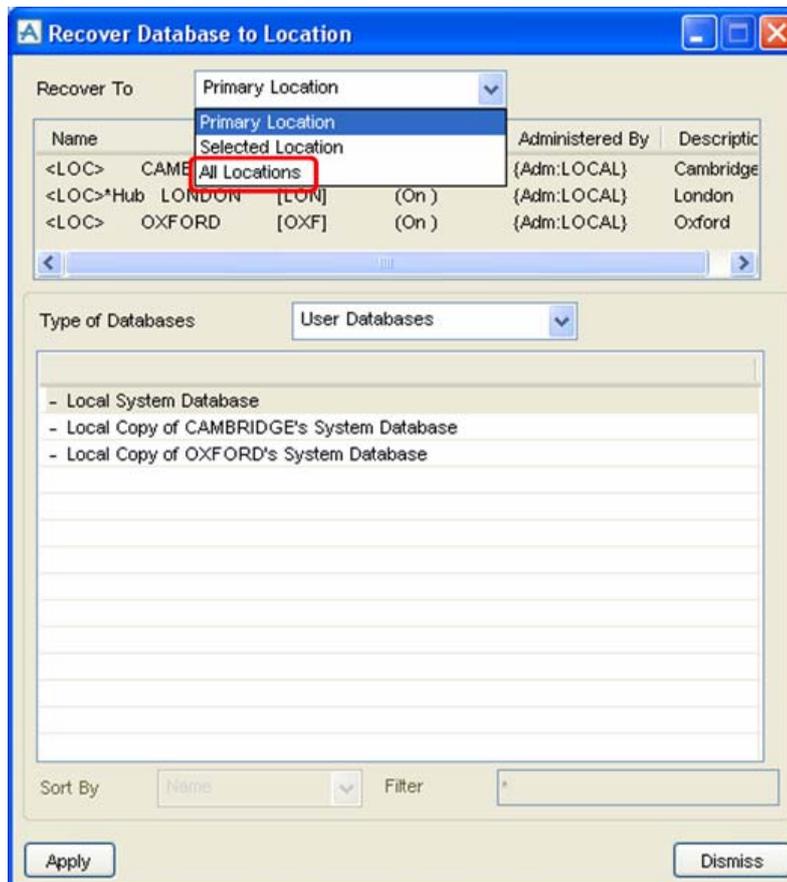
A new Global command has been added to allow a Global Administrator to recover a database to all allocated locations. This functionality is available from the HUB, the Primary location of the database, or the administering location of the location where the database is primary.

This process should be used with care, as it may take some time.

New syntax:

```
RECOVER <dbname> TO ALL/LOCATIONS
```

```
RECOVER <dbname> AT <locname> TO ALL/LOCATIONS
```



### 7.2.2 Extended Recover to include Global database

The Global database can be recovered to a single location or ALL locations – this functionality is only available at the HUB. New syntax is:

```
RECOVER GLOBAL TO ALL/LOCATIONS
```

```
RECOVER GLOBAL [AT <locname>] [FROM <locname>]
```

## 7.3 Improved Messaging

We have continued to improve the messaging system within Global, as with previous releases.

### 7.3.1 New - Daemon Messages numbered

We have now used the PDMS message module system to number Global messages. A new module (102) has been created to report Global specific errors. Extract error messages share Module 43 with PDMS so that Users should see the same error messages whether it is a local or remote extract command (please note that remote commands still uses the transaction database).

These messages can be extracted by using standard PML.

### 7.3.2 Reduced Console Messages

Messages reported in the Daemon ‘console’ window have been reduced. However, this is an ongoing task, so some messages are still echoed to this window.

### 7.3.3 Extended Update Messages

The inter-DB macros, transfer of other Data and pre and post execution scripts (EXECA and EXECB) now run in their own operations enabling better reporting of messages, success and failures.

## 7.4 Improved Offline Locations

The offline location functionality has been revisited to improve the robustness, a number of problems have been identified and resolved – see Chapter 4.

## 7.5 Synchronise Drawings command

A new command allows the Global Administrator to synchronise drawing files (for PADD databases) without the need to modify the Drawing database itself.

New Syntax:       SYNCHRONISE <dbnam> DRAWINGS/ONLY [FORCE/PICFD]

It is possible to override the PICFD attribute by using the FORCEPICFD option.

**Note:** This command can only be used for individual databases and cannot be used on a subset of databases.

## 7.6 New Query remote Banner

It is now possible to query the Global Daemon banner at remote locations allowing system administrators to be sure that a compatible daemon is running (including patch releases). **Please note:** that it is not possible to query banners of a previous version.

New Syntax:

QUERY REMOTE <locnam> BANNER

## 7.7 Extended Remote Merging

Minor improvements have been made to the Remote Merge functionality within Global. It is now possible to remote merge the Global database.

Also Remote Merge can be scheduled at given time using the syntax:

```
REMOTE <locnam> MERGE <dbname> AT <time> . . .
```

A Timed Merge button has been added to the Global Merge form:

The screenshot shows the 'Remote Merge Changes' dialog box. The 'Primary Database Location' is set to 'LON' for 'Location'. The 'Single database' dropdown is set to 'ADMIN/ASLCONFIG'. A list of 'Available databases' is shown on the left. The 'Changes' section has radio buttons for 'All', 'After' (selected), and 'Up To'. Under 'Changes After', there are radio buttons for 'TimeDate', 'Session' (selected), and 'Stamp'. Fields include 'Time: HH:MM' (10:00), 'Date: DD Mon Year' (8 Aug 2007), 'Session Number' (1), and 'Session User' (lloyd.brooks). A similar section exists for 'Changes Up To' with 'Time: HH:MM' (11:41), 'Date: DD Mon Year' (4 Aug 2008), 'Session Number' (113), and 'Session User' (lloyd.brooks). At the bottom, the 'Timed Merge' button is highlighted with a red box.

Clicking the button causes this form to be displayed:

The screenshot shows the 'Timed Merge Changes' dialog box. It has a title bar with 'Timed Merge Changes' and a close button. The main text says: 'This form is for specifying time merges. Please enter the Time and date for the merge to take place'. There are two input fields: 'Time: HH:MM:SS' with the value '09:22:53' and 'Date: Day Mon Year' with the value '17 Feb 2009'. At the bottom, there are 'Apply' and 'Cancel' buttons.

## 7.8 Improved Create Satellite functionality

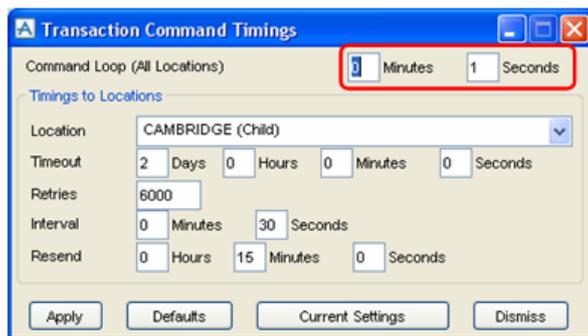
On creation of a new satellite the system DB is allocated to all online and un-initialised locations.

Also the automatic expunge has now been removed (except for the new system DB) which would lead to spurious Reverse propagation errors.

## 7.9 Changed – Default settings

The daemon uses an internal loop to process commands, this progresses the state of the command, and its sub-commands and operations through the actions that the command must carry out. This is configured by the attribute setting LEVENL located on the LCTIML element.

The default setting has been changed from 5 seconds to 1 second, and should result in the commands completing in a timelier manner. For existing projects this value will need to be changed by hand and can be found in the Transaction Timings menu option located under the Settings menu option of the main form:



## 7.10 Improvements to Drawing Files

### 7.10.1 Removal of Drawing File limit

The restriction of the limit for propagating drawing file of 500 per database has been removed. All drawing files are propagated in one go now.

### 7.10.2 Better support for Extracts

Drawing Files that are referenced from Extracts are now handled better; drawing file deletion is now protected if 2 extracts share the same drawing file.

### 7.10.3 Better Management of Final Designer Files

Final Designer files are managed better for databases with non-propagating drawing files.

### 7.10.4 Improved Allocate Drawing Files

The allocation of the Drawing files has been decoupled from the main allocation process. This means that the allocation of the database can complete whilst the drawing file allocation can take longer. This allows the database to be accessed without having all the drawing files available.

## 8 Catalogue & Specification

The user interface for all aspects of catalogues, specifications and material properties has been extensively revised. In addition, the PDMS 12.0 Catalogue data structures provide capabilities for new disciplines and support various new features elsewhere in the system. An introduction to the new facilities is provided in the new *Catalogues and Specifications User Guide*.

### 8.1 Integrated user interface

A completely new GUI for Paragon, together with associated database enhancements, provides a much enhanced method of building and editing the Component Catalogue, Material Property and Specifications to be used on a project. This covers the Piping, Equipment, Steelwork and HVAC disciplines.

The new user interface includes new forms to manage pipe specifications, selection tables, part families and categories. The General application provides a common set of menus for non-discipline specific activities; there are also individual applications for each discipline. Several of these new applications use Selection Tables instead of Specifications.

#### 8.1.1 Catalogue Explorer

There is also a new Explorer that provides access to the Catalogue, Properties, Design and DRAFT (PADD) databases. This allows references to be made to other catalogue elements, properties elements, design templates, and DRAFT symbol sets.

#### 8.1.2 Storage Areas

The new *Storage Areas* form, available from the *Settings* menu, is used to define where various types of data are to be stored, on a per discipline basis. For each entry, the form indicates the allowable type of storage element, and enables selection by entering a name or by navigating to the element and clicking on a CE button. The storage element does not take effect until the **OK** or **Apply** button is clicked.

From the *File* menu on this form, the user can save and load settings for all PDMS users, for the project, or for themselves only.

The settings are stored in the file `cat-refdata.pmlat` in one of the directories:

```
%pdmsdflts%
%<proj>dflts%, e.g. %samdflts%
%pdmsuser%
```

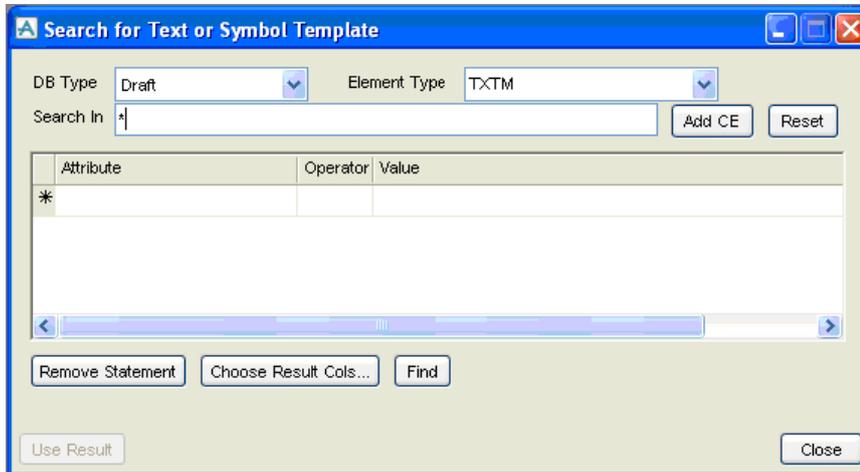
Only administrative users may save to the first two locations.

#### 8.1.3 Create menu

This can be used to create the storage elements, both top level and lower level, and other data such as Geometry Sets (GMSE) etc.

#### 8.1.4 Catalogue search tool

There is a new Search form can be used for a variety of purposes. This example shows it invoked from the **DRAFT Symbol Set** form.



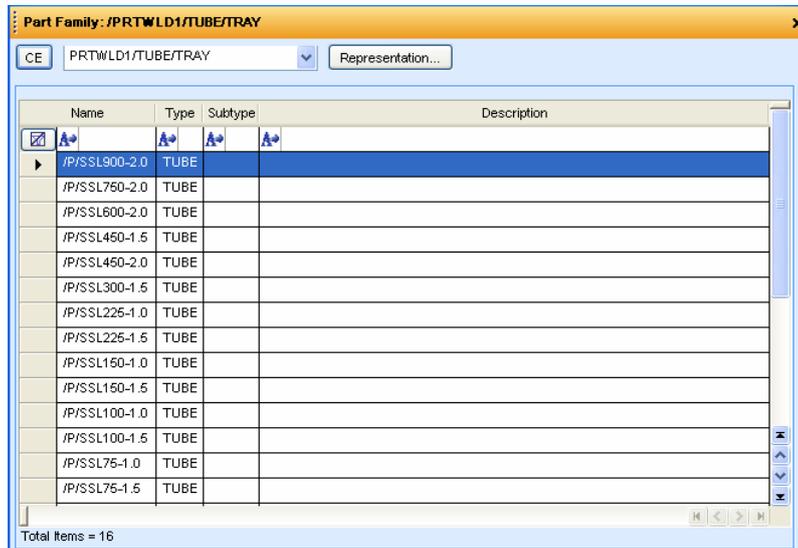
## 8.2 Parts, Part Worlds and Families

There is a new concept of Part elements (GPART), grouped in Part Families (PRTELE), which are stored in a Part World (PRTWLD). The GPART element has the same standard attributes as a SPCO, including CATREF, DETREF, MATXT, CMPREF and BLTREF, along with other attributes. It is also possible to add user-defined properties to each individual part.

Parts can be added to the new Selection Tables for selection in the design model: these can be used for all disciplines except piping. For the piping discipline, it is possible to add Parts to Piping Specifications in the same way as SPCOs, and there is a utility for converting PDMS 11.6 piping specifications to use Parts.

It is also possible to select Parts in the design model directly from the catalogue, using filtered searches.

Part Families are managed via the new Part Family form, available from the menu entry **Modify > Part Family**. Multiple versions of this form can be shown concurrently, allowing different Part Families to be viewed simultaneously.



The Part Family list allows the user to select some or all of the parts in the family for modification. Information displayed and updated in the lower panels then applies to all the parts selected.

A different Part Family can be displayed using the **CE** button and a Part Family viewed earlier in the current session can be selected from the list alongside the **CE** button.

The **General Attributes** and **References** links control which data are displayed in the lower panel.

New parts can be created using the various **Create** links. Parts are created relative to the current selection in the list. Selected parts can be deleted using the **Delete** button.

## 8.2.1 General Attributes

The Attributes view displays the key part attributes. If other attributes are to be modified, this can be achieved using the **Modify Attributes** form invoked via the **Edit All Attributes** button.

When multiple parts are selected, any data item that is not the same for all selected parts is indicated by the text “<Multiple values>”, as shown in the Attributes view alongside.

Any updates will be applied to all selected parts. Updates will not be applied for fields that contain the text “<Multiple values>”.

## 8.2.2 Reference Attributes

The References panel displays the reference attributes for the selected parts – Catalogue ref, Template ref, DRAFT Symbol Set ref, Detail Text, Material Text, Bolt ref. and Component ref. Selecting a reference in the list displays the current setting. This can be changed by entering the name of a new reference element, by navigating to the new reference element and pressing the **CE** button on this panel, or by pressing the Search button to search for an appropriate reference element.

Each reference attribute has its own display in the right hand side of the panel. These are shown below for a flange (except for the template which is shown for a pump). Data shown inactive are read-only on this form. The reference element itself may be modified by pressing the **Edit 3D Model** button on the panel.

The various editing options invoke various specialised form, such as the Category form for 3D editing or the DRAFT Symbol Set Form for the **DRSSREF**.

For full details, refer to the *Catalogues and Specifications User Guide* – Chapter 4 Working With PARAGON Applications.

The **Search** button on each Reference panel brings up the *Search* panel, containing the Search control. This panel appears with the appropriate search criteria for attribute concerned; the user can make any desired changes and then press the **Find** button. If a result row is selected, the **Use** button will be activated; this returns to the Reference panel with the chosen value ready to **Apply Changes**. The **Back** button returns to the Reference panel unchanged.

## 8.3 Autonaming

Auto Naming is now available under the menu **Settings > Naming**. It works in the same way as Auto Naming in Design.

Naming rules are stored in the file %pdmsdflts%\cat-nam.pmlat. Element type rules are stored in the file %pdmsdflts%\cat-element-rules.pmlat

A basic example set of rules is included for reference.

## 8.4 Specifications and Selection Tables

### 8.4.1 Pipe Specs

Piping specifications are managed by the new *View Specification* form, available from the menu entry **Modify > Specification** in the Pipework Application. When first displayed, this lists all SPCOMS in spec order. Columns list the selectors and references – this view replaces the Specon text output.

Specification: /A1A (CAD view)

CE A1A Heading s ATTA

Name	T...	PBOR0	STYP	SHOP	Part Ref	Catalogue Ref	Detail Ref	Material Ref	Component Ref	Bolt Ref	Template Re
/A1A/ATT15	ATTA	15	AT	TRUE	=0/0	ATT15		=0/0	=0/0	=0/0	=0/0
/A1A/ATT.SA.15	ATTA	15	SA	TRUE	=0/0	ATT15	PIPEWORK.SUPPORT.TYPE.A	=0/0	=0/0	=0/0	=0/0
/A1A/ATT20	ATTA	20	AT	TRUE	=0/0	ATT20		=0/0	=0/0	=0/0	=0/0
/A1A/ATT.SA.20	ATTA	20	SA	TRUE	=0/0	ATT20	PIPEWORK.SUPPORT.TYPE.A	=0/0	=0/0	=0/0	=0/0
/A1A/ATT25	ATTA	25	AT	TRUE	=0/0	ATT25		=0/0	=0/0	=0/0	=0/0
/A1A/ATT.SA.25	ATTA	25	SA	TRUE	=0/0	ATT25	PIPEWORK.SUPPORT.TYPE.A	=0/0	=0/0	=0/0	=0/0
/A1A/ATT40	ATTA	40	AT	TRUE	=0/0	ATT40		=0/0	=0/0	=0/0	=0/0
/A1A/ATT.SA.40	ATTA	40	SA	TRUE	=0/0	ATT40	PIPEWORK.SUPPORT.TYPE.A	=0/0	=0/0	=0/0	=0/0
/A1A/ATT50	ATTA	50	AT	TRUE	=0/0	ATT50		=0/0	=0/0	=0/0	=0/0
/A1A/ATT.SA.50	ATTA	50	SA	TRUE	=0/0	ATT50	PIPEWORK.SUPPORT.TYPE.A	=0/0	=0/0	=0/0	=0/0
/A1A/ATT80	ATTA	80	AT	TRUE	=0/0	ATT80		=0/0	=0/0	=0/0	=0/0
/A1A/ATT.SA.80	ATTA	80	SA	TRUE	=0/0	ATT80	PIPEWORK.SUPPORT.TYPE.A	=0/0	=0/0	=0/0	=0/0
/A1A/ATT100	ATTA	100	AT	TRUE	=0/0	ATT100		=0/0	=0/0	=0/0	=0/0
/A1A/ATT.SA.100	ATTA	100	SA	TRUE	=0/0	ATT100	PIPEWORK.SUPPORT.TYPE.A	=0/0	=0/0	=0/0	=0/0
/A1A/ATT.SHOE	ATTA	100	SH	TRUE	=0/0	ATT-SHOE	PIPEWORK.SUPPORT.SHOE	=0/0	=0/0	=0/0	=0/0

Total Items = 23

Eng. View  CAD View

Select All Clear Selection

Tasks

Specification	Tables	Headings	Items
Edit Spec Atts...	Size Range...	Add Heading...	Add New Items...
Edit CAD Atts...	Branch Table...	Edit Heading...	Add From Limbo...
Rename Spec...	Reducer table...		Edit Answers...
Export...			Edit References...
			Edit Extra
			UDA's...
			Rename Items...
		Delete Heading	Remove to Limbo
			Delete
			Permanentiv

Items in the table can be sorted by column by clicking the column heading in the usual spreadsheet manner. The view can also be toggled between an 'Engineering View' and a 'CAD view'.

### 8.4.2 Piping Tables

In addition to the COCO (Connection Compatibility) and the Nominal Bore/Wall Thickness tables, there is a new Branch/Reducer Table in the PARAGON database.

New form controls are available to enable easy configuration and maintenance. These controls allow you to create, modify and delete table information without having an immediate effect on any active databases. When you have finished the modifications, you can either **Apply** the changes, **Reload** the control to the initial state or just cancel the form.

The pictures overleaf show the Nominal Bore and Branch/Reducer tables. Full details of the new forms are given in the *Catalogues & Specifications User Guide*.

**Nominal Bore Table**

Available Nominal Bores (mm)

Specification Nominal Bores and Wall Thicknesses (mm)

Nominal Bores	Wall Thickness 1	Wall Thickness 2
6	XXS	XXS
8	XS	SCH-160
10	STD	XS
15	SCH-160	5
20	SCH-140	5
25	SCH-120	4
32	SCH-120	4
40	SCH-100	4
50	SCH-80	3
65	SCH-60	3
80	SCH-40	2.5
90	SCH-30	2.5
100	SCH-20	
125	SCH-10	
150	80S	
200	40S	
250	10S	
300	5S	
350		
400		
450		
500		

Grid Insertion Type

Schedule

Wall Thickness

Rejoad Apply

Cancel

Nominal Bore table

**Branch and Reducer Table**

Available Nominal Bores (inches)

Branch Size

Header Size	Bores	0.125	0.25	0.375	0.5	0.75	1	1.25	1.5	2	2.5	3
0.125	TET											
0.25	TES	TET										
0.375	TES	TES	TET									
0.5	TES	TES	TES	TET								
0.75	TES	TES	TES	TES	TET							
1	TRS	TRS	TRS	TRS	TRS	TET						
1.25	WOL TRS PAD	TRS	TRS	TRS	TRS	TRS	TET					
1.5	TOL WOL PAD	TOL WOL	TEB	TEB	TEB	TEB	TEB	TET				
2	TOL	TOL WOL PAD	TEB	TEB	TEB	TEB	TEB	TEB	TET			
2.5	TOL	TOL	TOL WOL PAD	TRB	TRB	TRB	TRB	TRB	TRB	TET		
3	TOL	TOL	TOL	TOL WOL PAD	SOB	SOB	SOB	SOB	SOB	SOB	TET	

Reducer Sizes

Short Codes

Cell Click Action

None Add Remove Clear

Rejoad Apply

Cancel

Branch/Reducer table

### 8.4.3 Equipment Specifications

Equipment specifications may now be used to select Equipment templates. These specifications may reference components (SCOM) containing parameters for a family of equipment components.

Parameterised obstruction volumes and maintenance volumes can of course be incorporated into the template definition.

### 8.4.4 Selection Tables

All applications other than Pipework (i.e. Steelwork, Equipment and HVAC) use the new Selection Tables, managed by the new *Selection Table* form, available from the menu entry **Modify > Selection Table**. This form allows the user to control all the data required to define a Selection Table, its Questions and Answers. Multiple versions of this form can be shown concurrently, allowing different Selection Tables to be viewed simultaneously.

Active	Item Name	FUNC	AREA	Part Name	Pri
TRUE	=15693/36311	Process	100	/P/STD/Reboiler-With-Horizontal-Tube-Bundle/TYPEA	Hv
TRUE	=15693/36312	Storage	100	/P/STD/Storage-Vessel-Coned-One-End/TYPEA	Hv
TRUE	=15693/36313	Storage	200	/P/STD/Storage-Vessel-With-Dished-Ends/TYPEA	Wv
TRUE	=15693/36314	Storage	200	/P/STD/Storage-Hoppers/TYPEA	Wv
TRUE	=15693/36315	Storage	200	/P/STD/Storage-Hoppers/TYPEB	Wv
TRUE	=15693/36316	Storage	200	/P/STD/Storage-Flged-Top/TYPEA	Wv
TRUE	=15693/36317	Storage	300	/P/STD/Storage-Flg&Dished-Top/TYPEA	Wv
TRUE	=15693/36318	Storage	300	/P/STD/Storage-Tower-Urn/TYPEA	TV
TRUE	=15693/36319	Storage	300	/P/STD/Storage-Tower-Inverted-Urn/TYPEA	TV
TRUE	=15693/36320	Storage	300	/P/STD/Conical-Top-Storage-Tank/TYPEA	VT
TRUE	=15693/36321	Storage	300	/P/STD/Flat-Top-Storage-Tank/TYPEA	VT
TRUE	=15693/36322	Storage	100	/P/STD/Dished-Top-Storage-Tank/TYPEA	VT
TRUE	=15693/36323	Exchanger	100	/P/STD/Shell-Exchanger-Dished-One-End	HE
TRUE	=15693/36324	Exchanger	100	/P/STD/Shell-Exchanger-Dished-Both-Ends	HE
TRUE	=15693/36325	Exchanger	200	/P/STD/Shell-Exchanger-Flged-Both-Ends	HE
TRUE	=15693/36326	Exchanger	200	/P/STD/Shell-Exchanger-Dished-Both-Ends-Nozzles	EC
TRUE	=15693/36327	Exchanger	200	/P/STD/Shell-Exchanger-Dished-Flged	EC
TRUE	=15693/36328	Exchanger	300	/P/STD/Shell-Exchanger-Dished-One-End/Vert	HE

Selection Table Total Items = 32

Select All Clear Selection

Table	Types	Selection Criteria	Items
Table Attributes...	Add Type...	Edit Criteria...	Add Items (from CE)
	Edit Type...		Add Items (Search)...
	Delete Type...		Edit Selection...
			Delete Selection

The Selection Table form allows the user to select some or all of the rows in the table for modification. Information displayed and updated in the lower panels then applies to all the rows selected.

A different Selection Table can be displayed using the **CE** button; a Selection Table viewed earlier in the current session can be selected from the dropdown list alongside the **CE** button.

Parts from a Part Family (see below for *Part Family* form description) can be added using the *Add Items (from CE)* link label (the current element must be a Part Family, i.e. a PRTELE that has GPART members). Selected rows can be deleted using the *Delete Selection* link label. The link labels control the data displayed in the lower panels.

## 8.5 Symbolic representation of design objects

The catalogue component SCOM can now reference 2D symbols as well as 3D geometry. These can be used in DRAFT in place of, or in addition to, the 3D picture – see section 16.6 Symbolic representation of model objects.

The database structure is analogous to the point and geometry references, which point to PTSETs and GMSETs. The SCOM now has a DRSSref that points to a DRSSSET in a CATE, STCA, SECT or STSE. These DRSSSETs have references to DRSYLK elements in a DRAFT (i.e. PADDLE) database. These are the templates for the 2D design symbols that are referenced by the Catalogue.

It is envisaged that most users will use a standard DRAFT symbol library in such a database in a manner similar to the master discipline catalogues, probably in a master project such as the sample MAS project. In this way, the data structures in the PADDLE database for symbols and symbol libraries can be reused and the DRAFT design symbols can be made available in user projects by including a foreign reference to the relevant MDB in the master project. This makes the 2D design symbols available throughout the organisation but prevents most users from modifying them.

As the DRAFT design symbol libraries will be stored within a Foreign project database (e.g. MAS), then it will be the responsibility of the system/project administrator for the Foreign project to distribute them globally. The PDMS Global application only distributes databases for a given project. Thus if MAS is required at another location, then the system/project administrator must either make that a Global project or otherwise arrange for its distribution.

Use of Sheets and Overlays should be avoided within the design symbol database since these will complicate distribution of these libraries.

It should be possible to use a normal reconfiguration for a project in which elements of a master DRAFT design symbol database are referenced from the Catalogue in this way.

## 8.6 Allowable angle attribute for ppoints

A new attribute (ALLANG) is available on PTAX, PTMI, PTCA & PTPOS elements. Its primary purpose is to allow additional data checking for HVAC ducting.

## 9 Design Changes

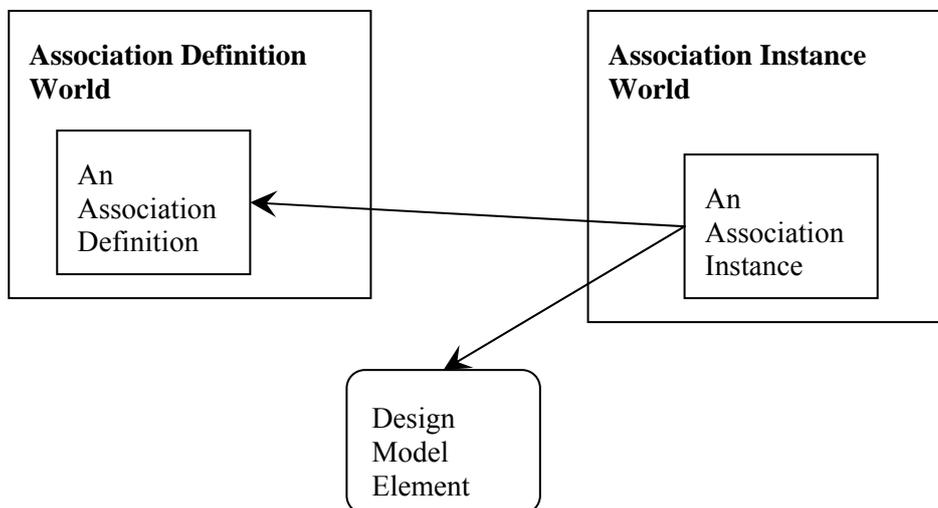
### 9.1 Associations

The system now allows the user to create, modify, view and report positional, dimensional, or geometric associations between multi-disciplinary elements, and provides graphical feedback on invalid associations.

Associations are stored in DESIGN databases but remain independent of the objects that they link. They may therefore be stored in an independent DESI database, with no design data, that is accessible for writing to all users who can create Associations. This means that, for example, a user with access to Equipment may relate its position to a structural object without having to have any access to the structure itself.

Associations (ASSOC) are organised in groups (ASSOGP) in an Association World (ASSOWL) and contain a number of objects defining the relationships and the related objects. They also reference a master Association Definition, which defines the various types of Association and the rules under which they operate. These are also in a separate database, to which the users' access may be restricted, if required.

The diagram shows the relationship between Association Definitions, Association (Instances), and Design elements participating in Associations. All references are one way. A design element may be referenced by many Association Instances; an Association Definition may be referenced by many Association Instances.



Associations are quite complex but will most often be incorporated in an application for use by the end user. For example, PDMS 12.0 uses them in the *Hole Management* and *Equipment Associations* applications.

## 9.2 Hole Management

The Hole Management System provides additional functions for penetrations and allows control and reporting of data associated with a ‘managed’ hole, which may include multiple penetrating objects. It uses the new ‘Association’ functions to:

- Manage the communication of hole data between disciplines
- Check data consistency on request providing relevant user feedback
- Allow discipline communication of data for managed holes
- Generate reports on managed holes

The old Penetrations application menu bar has been removed from all discipline utilities menus, but can be reinstated by defining the global PML variable !!USEOLDPEN in the product start-up. However, this application has not been fully tested at this release.

Hole Management uses some new terminology, which is summarised here:

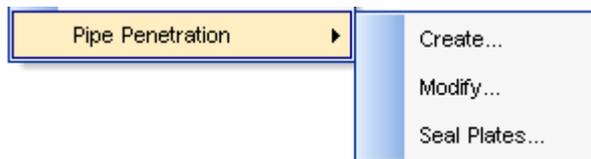
**Managed Hole**      The elements and data being managed by the Hole Management system

**Virtual Hole**      The modelled representation of the required hole shape

**Real Hole**      The model geometry of the hole

**Penetration**      Model geometry added by the Penetrations application

The Application is accessed using the new utilities menu bar commands **Utilities>Pipe Penetrations** in the Piping application, **Utilities>HVAC Penetrations** in the HVAC application, and **Utilities>Steel Penetrations** in the Structural applications. Each Penetrations menu has a sub-menu with Create, Modify and Seal Plates commands, for example:



Details of the application can be found in chapter 4 ‘Multi Disciplinary Penetration and Hole Management’ in the *Design Common Functionality User Guide*.

## 9.3 Plant Grids

A new **Plant Grid Systems** option on the utilities menu enables the creation, modification and display of both local and project wide grid systems. These grids are stored in the database and may be either linear or radial. Extensive options are provided for regular or irregular spacing, position and orientation, labelling, and for setting their extents.

A menu option enables the display of any picked position in coordinates relative to the currently selected grid. The pick uses the standard position toolbar so any element, ppoint, graphic, etc. can be picked. The picked position is displayed in both world and grid coordinates (note that the designer can make use of this information to define clipping planes by selecting gridlines that include the region of interest – see below).

A wide range of options, including both 2D and 3D lines and various labelling options, enables the display of grids to be suited to the task in hand.

## 9.4 Six plane clipping of volume view

The volume view clipping menu (secondary mouse click on the **Clipping & Options** button on the view frame) has been extended with a **Planes...** option. This provides an alternative to the clipping box: up to 6 individual planes may be defined to clip the model. These may be aligned on plant items such as panels and beams, or by selecting grid lines.

The **Clip** form enables the planes can be defined and enabled. Up to 6 clip planes can be defined, at any angle, to suit irregularly shaped areas. The direction of a plane is considered to point into the region of interest.

Once plane position and direction have been obtained from the picked item, the plane can be enabled. It can then be finely adjusted using the nudge and slide gadgets with the graphics changing as you move the slider. The reverse direction button is useful, for example where a floor plate is picked and the view must be above or below it.

## 9.5 Data Listing

Improvements have been made to DATAL function to support project copying, by making it possible to navigate the database when creating elements. In order to provide this, the additional keywords LOCATE and REPLACE have been added to the NEW command.

### 9.5.1 Changes to NEW syntax

The NEW command to create elements now includes 2 optional keywords:

The LOCATE keyword will navigate to an element with the specified name and type; if it does not exist, it will be created. The newly created element will always go at the end of the current list. NEW LOCATE EQUI /VESS1 creates new elements in /VESS1.

The REPLACE keyword will replace an existing element with the specified name and type; if it does not exist, it will be created. If the named element already exists, it will be deleted, and re-created at the same point in the hierarchy with the same reference number. If not, it will go at the end of the current list. For example NEW REPLACE EQUI /VESS1 will overwrite /VESS1.

In either case, both the name and element type must match.

### 9.5.2 Support for Long arrays

Integer arrays up to 8192 long are now supported in PDMS. These may be input using the APPEND syntax to extend an array; and Data listing output splits the array across a number of command-lines using the APPEND syntax:

```
ELDATA 1 2 3 4 5 6 7 8 9
ELDATA APPE 10 11 12
```

Use of APPEND avoids the need to specify a start point explicitly.

It is not possible for the entire array to be extracted in a single expression (other than through Datal output). However use of the NUMBER qualifier allows parts of the array to be extracted:

```
Q ELDATA NUM 1 to 1000
Q ELDATA NUM 8192
Q var !!CE.DTLTST[8192]
```

The error (2,136) will be returned for an unqualified array if the attribute is larger than that allowed for expressions (1000)

*Note that APPEND syntax can only be used for integer arrays.*

### 9.5.3 Changes to OUTPUT command

OUTPUT syntax now includes new options LOCATE and REPLACE. Both may be used together to locate the new element at the required position in the hierarchy. Elements above the selected elements will be included in the output with the LOCATE keyword, and the selected elements will be included using the REPLACE keyword. For example, if both keywords are used:

```
NEW LOCATE SITE/ATEST
NEW LOCATE ZONE /ZONE1.EQUIP
NEW REPLACE EQUIP /VESS1
```

These options are not available with OUTPUT CHANGES syntax. Note that this functionality is less powerful than OUTPUT CHANGES, since only the selected elements will be replaced; members of these elements will be newly created.

Both OUTPUT and OUTPUT CHANGES now begin with the syntax INPUT BEGIN and end with the syntax INPUT END. The list of elements and attributes to be output can be modified using two new attributes DTLNIS and DTLELE.

- DTLNIS specifies a list of attributes to be output. The default is the attribute list ATNLIS.
- DTLELE specifies a list of elements to be output; if unset, the current element is used. Otherwise, the current element must be included explicitly if required.

## 9.6 Changes to EXPORT command

**\*12.0.SP5\***

The Review Export file format has a new option to enable the export of insulation and obstruction translucency and colours from PDMS to Review – but please note that Review 12.0.SP2 or later is required to display this new format. This gives the Review user browsing the PDMS model a quick and simple way of producing a useful display, with the option of including translucent insulation and/or obstruction geometry.

The new syntax to export representation is:

```
EXPORT REPR/ESENTATION ON
EXPORT REPR/ESENTATION OFF
```

When set ON, the Design colours defined by the Export Autocolour rules, with translucency of insulation or obstruction primitives set using the Representation settings, will be exported.

This new option is not currently supported in the Design GUI.

## 9.7 Enhancements to Drawlist & Explorer **\*12.0.SP5\***

The Drawlist now tracks changes automatically and the **Refresh lists** button has been removed. **Update Display** and **Reset** buttons have been removed and Visual properties are now applied individually after they are changed. The **Remove** button has become **Remove selection**.

It is now possible to add or remove, from the Drawlist, a primitive only rather than the significant element. This can be done from the Explorer using new context menus under **3D View** to **Add Only** or **Remove Only**. Alternatively, primitives can be added by keeping the <CTRL> key pressed while Dragging and Dropping from the Explorer to the 3D view.

# 10 Engineering Disciplines

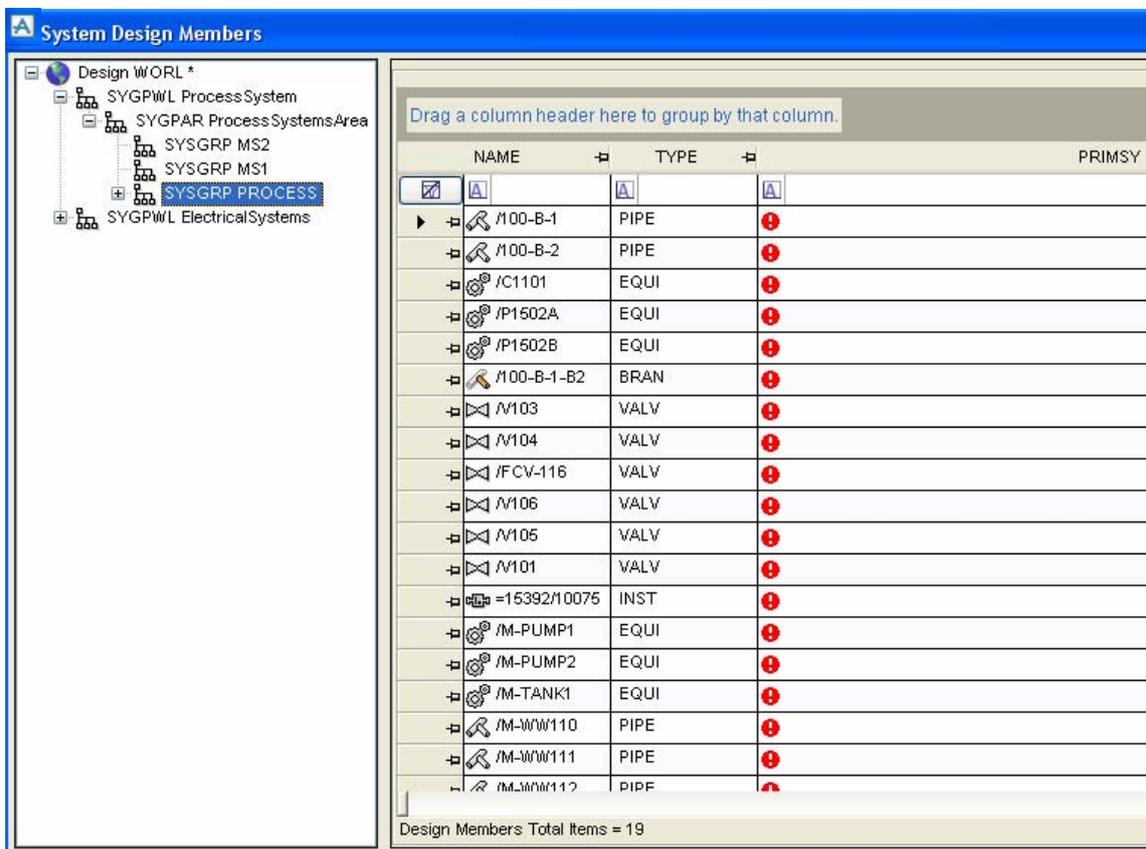
All the engineering applications have had major improvements, which are detailed below. In addition, there are some upgrades common to several or all of them, which are listed in this chapter.

## 10.1 Organisation by system

Pipes, Equipment, HVAC & Cable Trays may now be organised by system as well as in the usual geographical SITE, ZONE... structure. These systems may be used for reporting, display and other operations.

The systems are set up by administrators (see section 3.2) and then populated by designers.

The contents are manipulated using the System Explorer:



An Explorer pop-up menu allows you to access a system in the 3D view and a *Utilities* menu option allows you to modify the system.

## 11 Equipment

The PDMS 12.0 ‘Equipment’ Discipline has the following new features:

### 11.1 Design Template Application

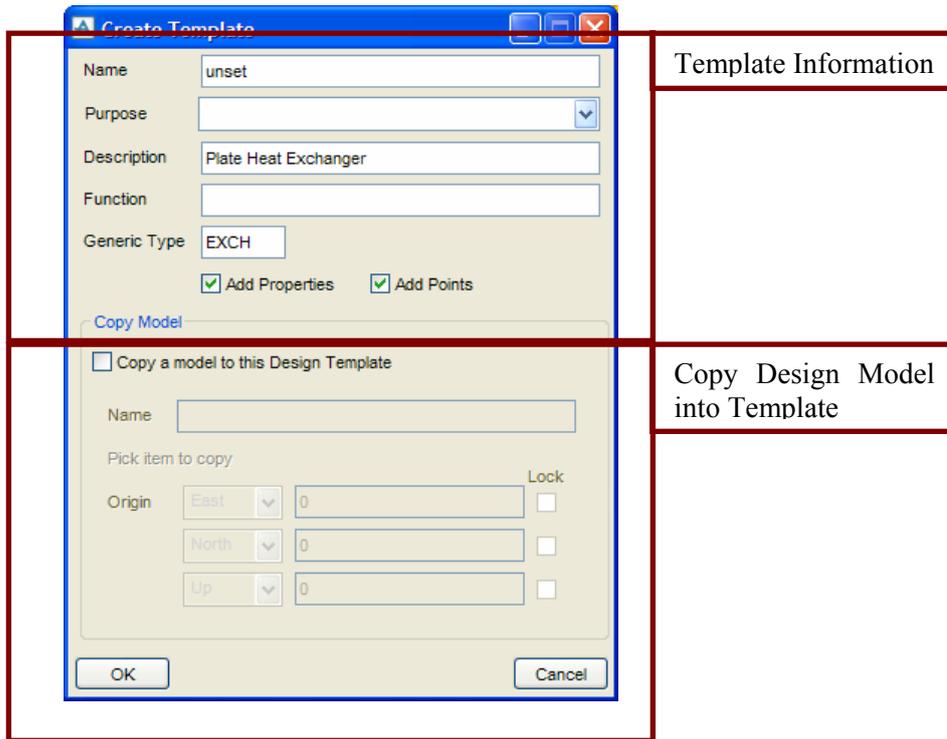
The Design Template Application has been extensively improved and incorporates the use of more advanced GUI tools. Templates are created using the **Create>Template...** menu. The Template Information section is unchanged from earlier versions of PDMS. Aspects that have been updated include:

- Design Templates with no geometry – may now be created
- Primitive creation and manipulation
- Search tool

To create a Design Template containing no Design geometry, leave the **Copy a Model to this Design Template** box unchecked, and press the **OK** button.

The Parameterisation form (**Modify>Parameterisation...**) has been updated and now provides:

- Repeat element rules
- Local Name definition functions
- A rule definition form with a list of properties available
- A new GUI for Design Parameter rules and Easting, Northing, Upping rules in the attributes list at the bottom of the parameterisation form.

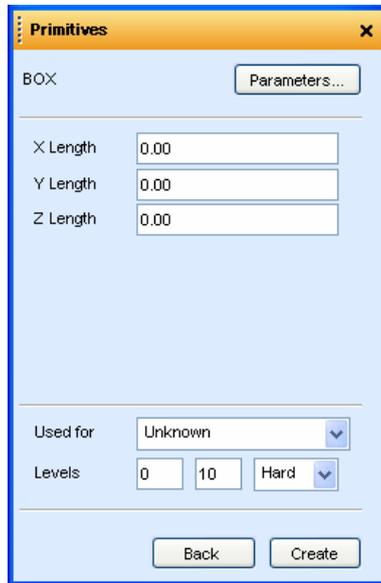


## 11.2 Primitive Creation

A new primitive creation form is accessible from the Equipment application from the **Create>Primitives** menu. This form is also used for the new Volume Model.



Picking a primitive type will lead to a further form – for example, the box creation form, for entry of the appropriate attributes.



### 11.3 Selection from specification

Equipment templates can now be selected via a specification and changes in the template can be propagated to all instances of that item in the project.

This allows modifications to a Design Template master to be propagated to its linked instances. In previous releases, this was not the case as the instances are copies of the master. This is different from catalogue components as instances of a catalogue components change as soon as the master catalogue component definition is changed.

The system now determines which Design Template instances need to be updated by comparing the last session date of the Design Template master with the session date for each of its Design Template instances. When the user requests that an instance is updated, the system will try to maintain electrical connections and connection to nozzles. Other connections, such as associative dimensions on drawings and Associations must be resolved by the user.

There are some changes to the Design Template definition that cannot be propagated to Design Template instances, where it is not logically possible to resolve the instance with the new master definition. For example, changing the meaning or order of Design Parameters; removing connection elements (e.g. nozzles) from the master where that item has been connected in an instance. In such cases, it will be necessary to delete the instance and create a new instance from the new Design Template master.

It is possible to disconnect a Design Template instance from its master definition. If a Design Template instance has been disconnected from its master definition it will not be updated by Design Template propagation.

The Design Template change propagation form is shown by using the *Utilities>Propagate Changes...* menu command.

The form below shows all linked instances of Design Template /ADV/VESS004. All of the instances are marked as **Suspect**. This means that the master Design Template has been modified either in the same session or in a subsequent session to the last modification to the Design Template instances, and consequently they should be considered for propagation of changes.

Note that Design Template instances may be updated only if the user has full access to modify each instance. If any instances are claimed by another user, or modification is prevented by Data Access Control then the update will fail.

**Propagate Changes**

Name: ADV/VESS004  
Last Modified: 18:23:00 2 March 2007

Name	Date	State	Message
V1050A	18:22:00 2 March	Suspect	
V1100A	18:22:00 2 March	Suspect	
V1010A	18:22:00 2 March	Suspect	
V1060A	18:22:00 2 March	Suspect	
V1020A	18:22:00 2 March	Suspect	
V1070A	18:22:00 2 March	Suspect	
V1000A	14:39:00 9 Janua	Suspect	
V1030A	18:22:00 2 March	Suspect	
V1080A	18:22:00 2 March	Suspect	
V1040A	18:22:00 2 March	Suspect	
V1090A	18:22:00 2 March	Suspect	

Show All  
 Show Suspect Only  
 Show Failed Only

**Annotations:**

- List of Template Instances
- Date of session when last modified
- The State column indicates whether the instance needs to be updated before the Update operation, and reports the success or failure of the operation when the update has finished
- The Message column reports on Update failures after the update operation has finished
- Message area for information about individual Design Template instances
- Filters the Design Template instances shown in the list according to the State column
- Display selected Instances in a 3D
- Print preview of the current content of the table on the form
- Performs the Update operation

## 11.4 Associations Utility

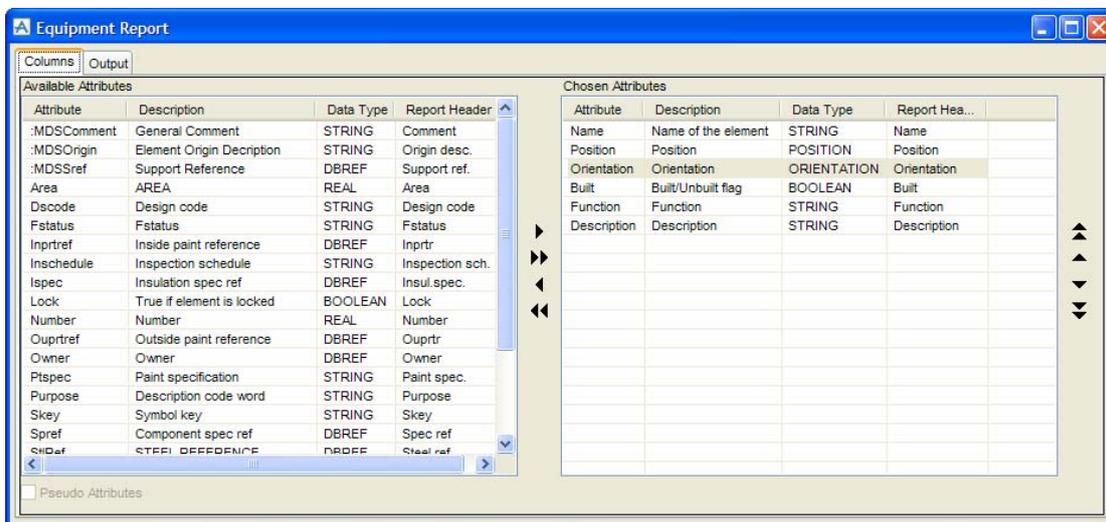
The Equipment application now allows users to apply geometrical constraints between a piece of Equipment and its surroundings for subsequent design checking. This uses the new Association system (see section 3.6) that stores constraints between geometrical features (e.g. Ppoints, Design Points and Plines) on Equipment and other significant Design elements. It should be noted that Associations are passive relationships that do not necessarily fully constrain an object in the model, so the system reports broken constraints but does not modify the model to resolve them.

An Equipment Association is a design rule that can be checked by the system. The system requires that a set of Association Definitions is loaded into each MDB where Associations are to be used. The MAS project supplied includes a new database MASTER/ASSOCDEFN (DBNO 7027) that contains the Associations used by the application. Users who wish to use Equipment Associations should load this database, or its Association Definition World, into their project. They do not need to load the data if they do not intend to use this utility; it can be loaded at a later stage of the project if required.

The **Equipment Associations** utility in the **Utilities** menu provides the ability to create, modify, delete and view details of Equipment Associations. It will report success if a design constraint is satisfied by the model, and it will report failure for a design constraint that is not satisfied by the model.

## 11.5 Equipment Reports

A new **Equipment Report** option is available from the **Utilities** menu. This initiates a form that enables users to pick and sort the required attributes in the **Columns** tab for inclusion in the report shown in a grid control in the **Output** tab.



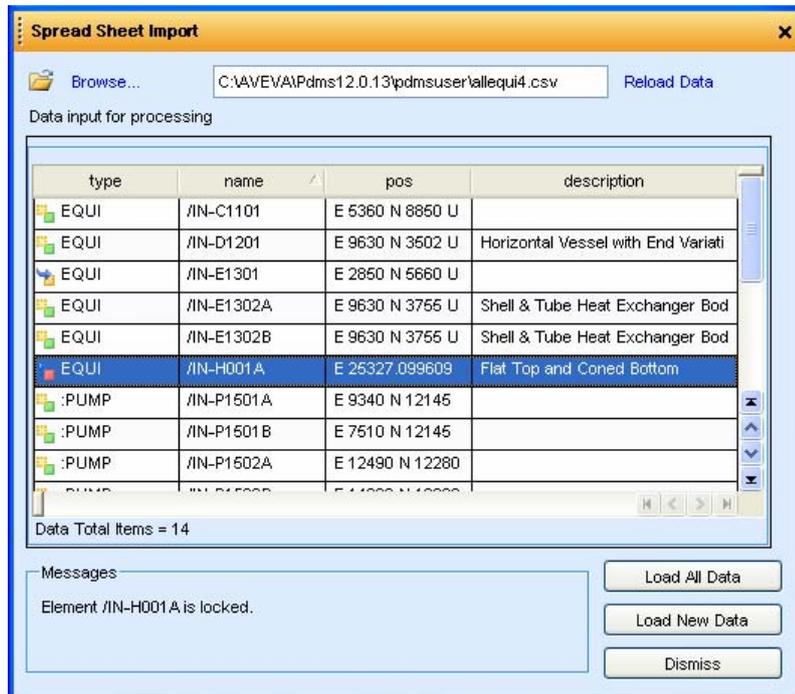
NAME	POS	ORI	BUIL	FUNC	DESC
=15392/9960	E 0mm N 0mm U 0mm	Y is N and Z is U	false	unset	unset
/E1301	E 2850mm N 5660mm U 1470mm	Y is N and Z is U	true	unset	unset
/D1201	E 9630mm N 3602mm U 6170mm	Y is N and Z is U	false	unset	unset
/C1101	E 5360mm N 8850mm U 305mm	Y is N and Z is U	true	unset	unset
/E1302A	E 9630mm N 3755mm U 8385mm	Y is S and Z is U	false	unset	unset
/E1302B	E 9630mm N 3755mm U 9352mm	Y is S and Z is U	false	unset	unset
/P1501A	E 9340mm N 12145mm U 645mm	Y is N and Z is U	true	unset	unset
/P1501B	E 7510mm N 12145mm U 645mm	Y is N and Z is U	true	unset	unset
/P1502A	E 12490mm N 12280mm U 1150mm	Y is N and Z is U	true	unset	unset
/P1502B	E 14880mm N 12280mm U 1150mm	Y is N and Z is U	false	unset	unset
/VENTILATION_UNIT1	E 2000mm N 17500mm U 2000mm	Y is N and Z is U	false	unset	unset

The grid control provides facilities for filtering, sorting and modification of columns, and export to Excel.

## 11.6 Import Equipment from file

Equipment data may now be imported from a CSV format text file, formatted according to certain rules. This allows Equipment tags and descriptions to be imported from another system. It is anticipated that this function will be used near the beginning of a project to pre-populate a Design database with a list of Equipment. The geometry of the imported equipment will not be defined by this method, but may be supplied using the usual GUI.

The **Utilities>Import Equipment...** menu command first shows a standard file browser to pick the file to be loaded. Pressing the **Open** button displays the content of the selected spreadsheet in the following form.



At this stage, this is just a preview and no data has been loaded. The icons give an indication of the status of the data and whether or not a piece of equipment with that name already exists in PDMS. If it already exists, or the system detects another error, it will not be created.

Pressing the **Load All Data** button will process all of the rows with no error that create a new element or modify an existing element. Pressing the **Load New Data** button will process only the rows that create new elements.

## 12 Piping

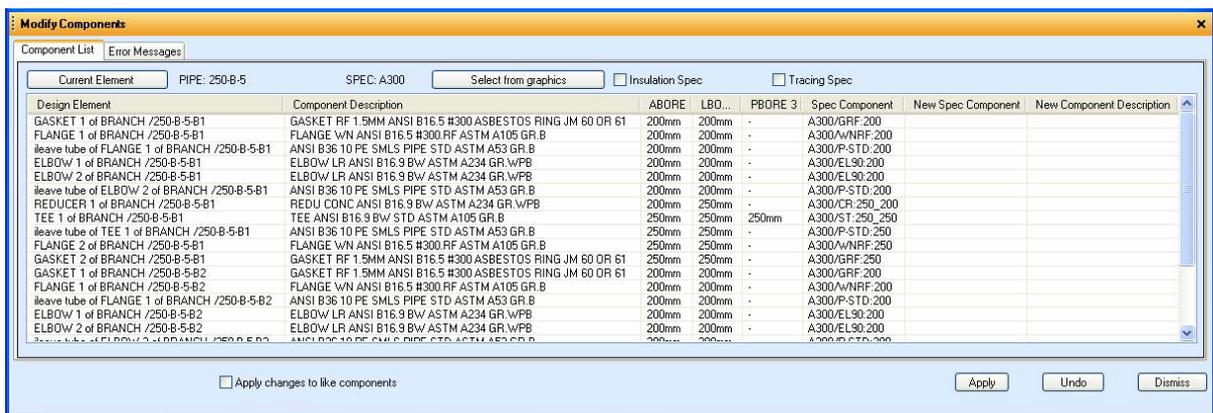
The Piping application has the following new features:

### 12.1 Split Pipe at Defined Boundary

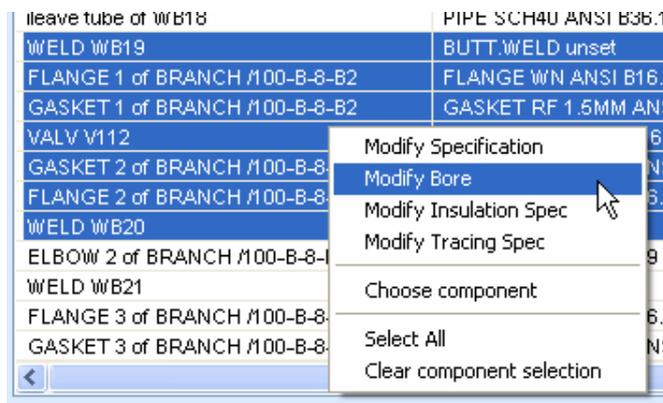
A new ‘Pipe Splitting’ option in the piping utilities menu allows a pipe to be split into two separate pipe elements at a defined planar boundary. Pipes may be split into segments within the same branch, new branches or new pipes – with many options for achieving the desired result. At split points, the system allows break components such as flanges sets or couplings to be inserted. Multiple pipes may be split on a single plane such as a wall or bulkhead.

### 12.2 Change Pipe Bore or Specification

A new ‘Component bore/specification’ option in the Modify menu allows the bore or specifications (piping, insulation or tracing) of one or more components in a pipe or branch. This will display a form with details of selected pipe or branch.



After selection of the appropriate items, a popup menu offers a means of making the changes:



## 12.3 Pipe Component Assemblies

The system now allows standard pipe component assemblies to be defined and stored for reuse (select and instance). These assemblies are prototypes of a design configuration which can be re-used in multiple design situations. The development has two main roles:

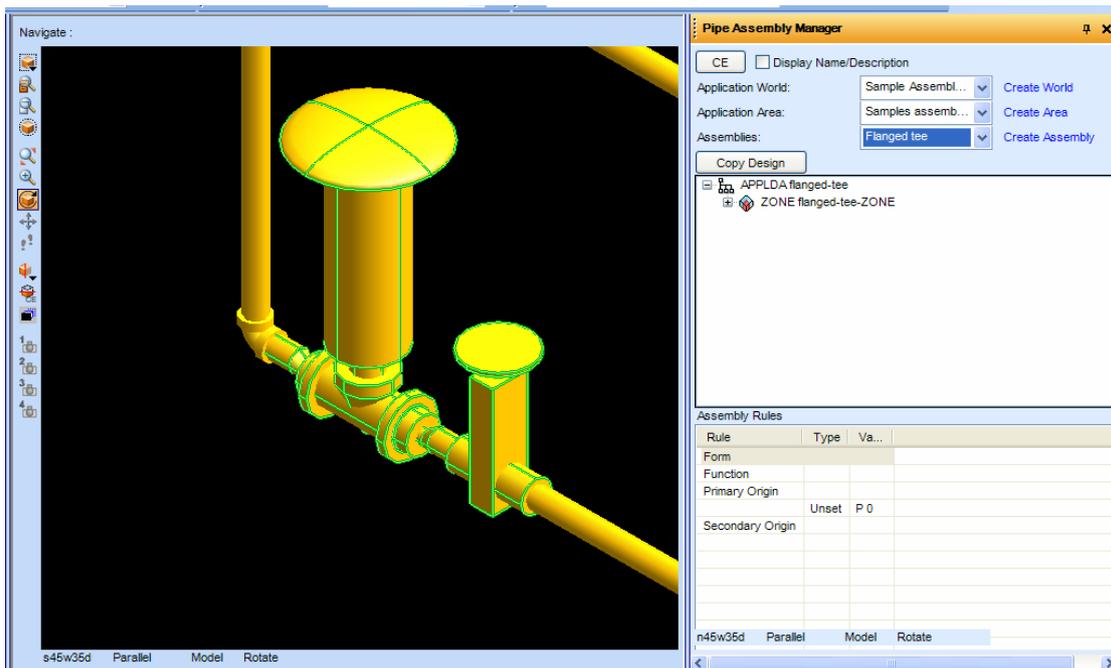
- To provide a building and storage mechanism for piping assemblies. This saves assemblies for use as required but ensures that they are not picked up for clash checks or design reporting.
- To provide a selection and insertion mechanism to enable the assemblies to be used.

Data for piping assemblies is stored in the new Application Data World (APPLDW), which contains a data structure similar to the design database. This allows it to be treated as a separate entity from the point of view of clashes and reporting.

Assemblies are defined using **Utilities>Piping Assemblies...**

### Assembly Creation & Administration Application

- Create assembly & define origin
- Define bore range and available specification
- Note: a user function may be called



### Assembly Instances

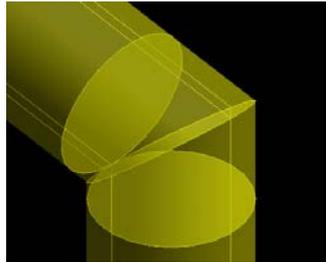
When an assembly is inserted into the design, it is a similar item to the assembly prototype but may use different bores and specifications in the context in which it is placed. As a consequence, the components created by inserting an assembly are individual design items with no reference back to the original assembly. Normal UNDO capabilities are available, but the user cannot select an inserted assembly as a single entity.

## 12.4 Improved Mitred Pipe Bends

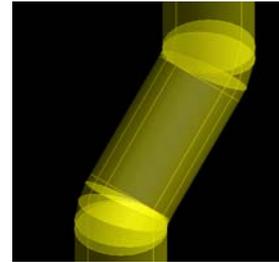
The modelling of multi-segment mitred pipe bends has been improved and allows more accurate pipe cut-lengths to be reported. This has been achieved by adding an NCUTS attribute to the BEND element. Like RADIUS and ANGLE, it is always available for definition and query, but does not always affect the model – that depends on the catalogue.



NCUTS 0



NCUTS 1



NCUTS 3

NCUTS is taken into account only if:

- The catalogue item has no GMSET (so implicit bend geometry is required)
- The catalogue parameters do not have a zero-or-positive value for parameter 4 (if CPAR(4) is zero-or-positive, it is used as the number of cuts)

The maximum number of cuts is treated as 25. If the number of cuts is zero or negative, the bend is treated as pulled rather than mitred.

Dynamic Ppoints are implemented along the mitre-cuts by extending the associated pseudo-attributes to cope with the extra qualifiers: 10, 11, 12, 13, ... as appropriate.

As a 25-cut mitred 180-degree bend would have 130 Ppoints, the SIZE attribute of %PPLS %PPVI has been extended from 100 to 200. The following pseudo-attributes are supported:

- |                 |                          |
|-----------------|--------------------------|
| • PPLS/T        | List of valid p-points   |
| • PPCOU/NT      | Number of valid p-points |
| • PPOS/ITION    | P-point position         |
| • PDIR/ECTION   | P-point direction        |
| • PPCO/NNECTION | P-point connection type  |
| • PPSK/EY       | P-point pskey            |
| • PPBO/RE       | P-point bore             |
| • PPVIF/LAG     | P-point visibility flag  |
| • PPEXST        | P-point existence flag   |

## 12.5 Automatic Generation of Pipe Spools

PDMS 11.6.sp4 introduced the automatic generation of pipe spool definitions within the design function, from the start of the pipe modelling activities. It also introduced the Production checks utility which validated the design for bending and fabrication of the spools.

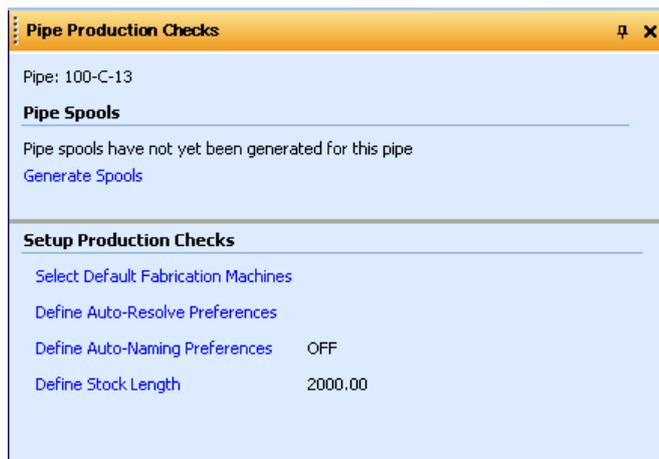
(Note that these spool definitions differ from those defined in the separate spooler module, which can be used to define ‘spool’ isometrics that can also be used for other purposes. The new spool elements cannot yet be drawn by Isodraft, but can be used to produce to-scale pipe fabrication sketches.)

The PDMS 11.6 development did not however provide a mechanism for spool naming; this omission has now been rectified. Spool names are derived on spool creation using the standard PDMS auto naming functionality. There is also an individual spool renaming capability and a rename all option.

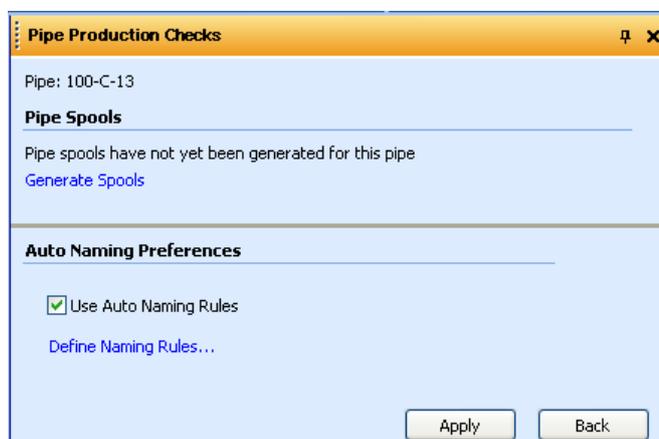
## 12.5.1 Auto-Naming

Auto-naming enables new spools to be named when they are generated, using the auto-naming rules, which need to be set up for PPOOL elements. If auto-naming is turned off, spools will be given default names (Spool1, Spool2...).

Auto-naming is controlled by clicking on the “Define Auto-Naming Preferences” link under “Setup Production Checks”; feedback shows whether it is currently “ON” or “OFF”:



To turn it on, tick the checkbox and click apply, when you will then be taken back to “Setup Production Checks”. The back button will take you back to “Setup Production Checks” with no changes are applied. Naming rules can be set up by clicking on the “Define Naming Rules...” link.



## 12.6 Router

The Advanced Pipe Router product is now included with PDMS, as standard.

## 12.7 Bending checks

*(First introduced at PDMS 11.6.sp4)*

A new option allows you to check pipe pieces and pipe spools for production readiness against welding machines, bending machines, pipe cut lengths on drawings and reports, and defined stock-lengths of tubing.

Fabrication checks run against available stock length and fabrication machines.

- Fabrication machines are currently limited to bending and auto welding.

Pipes designed and checked in this way may be detailed using the new pipe-sketch facility – but not yet with Isodraft.

## 12.8 Pipe Sketch ADP

Automatic Drawing Production (ADP) has a new option to produce pipe sketches automatically using production-checked pipe-spool data from the Design application (see above). The sketches include dimensioned scale drawings of a pipe spool along with tables of relevant manufacturing data.

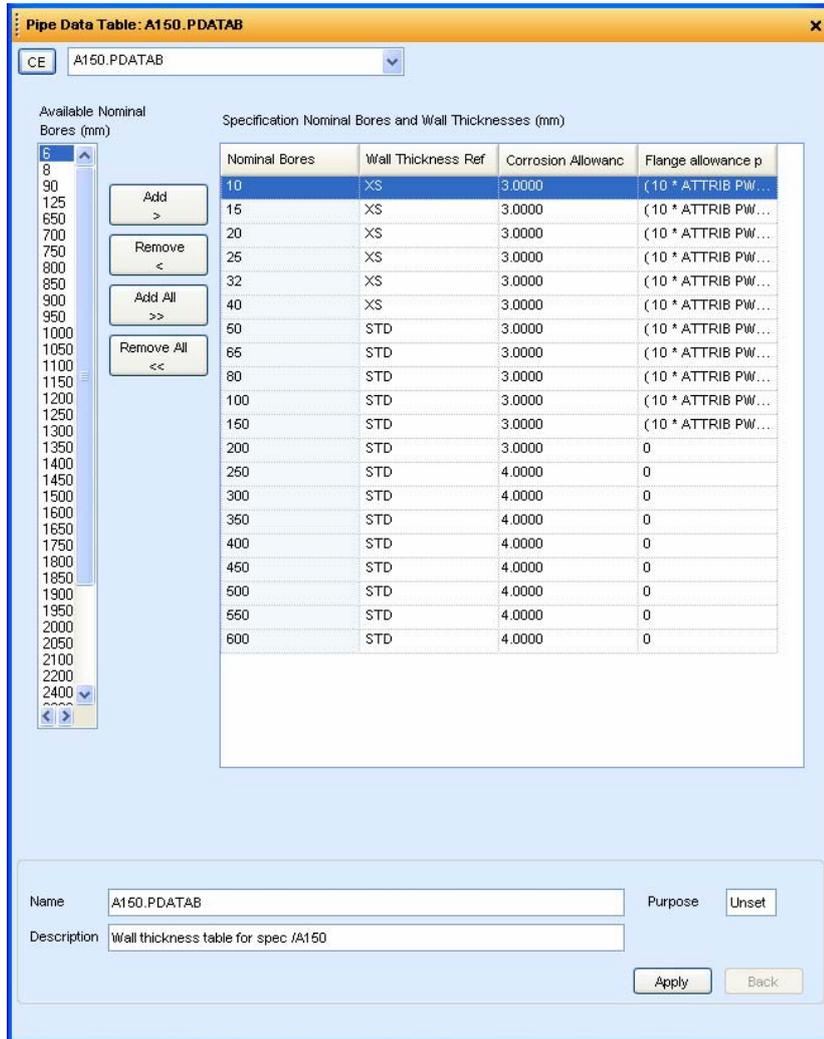
Pipe Sketch drawings are based on a Template Drawing, which contains views and layers like any other DRAFT Template; for other Drawing information the Template Drawing references a Backing Sheet. Users will generally have their own Sketch Templates for Pipe Sketches.

## 12.9 Pipe Data Table

**\*12.0.sp5\***

Pipe data tables provide a lookup for bore related data, with a Pipe Data element for each bore size in the piping spec. It is currently designed to hold data on wall thickness, corrosion allowance and flange allowance; other values could be added in future if required.

The tables are set up in Paragon:



Typical data:

**Name** /A150.PDATAB  
**Type** PDATAB  
**Owner** /PIPE-DATA-TABLES  
**Description** Wall thickness table for spec /A150  
**Purpose** unset  
**Corrosion** 0mm

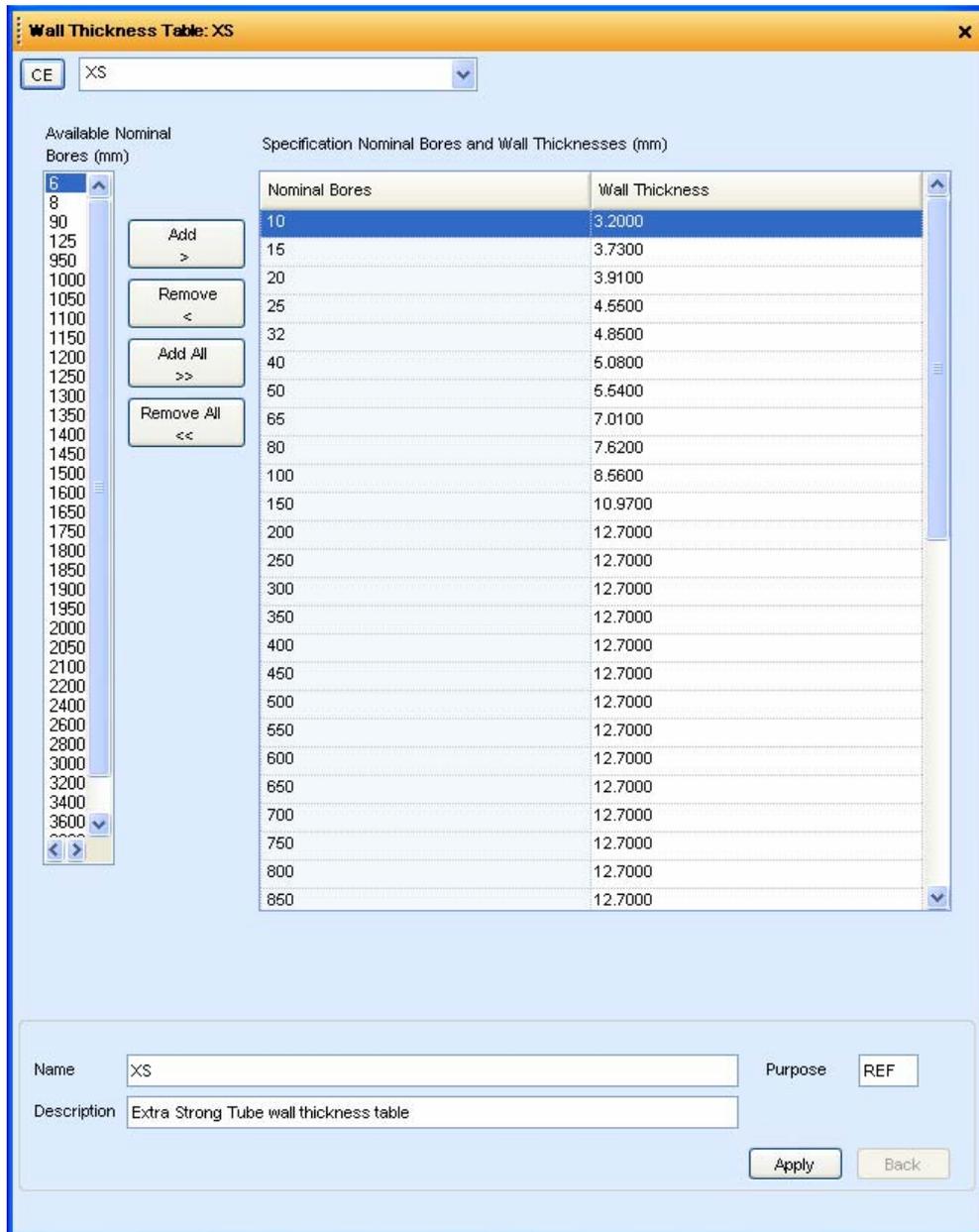
**Name** /A150.PDATAB-25  
**Type** PDAELE  
**Owner** /A150.PDATAB  
**NBore** 25mm  
**Corrosion** 3mm  
**Pfallowance** ( 10 \* ATTRIB PWALLT(1) )  
**Wthreference** /XS

These tables refer in turn to Wall Thickness and Corrosion Allowance tables, which behave in a similar manner.

## 12.10 Wall Thickness Table

**\*12.0.sp5\***

This is based on the nominal tables introduced in PDMS 12.0 and replaces a text based system with tables, which are simple and easy to implement but flexible enough to cater for multiple wall thicknesses.



Name /XS  
 Type WHTAB  
 Owner /WALL-THICKNESS-TABLES  
 Description 'Extra Strong Tube wall thickness table'  
 Purpose REF  
 Schedule XS

Name /XS-25  
 Type WTHELE  
 Owner /XS  
 NBore 25mm  
 WThickness 4.55mm

## 12.11 Linking Pipe Spec to Wall Thickness \*12.0.sp5\*

At Pipe Spec level there is an attribute PDAREF. Setting this on a spec is all that is required to enable Pipe Data Tables.

Each SPCOM also has a PDAREF attribute which takes priority over the spec PDAREF, thereby overriding the spec level wall thickness. This enables different wall thicknesses at the same bore and caters for multiple tubes, thick walled elbows, unavailable material etc.

## 12.12 Design Queries

**\*12.0.sp5\***

A number of new Queries allow access to the evaluated wall thickness or corrosion allowance at the various points. The old Q WALTH continues to work in the same way, for compatibility.

Similarly, there are new queries for flange allowance and also for the pipe data table references.

## 12.13 Flange Allowances

**\*12.0.sp5\***

An SCOM now has a COMPTYPE attribute. If set to ALLO, a loose flange allowance ALLOW attribute will be calculated according to an expression in the PDATAB, according to the bore size.

A typical example might be:

```
PFLALLOWANCE (10*ATTRIB PWALLT(1))
```

When such an allowance flange is selected, the allowance value is calculated and added to the allow attribute of the flange, and its loose attribute set to true.

## 12.14 Bend Radius Enhancements

**\*12.0.sp5\***

There is a new attribute BENDMACREF at ZONE level, which can be set to the appropriate bending machine.

This enables the bend radius to be obtained from either the pipe spec or the bending machine:

- First priority is the radius set in the spec selectors
- Second priority is to check the zone for a fabrication machine group and validate the bend against this.

This operation is performed when the CompType on the relevant SCOM is VAR.

Each bending machine has a series of dimension elements with attributes of OD and Bend radius. When an attempt is made to get a bend radius from the bending machine, these dimensions are searched to find an appropriate tube OD.

The actual bend radius is calculated by multiplying the OD by the BRAD; if no matching dimensions are found the radius cannot be calculated and the radius must be set by the user.

A new pseudo attribute DFBRAD at bend returns the machine derived radius if available.

## 12.15 Enhanced Production Checks

**\*12.0.sp5\***

A number of enhancements have been made to improve the pipe production checks:

- Pipe Spools and Pipe Pieces are now visible in the Design Explorer.
- Option on the production checks form to delete all spools in a pipe

- Validation and spooling log file to help track down errors. The Pipe Production Checks form has a new link label under “Pipe Tasks” called “View Log”. This opens a viewer with tabs for validation and spool generation; the output can also be printed or sent to a file.
- Feed Excess warnings now advise the user of additional material needed for the bending process, both at spool generation and on the production checks form.
- Stock Length Read Only
- Auto naming is now on by default for spool creation. Pipe spools can now be renamed from the results panel on the production checks form, as well as the main view.
- Introduction of two extra spool types
- New attributes are now available for use on pipe spool drawings.

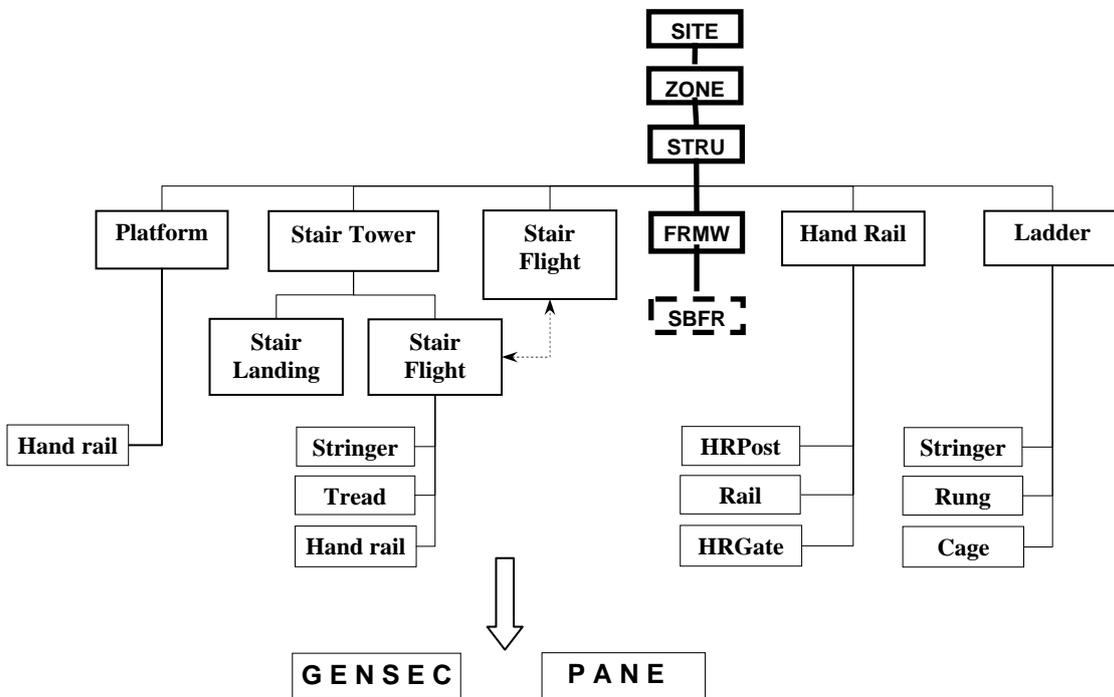
## 13 Structural

### 13.1 Access, Stairs & Ladders (ASL)

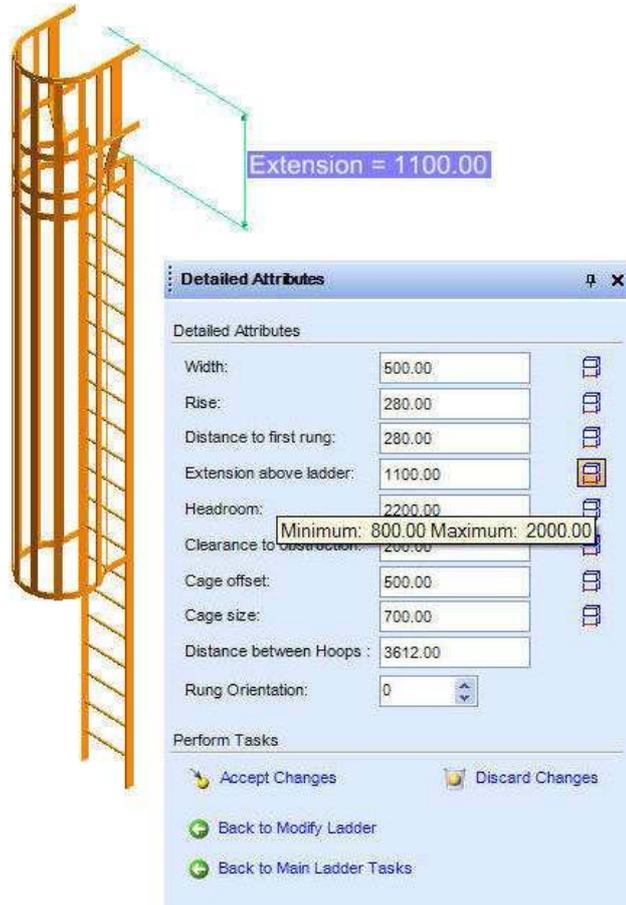
\*12.0.sp5\*

This is a completely new application that replaces the old ASL application. It features:

- Fully Parametric Stair Tower, Stair Flight, Stair Landing, Platform, Ladder, Cage, Handrail and Gate steel assemblies using Structural steel objects
- New database architecture with meaningful names such as Stair, Ladder, Cage, Rail, Tread... and attributes using engineering terminology



- Standards are easily configurable by the Administrator (Settings>ASL Standards) to conform to Design Specification; ANSI, BS, DIN, Project, User standards
- Graphical picking of 'Work Points' is used for creation and modification
- System performs intelligent evaluation of engineering criteria with relevant user feedback



*Please note that a number of shortfalls are present in the new Access, Stairs & Ladders application at PDMS 12.0. To address these shortfalls, a number of improvements have been identified. The proposed improvements are currently being planned and release dates will be communicated to the customer base in Q1 of 2010.*

*Until the proposed changes are implemented it is recommended that the old primitive-based ASL application, as delivered with previous releases, is used for engineering projects in a production environment. Details of how to do this are given in section 2.9.1.*

## 13.2 Enhanced member splitting

There is a new UI for splitting Steel members, including Profiles and Plates, without the need for a sub-application switch.

## 13.3 Enhanced Mitred ends

There is additional functionality to support User-defined connections for End-cut, Snip, Cut-out, Slot, and Mitre that connect GENSEC, SCTN to a Planar Panel.

## 14 Heating & Ventilating (HVAC)

See the *HVAC User guide* for more information.

### 14.1 Organisation by module & system

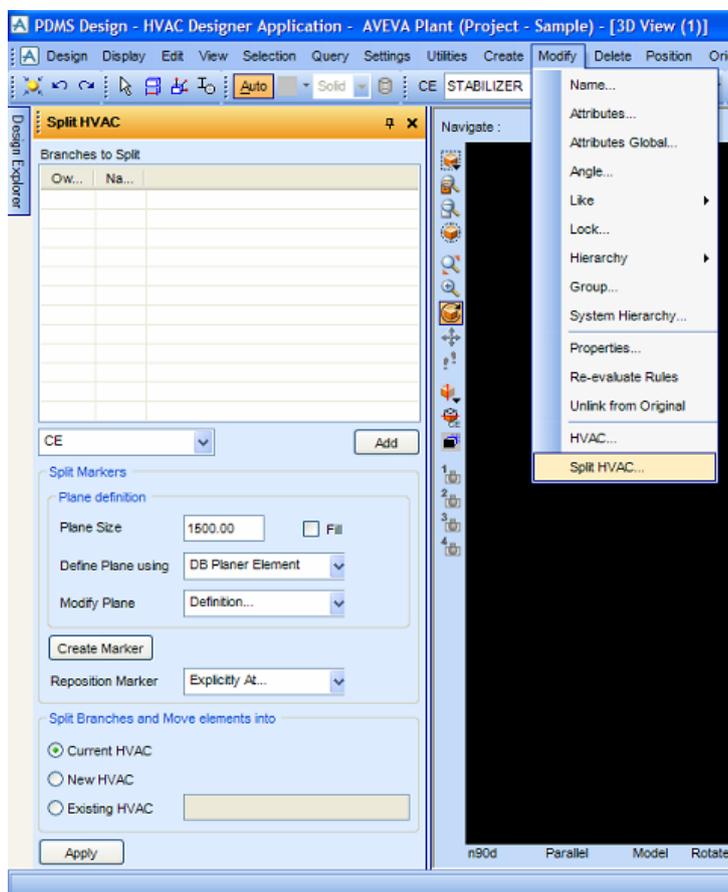
In common with other disciplines, HVAC may now be organised in an alternative hierarchy. Please see section 10.1 Organisation by system .

### 14.2 Splitting

This provides a simple way to split an HVAC system into different sections, using the following operations:

- Define a list of HVAC branches to split
- Create a split plane
- Create markers (split ATTAs) at the positions derived by the intersection of the split plane and the implied tube of HVAC branches in the list
- Split the HVAC system at the markers

The HVAC Designer form to be used is **Modify > Split HVAC...**

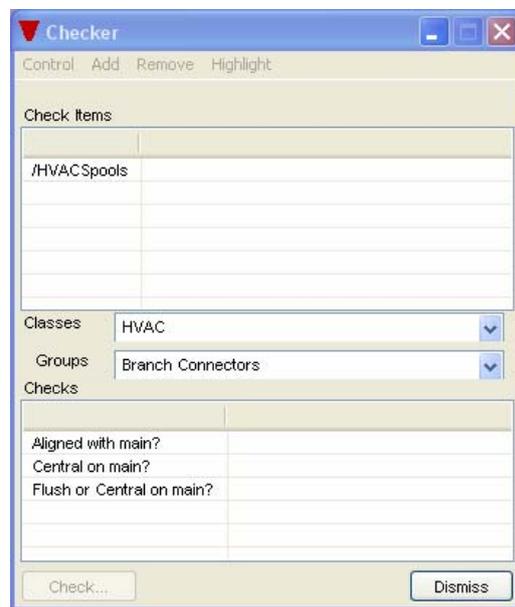
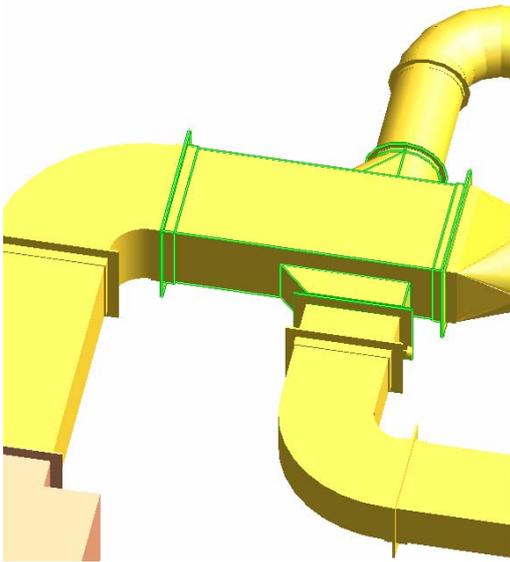


### 14.3 HVAC Model Integrity Checks

HVAC model integrity checks have been improved to check branch connection alignment, as well as bolt hole and bolt circle diameter on circular ducts.

Three new functions are available from *Utilities>Data Consistency* and check whether HVAC branch connector components are fitted correctly to the main branch:

- Connected – Aligned with main
- Connected – Central on Main
- Connected – Flush or Central on main



In order to avoid misaligned holes, the orientation of circular ducts can be checked by setting the PZAXIS Y and ROTANG ((360 / DESP[number])) on the connecting ppoints of circular components, where DESP[number] is the number of holes in the flange.

### 14.4 HVAC Spooling

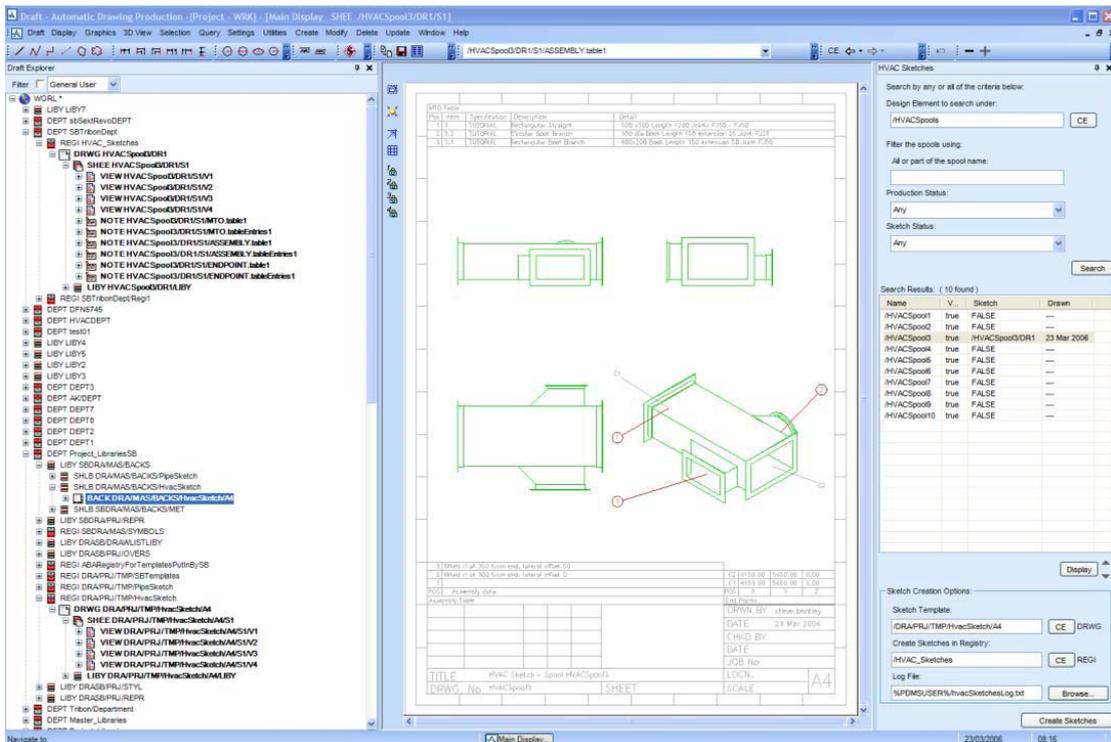
HVAC can now be split into spools, identified automatically, so that they can be selected and drawn in DRAFT. The HVAC Spool (HSPool) element is a collection of HVAC elements that are to be fabricated together as a single spool.

A new **HVAC Spooling** application, accessed from HVAC Designer Utilities menu, allows them to be created and maintained in the database hierarchy. A property named WKSF is used in the grouping of the HVAC elements into an HSPool hierarchy. HSPools are stored in an HSLIST below the HVAC element.

### 14.5 HVAC Sketches

The system can produce HVAC sketches that include dimensioned, scale drawings of an HVAC spool. These include MTO/Assembly Tables and End Point Tables and are similar to the piping sketches introduced at PDMS 11.6.sp4. The user interface allows the selection of User Defined Templates and Backing Sheets and also enables them to be printed.

The HVAC Sketch form is accessed from DRAFT ADP *Create>HVAC Sketches* and allows the user to identify the spools from a level in the Design hierarchy. He can also select the drawing template, which may be user-defined, and the database location for storage of the sketches.



## 14.6 HVAC Catalogue

The sample HVAC catalogue has been extended, notably in the following areas:

- Flat Oval tube representation
- Flexible ductwork representation
- User-defined Joints
- User-defined Stiffeners

It allows for accurate Weight, Centre of Gravity and Material reports.

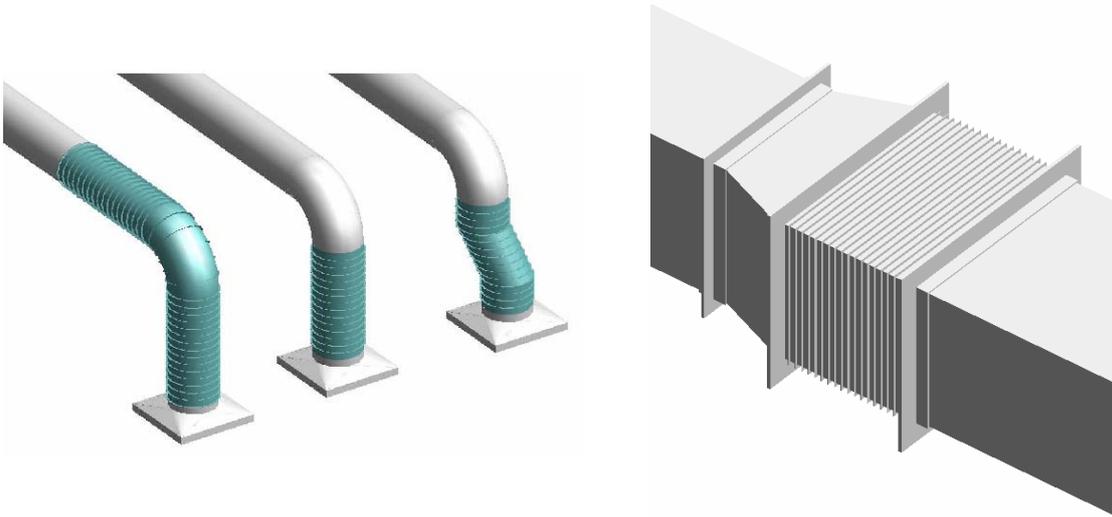
### 14.6.1 Flat Oval tube representation

Flat oval implied tube is now shown correctly, rather than as a box. The Surface area calculation is also accurate. The Catalogue TUBE element now has a PAXIS attribute, similar to BOXI, to allow this to work.

Note that HVAC implied tube is intended to be a temporary state in the design sequence, and should be filled with real components for production.

### 14.6.2 Flexible ductwork representation

The representation of flexible ductwork has been modified to show ribs, which is particularly useful for DRAFT drawings. These ribs are visible in levels 9 to 10:



### 14.6.3 User-defined Joints

Prior to PDMS 12.0, there was a fixed set of joints, such as FJ25, FJ30, RE etc. (see manual for full list). It is now possible for the user to define the joints for rectangular, circular and flat oval ductwork.

There are 6 new sections (SECT) in the HVAC catalogue database.

```
/CADCHVACCATA-Joints-RECT
/CADCHVACCATA-Joints-CIRC
/CADCHVACCATA-Joints-FOVA
/CADCHVACCATA-Joints-RECT-Imp
/CADCHVACCATA-Joints-CIRC-Imp
/CADCHVACCATA-Joints-FOVA-Imp
```

These sections hold dataset elements (DATASET) for each joint, and each dataset has 7 data elements: .../DESC; .../CODE; .../ALPH; .../NUME; .../HVJA; .../HVJB; .../HVJC

The data in these data elements define a joint and all its relevant information to be used and displayed in the Joints form. The joints provided in the standard product are the same as before but now use this new mechanism so administrators can easily remove or create joints.

A PML object HVACJOINTS is the only place that controls the HVAC Joint storage location and is therefore easily modified.

### 14.6.4 User-defined Stiffeners

Prior to PDMS 12.0, there was a fixed set of stiffeners, such as 25, 30, 40 etc. It is now possible for the user to define the stiffener sizes and codes.

There is a new section (SECT) in the HVAC catalogue database.

```
/CADCHVACCATA-Stiffeners
```

This holds dataset elements (DATASET) for each stiffener, and each dataset has 7 data elements: .../DESC; .../CODE; .../HVSA; .../HVSB; .../HVSC; .../CONFIG; .../SHAPE

The data in these data elements defines a stiffener and all its relevant information to be used for stiffener creation. For example:

```
Stiffener      100 $<100x100x10 Angle$> 100 100 10
```

The codes above are numbers such as 25, 30, 40 etc but a code can be any text such as abc123, xyz789 etc.

## 14.7 Surface Area and Weight

Surface area and weight are now calculated each time an HVAC component is created or modified. In previous versions, this was done from the **Utilities>Surface Area & Weight...** menu.

## 15 Cable Design

**\*12.0.SP5\***

AVEVA is a new add-on product for the design of cables, including their routing in cableways and through penetrations. Automatic routing is possible. Output includes cable schedules with routes, cable cutting lists and material take off.

Cable Design was introduced at PDMS 12.0.SP2 and has been continually enhanced in the light of early use on project work. It appears as a Design application but a separate Cable Design license is required for using the new (3D) cable objects in this application.

For details, please refer to the new *AVEVA Cable Design User Guide*.

Cable diagrams are covered in the *AVEVA Diagrams User Guide* – as from PDMS 12.0.SP5, they are licensed separately, as part of AVEVA Diagrams.

## 16 Drawing Production Enhancements

### 16.1 DRAFT start-up

**\*12.0.sp2\***

On entry to DRAFT the graphics of all Symbol Libraries (SYLB) are loaded ready for use as required. Earlier versions of PDMS scan all PADD databases in the MDB for SYLBs; for large MDBs this may be time consuming. At PDMS 12.0, the database has been enhanced to remove the need for this scan: this should lead to faster DRAFT entry. The Upgrade Script for PDMS 12.0 DRAFT will update databases created at 11.6 (or earlier) in order to enable this new feature.

A new command (Q SYLBTABLE STATUS) checks the status of the databases in the current MDB. It lists all top-level DEPT and LIBY elements and reports whether they have been successfully upgraded. In the event that an upgrade has not been successful, a new command (UPDATE SYLBTABLE) will update all writeable PADD databases in the MDB.

### 16.2 AXES symbol

A system AXES symbol that automatically indicates the world axes.

### 16.3 Colours & Line-styles

Colour has been separated from the pen definition so all attributes in the DRAFT database that stored pen numbers have been replaced by style and colour attributes. In addition, there is a full 256 colour palette with direct mapping to the AutoCAD colour palette. Please see note on Colour Table changes in section 5.3.

Line styles are now database driven rather than through default files and can be defined in very fancy ways e.g. squiggles, multi-line, with text. User-defined Styles are stored in the database rather than in macro files.

An Upgrade command is provided; this sets the values of the new style and colour attributes based upon the value of the replaced pen attribute. It also attempts to create database LINSTYLE and FILLSTYLE elements to replace existing user-defined pens.

These changes should make the control of pens in DRAFT far easier. No longer will users have to set up large numbers of pens to offer a reasonable range of line pattern, thickness, and colour combinations. By removing colour from the 'bundle' of attributes it will be easier to specify graphical representation styles more directly, thus 'Dashed' or 'ChainedThick' rather than by a number that combines style, thickness, & colour.

#### 16.3.1 Line, Fill & Marker Styles

All DRAFT pen attributes (a total of 20, & usually of the form \*\*PN) have been replaced, generally by both style & colour attributes. Thus LLPN has been replaced by LLSTYLE & LLCOLOUR. The 3 text pen attributes (TPEN, DTPN, PTPN) have been replaced by colour attributes only. The existing pen attributes remain and their values can be queried (but they will not be visible in a Q ATTS listing nor in the Attributes pane). The syntax to set them remains but now has no effect.

User-defined pens were set up by macro at module-entry time; the new Line & Fill Styles are now defined in the database in a hierarchy headed by a STYLWL. SETPEN and associated commands

defining LinePatterns, LinePicture, & HatchPatterns, are now obsolete and have no effect. However their syntax is still available because the upgrade mechanism requires the SETPEN definitions in order to create database LineStyles & FillStyles to match the macro-defined pens.

There are 17 style attributes: 15 line-style attributes for linear primitives; 1 fill-style attribute for area primitives; and 1 mark-style attribute for marker primitives.

The 15 line-style attributes may be set to one of:

- the system-defined line-patterns (10 from PDMS and 5 from Tribon M3), called 'SOLID', 'TCHAINED', 'DASHDOT' etc., with an optional linethickness qualifier;
- a user-defined Linestyle - specified by Linestyle number (1-255) or name;
- the special values of 'OFF', 'DEFAULT', 'UNCHANGED', 'TEMPLATE'.  
These are allowed exactly as they were for the equivalent pens in previous releases.

The fill-style attribute may be set to one of:

- 'SOLIDFILLED' or one of the system-defined hatch patterns (thus: 'SYSTEMPATTERN 5'). There are currently 18 of these, of which 1-10 are the same previous releases and the other 8 to various cross-hatching and parallel line patterns;
- a user-defined Fillstyle - this may be specified by Fillstyle number (1-255) or name;
- the special values of 'OFF', 'DEFAULT', 'UNCHANGED'.  
These are allowed exactly as they were for the equivalent pen attribute.

The mark-style attribute may be set to either of:

- one of the system marker types (thus 'STOP', 'CROSS', etc) followed by a scale (1-8);
- the special values of 'OFF', 'DEFAULT'.  
These are allowed exactly as they were for the equivalent pen attribute.

See also DRAFT database changes – section 3.7.1.

A PML object handling the unbundled colours and styles has been added. Users' PML forms may of course require adjustment to cover these changes.

## 16.4 TrueType Text fonts

True-Type Fonts are now available in place of the PDMS ones; before use, they must be set up in Admin as a font family. Once defined, they may not be mixed on the same SHEET with PDMS fonts. Picture elements now have a flag identifying them as PDMS or TrueType font.

The user can set up the TTFONT elements in the database.

Draft supports the boldening, italicising and underlining of TrueType fonts. The user can use the new %b /%b (boldening ON / OFF) and %i /%i (italics ON / OFF) codes in the intelligent text string, when a TrueType font is in use.

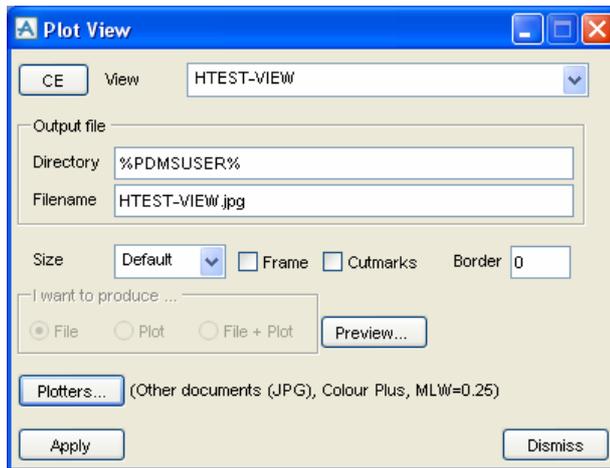
## 16.5 Printing and output formats

### 16.5.1 Direct printing and graphics file formats

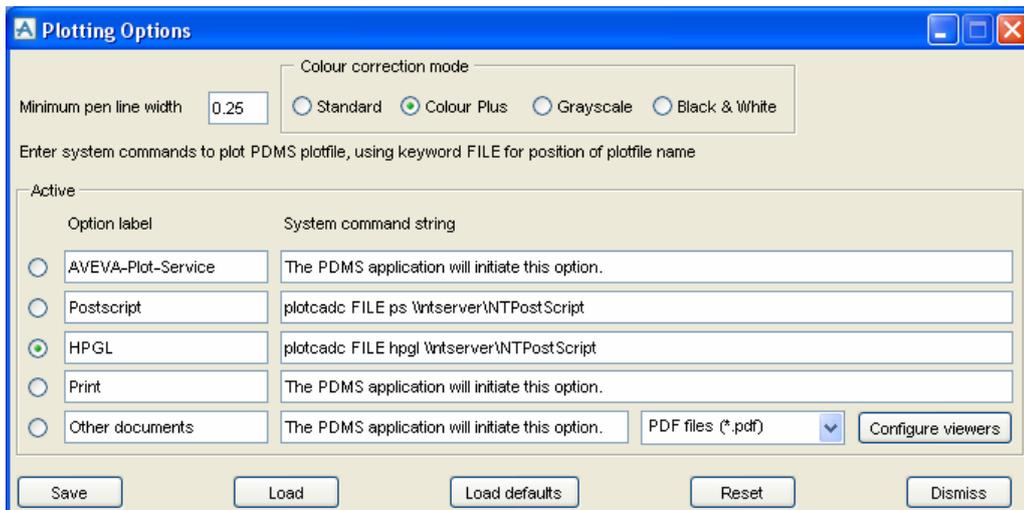
There is a new option in both DRAFT for direct printing to a Windows printer and for producing PDF file, Windows Enhanced Metafile (EMF) and other various image file types (TIF, TIF G4, TIF LZW, JPG, PNG, GIF, BMP). The PLOT command syntax has been expanded with new options (PRINT, PDF, IMAGE, METAFILE) and parameters to handle these. For details, please see the *DRAFT User Guide*.

In order to configure these new options, the DRAFT administrator has additional options to configure a revised plotter defaults file (\PDMSUI\dfmts\plotter\_user\_defaults and \PDMSUI\clib\plot\plot\_dfmts). There is also a new form to configure the plot viewing options, if required.

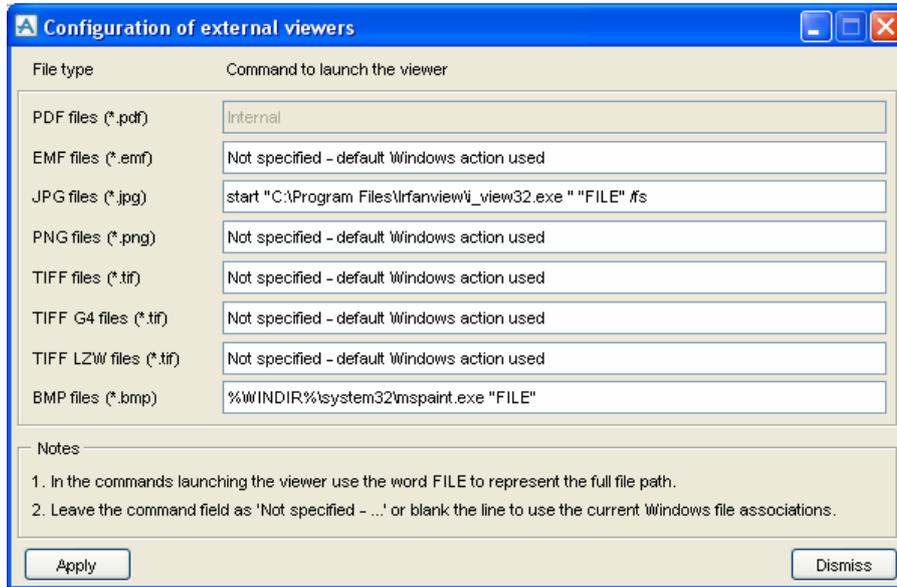
The plot viewing form has been updated:



Click **Plotters** for Plot Configuration:



Click **Configure viewers** for this form:



## 16.5.2 Configurable CAD output formats

**\*12.0.SP4\***

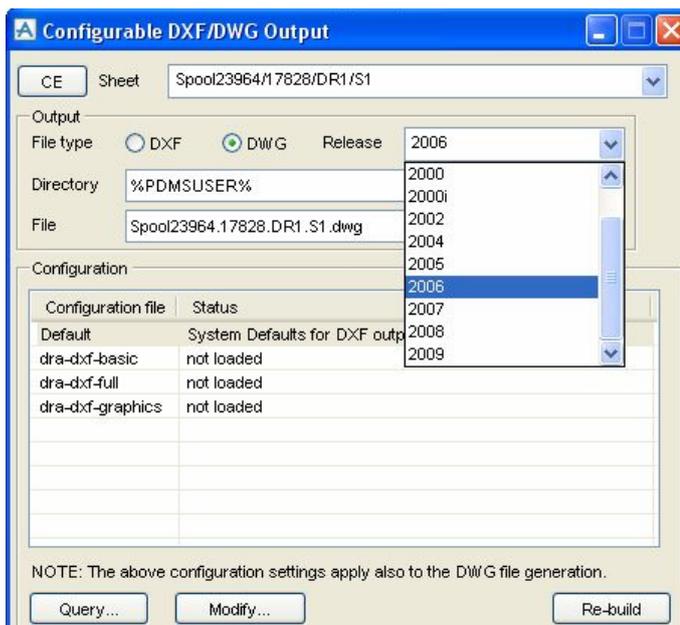
### 16.5.2.1 MicroStation format output

This has been updated to provide an option for MicroStation v8 DGN output – please refer to the *DRAFT User Guide* section 7.4.

### 16.5.2.2 AutoCAD format output

**\*12.0.SP5\***

This new option provides, in addition to DXF output, a direct output of a DWG file suitable for AutoCAD (releases 2000 through 2009) – please refer to the *DRAFT User Guide* section 7.5.



Please note that a warning may be given on import to AutoCAD – this is expected and does not cause any known problems!



## 16.6 Symbolic representation of model objects

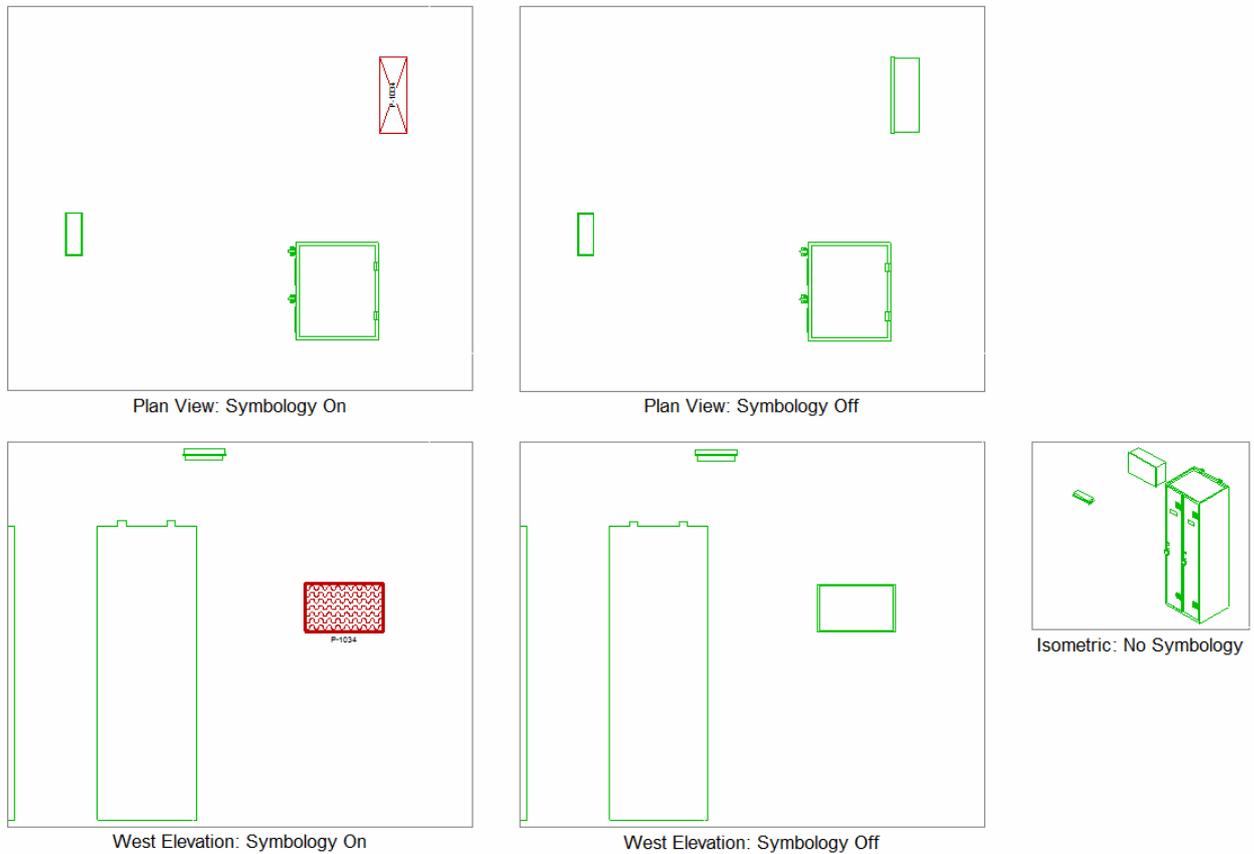
Design items may now be represented symbolically in a 2D View as part of the drawing of the 3D model. This could particularly useful for some of the drawings produced for architectural, electrical, and instrumentation disciplines.

The **Design Symbol** may either replace or add to the normal geometric representation of the item. Design symbols can consist of geometrical elements or text, including Intelligent Text hash-codes, or can be a combination of the two.

The Representation Rule (RRUL) functionality has been enhanced to allow these 2D symbolic representations to be specified.

Templates for design symbols are stored in the DRAFT database using the Symbol and Text Template elements (i.e. SYTM and TXTM). However the data defining which templates to use for a given design item, and under which circumstances, is stored in the Catalogue database. This allows several templates to be associated with a given design item so that it can be represented differently in different types of Views. Thus the representation of a Lighting Fitting, for example, could depend upon both the View direction (i.e. Plan or Elevation) and upon the View classification (e.g. Layout, Cabling, etc).

A simple example is shown below:



Design symbols are specified as ‘scaled’ or ‘non-scaled’ symbols. The size of scaled symbols depends upon the View scale, whereas non-scaled symbols are a fixed size irrespective of paper size and View scale. Since a change in View scale (which is relatively unusual) will always be followed by an UPDATE DESIGN command, no separate update is provided.

Design symbols are created as Design Symbol (DESSYM) database elements. The DESSYM is a new element type, based on (a soft-type of) the SLAB. These are added as members of a Design Symbol Layer (DSLAYE) element. The DSLAYE is a new element type, which is a soft-type of LAYE and will thus be a member of a View. One (only) DSLAYE element will be created per View during the UPDATE DESIGN process; this will be removed if it ceases to own any DESSYMs. Thus these symbols will be created as part of the annotation of the View (rather than design graphics).

Although design symbols will be created, deleted and modified as part of the annotation of the View, users will have less control over these elements than other forms of annotation. DSLAYEs and DESSYMs will be created and deleted automatically and the user will have no control over these operations. There is also less access to the attribute values of a DESSYM.

DESSYMs will not be created for any design item whose origin falls outside the View rectangle or whose Origin (or datum point) is excluded by the action of section planes. Where only a symbolic representation is required (i.e. when a normal geometric representation is not required in addition to a design symbol), no attempt will be made to determine whether the design item would have been hidden by the action of the hidden-line removal process. (There is no way of determining this without actually doing a preliminary UPDATE DESIGN with the items fully drawn.)

## 16.7 DRAFT Drawing file storage

Previous versions of PDMS have used a single Folder to store all the DRAFT picture files in a project, as specified by an environment variable, for example %XYZPIC% for project XYZ. A similar system is used for Final Designer files, for example %XYZDWG%.

To improve performance for projects with a large number of drawings, PDMS 12.0 splits the picture file folder into 32 sub-folders and allocates files on a pseudo-random basis using the SHEET database reference. The algorithm used is to take the modulus of the second part of the reference number and 32. For example, a sheet with the reference =15773/4101 will store its picture file in sub-folder 05 (= 4101 mod 32).

This should be transparent to the end user, but pseudo-variables are provided to assist the administrator in case he needs to locate the files. These are:

PICF/ilenam – full path to the DRAFT picture file

## 16.8 AutoDRAFT

**\*12.0.sp2\***

AutoDRAFT has been updated to work with AutoCAD versions 2006 and 2007. It now supports the full new range of PDMS colours 1 – 272, rather than the first 12 colours only. This includes the full range of AutoCAD colours,

There are currently some restrictions relating to the new or changed functions in both PDMS & AutoCAD, which are being investigated further:

- AutoDRAFT does not yet support the output of Unicode text.
- The Backing/Overlay sheet editor and the Symbol Editor will import TrueType fonts that are registered in the PDMS project. These fonts must be defined in AutoCAD in a custom text style named 'TTFNn' where 'n' stands for the number assigned to the given font in the PDMS project (e.g. TTFN5 or TTFN19).
- Only TEXT entities (single-line texts) can be imported into PDMS. MTEXT entities (multiple-line texts) are not handled.
- POLYLINE entities are not imported into PDMS

## 16.9 General Automatic Drawing Production (ADP)

General ADP is set up by default to use PDMS fonts, as in previous releases. In version 12.0.sp2 it is also possible to use TrueType fonts. In order to create drawings with True-Type Fonts, it is necessary to modify the setup by changing certain default files to match, as indicated below.

Note that TrueType fonts and PDMS default fonts cannot be mixed in a drawing. Users must ensure that the Department and Registry are set up with the right type of font before creating a drawing.

### 16.9.1 %PDMSUI%\DFLTS\RA-GEN-SYSTEM

This file contains references to the standard Draft libraries;

#### 16.9.1.1 # Master Library References

SYMB	/DRA/MAS/SYMBOLS/GEN	# Symbol library area (LIBY)
SLAB	/DRA/MAS/LABELS/GEN	# Symbolic label library area (LIBY)
PESYMB	/DRA/MAS/LABELS/GEN/PIPE/END	# Pipe End Symbol Template (SYTM)
BSRF	/DRA/MAS/BACKS/MET	# backing sheet library (SHLB)
TAGTMPLT	/DRA/MAS/LABELS/TAG	# Auto tagging template library area (LIBY)

PIPLAB /DRA/MAS/LABELS/GEN/USERDEF # ADP pipe label prefix

### 16.9.1.2 # Project Library References

DLLB /DRA/PRJ/DRAWLISTS # Drawlist library (LIBY)  
 OSRF /DRA/PRJ/OVERS/MET # Overlay sheet library (SHLB)  
 RRSF /DRA/PRJ/REPR/GEN # Representation rules (RPLB)  
 LRUL /DRA/PRJ/STYL/LOCAL # Local styles (RPLB)  
 TAGRULE /DRA/PRJ/AUTOTAG # Auto tagging rule library area (LIBY)  
 CLRF /DRA/PRJ/CIRCULATION/GEN # Circulation list library (CLLB)  
 TMLPT /DRA/PRJ/TMP # DRWG Template registry prefix  
 TMLPTDEF /DRA/PRJ/TMP/PIPING/A0 # Default DRWG or SHEE Template name  
 HRSF /DRA/PRJ/HRUL/GEN # Hatching Rep rules (RPLB)  
 HRUL /DRA/PRJ/HSTYL/LOCAL # Local hatching styles (RPLB)  
 CRSF /DRA/PRJ/CHANGE/RULESET # Change Rep rules (RPLB)

Each of these entries must be modified to reference the equivalent True-Type library, even for manual creation of True-Type drawings. Users who are using AVEVA default files should set the as follows, as supplied at 12.0 onwards;

### 16.9.1.3 # Master Library References

SYMB /TT/DRA/MAS/SYMBOLS/GEN # Symbol library area (LIBY)  
 SLAB /TT/DRA/MAS/LABELS/GEN # Symbolic label library area (LIBY)  
 PESYMB /TT/DRA/MAS/LABELS/GEN/PIPE/END # Pipe End Symbol Template (SYTM)  
 BSRF /TT/DRA/MAS/BACKS/MET # backing sheet library (SHLB)  
 TAGTMLPT /TT/DRA/MAS/LABELS/TAG # Auto tagging template library area (LIBY)  
 PIPLAB /TT/DRA/MAS/LABELS/GEN/USERDEF # ADP pipe label prefix

### 16.9.1.4 # Project Library References

DLLB /TT/DRA/PRJ/DRAWLISTS # Drawlist library (LIBY)  
 OSRF /TT/DRA/PRJ/OVERS/MET # Overlay sheet library (SHLB)  
 RRSF /TT/DRA/PRJ/REPR/GEN # Representation rules (RPLB)  
 LRUL /TT/DRA/PRJ/STYL/LOCAL # Local styles (RPLB)  
 TAGRULE /TT/DRA/PRJ/AUTOTAG # Auto tagging rule library area (LIBY)  
 CLRF /TT/DRA/PRJ/CIRCULATION/GEN # Circulation list library (CLLB)  
 TMLPT /TT/DRA/PRJ/TMP # DRWG Template registry prefix  
 TMLPTDEF /TT/DRA/PRJ/TMP/PIPING/A0 # Default DRWG or SHEE Template name  
 HRSF /TT/DRA/PRJ/HRUL/GEN # Hatching Rep rules (RPLB)  
 HRUL /TT/DRA/PRJ/HSTYL/LOCAL # Local hatching styles (RPLB)  
 CRSF /TT/DRA/PRJ/CHANGE/RULESET # Change Rep rules (RPLB)

Customers who use their own libraries will have to create True-Type equivalents or convert them.

## 16.9.2 Default files prefixed 'dra-genadp'

These must be modified to set any library references to True-Type equivalents;

### 16.9.2.1 dra-genadp-equilocn

```
var !!CDSCHEDLIBY | /TT/DRA/PRJ/ADP/SCHED/PGA|
var !!CDTAGGLIBY | /TT/DRA/PRJ/ADP/TAGGS/PGA|
```

### 16.9.2.2 dra-genadp-piping

```
var !!CDSCHEDLIBY | /TT/DRA/PRJ/ADP/SCHED/PGA|
var !!CDSCHEDDEF | /TT/DRA/PRJ/ADP/SCHED/PGA/Nozzle_1|
var !!CDTAGGLIBY | /TT/DRA/PRJ/ADP/TAGGS/PGA|
var !!CDTAGGDEF[1] | /TT/DRA/PRJ/ADP/TAGGS/PGA/Instruments|
```

### 16.9.2.3 dra-genadp-plotplan

### 16.9.2.4 dra-genadp-skew\_gdp1

### 16.9.2.5 dra-genadp-sort\_gdp1

By default the library references for these files are unset

### 16.9.2.6 dra-genadp-supports

```
var !!CDSCHEDLIBY | /TT/DRA/PRJ/ADP/SCHED/PGA|
var !!CDSCHEDDEF | /TT/DRA/PRJ/ADP/SCHED/PGA/Pipe_Support|
var !!CDTAGGLIBY | /TT/DRA/PRJ/ADP/TAGGS/PGA|
var !!CDTAGGDEF[1] | /TT/DRA/PRJ/ADP/TAGGS/PGA/Instruments|
```

## 16.10 Projection Line Direction – Syntax change \*12.0.sp5\*

The PLDI attribute can be set by specifying a point on the SHEET through which the LDIM's first projection line will pass. The syntax for this option has had to be altered slightly. It is now:

```
PLDI THR/ough <sheet_pos>
```

or, by cursor:

```
PLDI THR/ough @
```

The change is the introduction of the word 'THROUGH'.

## 17 Piping Isometrics

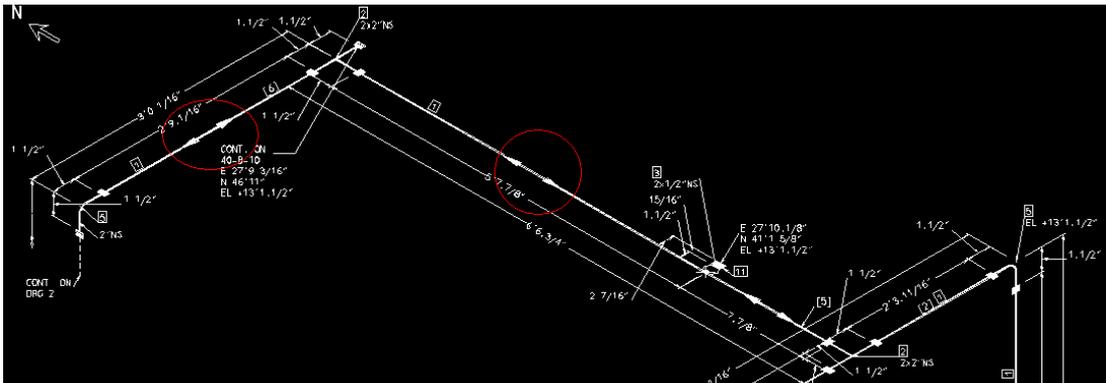
### 17.1 Flow Arrows

Isodraft places flow arrows on the isometric with their direction governed by the BRANCH attribute FLOWDirection. The function is controlled using the FLOWARROWS command (please see *ISODRAFT Reference Guide*). The arrows can be placed automatically or positioned using ATTachments with their ATTYpe attribute set to FLOW.

The settings for FLOWD are either BACK for flow from tail to head or FORW for flow from head to tail.

Two new settings are now handled by Isodraft: OFF to allow the arrows to be turned off or BOTH to indicate a two-way flow. Any other setting will continue to be treated as forward.

Examples of 2-way flow arrows are shown below:



### 17.2 Weights on Isometrics

This allows the user to add a weight column to the isometric material list and provide a summary total for the fabrication and erection material plus an overall total for isometric material weight.

#### 17.2.1.1 User Interface

The user interface provides the following new options:

##### WEIGHT on the Material List Column Definition

The 'Material List Column Definitions' form displays the option 'WEIGHT' in the list of available Component attributes.

##### Total Weight Option

If this option is selected, **three checkboxes** are displayed:

- TOTAL FABRICATION
- TOTAL ERECTION
- TOTAL COMBINED

##### Weight Conversion Factor

In addition, a Conversion Factor (pre-populated with a value of 1.0) may be specified.

### Command Syntax

This mechanism generates the following syntax in the 'Options file':

```
Column c OTHER Heading 'WEIGHT' WEIGHT with Width www [TOTAL FABRICATION] [TOTAL ERECTION] [TOTAL COMBINED] Factor f
```

### OUTPUT

- For the total weights, a new text element is optionally placed below each material column.
- All of the above texts have been given a text number and added to the alternative text list so that they may be modified to a different language.
- A '---' string shows that no weight can be found for the component.
- The weight column and extra weight text is output to the MATLISTFILENAME file if selected.

FABRICATION MATERIALS SPOOL SPL[0]						
PT NO	COMPONENT DESCRIPTION	N.S. (MM)	ITEM CODE	QTY	WEIGHT (Kg)	
<u>PIPE</u>						
1	ANSI B36 10 PE SMLS PIPE STD ASTM A53 GR.B	300	A300/P-STD	7.8M	574.47	
2	ANSI B36 10 PE SMLS PIPE STD ASTM A53 GR.B	250	A300/P-STD	2.4M	144.70	
<u>FITTINGS</u>						
3	TEE ANSI B16.9 BW STD ASTM A105 GR.B	300 x 300	A300/ST	1	70.50	
4	REDU CONC ANSI B16.9 BW ASTM A234 GR.WPB	300 x 250	A300/CR	2	30.00	
5	ELBOW LR ANSI B16.9 BW ASTM A234 GR.WPB	300	A300/EL90	1	60.00	
6	ELBOW LR ANSI B16.9 BW ASTM A234 GR.WPB	250	A300/EL90	2	78.00	
<u>FLANGES</u>						
7	FLANGE WN ANSI B16.5 #300.RF ASTM A105 GR.B	300	A300/WNRF	1	58.60	
8	FLANGE WN ANSI B16.5 #300.RF ASTM A105 GR.B	250	A300/WNRF	6	225.00	
TOTAL FABRICATION WEIGHT					1241.27	
ERECTION MATERIALS						
PT NO	COMPONENT DESCRIPTION	N.S. (MM)	ITEM CODE	QTY	WEIGHT (Kg)	
<u>GASKETS</u>						
9	GASKET RF 1.5MM ANSI B16.5 #300 ASBESTOS RING JM 60 OR 61	300	A300/GRF	1	7.10	
10	GASKET RF 1.5MM ANSI B16.5 #300 ASBESTOS RING JM 60 OR 61	250	A300/GRF	6	42.60	
<u>BOLTS</u>						
11	165 STUD BOLT CW HVY HEX NUTS ASTM A193 GR.B7	29	A300/1SBDW16	16	---	
12	133 STUD BOLT CW HVY HEX NUTS ASTM A193 GR.B7	25	A300/1SBDV13	96	---	
<u>VALVES / IN-LINE ITEMS</u>						
13	VALVE GATE ANSI B16.10 #300.RF 9% NICKEL STEEL	250	A300/GA-23	2	664.92	
TOTAL ERECTION WEIGHT					714.62	
TOTAL WEIGHT					1955.89	

Example Material List

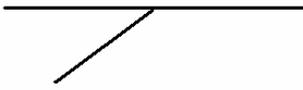
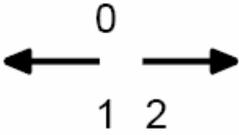
## 17.3 Isodraft SKEY Enhancements

### 17.3.1 New UNBW SKEY

A new SKEY UNBW (Butt Weld union) is now available. It has the same GTYPE, Plotted Symbol and P-points as the existing Socket Weld and Screwed Fitting Unions (UNSC and UNSW).

### 17.3.2 New FY\*\* SKEY

A new SKEY FY\*\* ('Y'-type Filter/ Strainer with \*\* = BW, CP, SW, FL, SC, PL) is now available.

Plotted Symbol		P-points	
			

This is in addition to the existing filter/strainer SKEYs FI\*\*, FA\*\*, FO\*\* and FR\*\* with \*\* = BW, CP, SW, FL, SC, PL.

### 17.3.3 TEE / OLET SKEY Enhancement

Certain existing TEE/OLET SKEYS have been enhanced to allow the user to indicate the presence of an offset P3. The P3 connection of the TEE/OLET must be connected directly to a pipe/tube.

Affected SKEYs are HC\*\*, TS\*\*, Y1\*\*, Y2\*\*, Y3\*\* (with \*\* = BW, CP, SW, FL, SC, PL) and TPUL, TEBW, TESO, TERF, TESW. The default behaviour is that, if an offset P3 configuration is present, a new ATEXT characterising the offset is output on the drawing. This new ATEXT is number 233 in the list of ATEXTs and its default value is **'BRANCH OFFSET BY'** followed by the nonzero relative coordinates of the offset.

## 17.4 Improved Continuation Sheet Options

### 17.4.1 New Annotation Options

#### 17.4.1.1 Show Coordinates across Sheets.

An extra clause ‘SHEET’ has been introduced to the ‘COORDINATES’ command to specify that spatial coordinates are to be shown at sheet breaks on the same isometric: -

Coords ON AT Sheet

This may be accomplished automatically by a new checkbox ‘Sheets’ option on the Annotation Options form (highlighted above as 1). Checking this box will display the appropriate coordinates.

#### 17.4.1.2 Switch on Continuation Sheet Information at Sheet Breaks

A new CONTSHEETS command is introduced which takes effect when one isometric drawing is located on several sheets. It allows the User to specify that the sheet number of the continuation sheet be shown at the sheet break when the connection goes from one sheet of a drawing to another. This option may now be set using the new checkbox option on the Annotation Options form (**highlighted above as 2**). Clicking this checkbox will toggle between:

CONTSHEETS ON

Continuation sheet numbers between sheets are switched on.

CONTSHEETS OFF

Continuation sheet numbers between sheets are suppressed.

*This is not to be confused with the CONTNOTES command which specifies continuation notes at the end points on drawings when the connection goes to another isometric.*

### 17.4.1.3 Specify Additional Pipeline Attributes to be Shown at Sheet Breaks

An extra clause, ContUdefText (continuation user-defined text), has been introduced to the 'CONTSHEETS' command to specify that further pipeline attribute or user-defined attribute (UDA) information may be shown as part of the continuation sheet information displayed at sheet breaks. The format of the constructed text string is controlled by the User and may contain arbitrary text and carriage returns:

```
CONTSHEETS ON ContUdefText
'LATTR1''arbtext1''LATTR2''arbtext2'''
```

where LATTR1 and LATTR2 are valid Pipeline attributes and arbtext1 and arbtext2 are two arbitrary text strings. The sheet number of the continuation sheet is automatically appended to the user-specified string. Therefore, the example specified above would output the string XXXXarbtext1YYYYarbtext2n for continuation sheet n where XXXX is the value of LATTR1 and YYYY is the value of LATTR2.

This may be accomplished automatically by a new text box on the Annotation Options window (highlighted above as 3). In the text box the User is able to add something like:-

LATTR1/'LATTR2'-'

where LATTR1 and LATTR2 are valid Pipeline attributes

This will generate XXXX/YYYY-n for sheet n where XXXX is the value of LATTR1 and YYYY is the value of LATTR2.

A more concrete example of the use of the CONTNOTES, ContUdefText option (combined with the COORDINATES option) is as follows. The specified options:

```
Coords ON AT Sheet
ContSheets ON ContUdefText '''Name=' 'NAME''
Type=' 'TYPE''&/Lock=' 'LOCK'' Owner=' 'OWNER'' PSPE=' 'PSPE''
pg'''
```

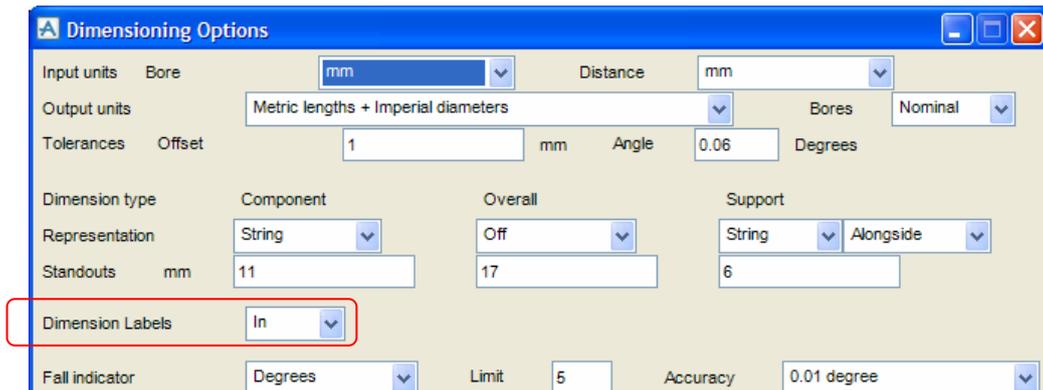
will display at the sheet break of an isometric:

```
E 12250
N 13500
EL +2735
Name =100-C-10 Type=PIPE
Lock= Owner=PIPES PSPE=A3B pg3
```

The COORDINATES option specifies the output of the first three lines. Note that the user-defined text occupies the last two lines because a carriage return '&/' is specified. The value of the 'Lock' attribute is not output because, in this case, it is invalid. The continuation sheet page 3 specified indicates that this text would be expected to be located on sheet 2 of an isometric at the sheet break continuing onto sheet 3.

Note that a valid non-null string specified by the ContUdefText option will always be output at sheet breaks, irrespective of whether the CONTSHEETS option, specifying whether the continuation sheet number is displayed or not, is set to ON or OFF.

## 17.5 Placing of Dimension Labels



A new DIMLABELS command is introduced, which allows the User to control the appearance of dimensions labels displayed on isometrics. This option may be set to either of the two options

DIMLABELS IN

Dimension labels are shown within the dimension line (the default).

DIMLABELS ABOVE

Dimension labels are shown above the dimension line.

This option may also be set by toggling between the two Dimension Labels options (IN/ABOVE) on the Dimensioning Options form (highlighted above). The effect of this option on the appearance of dimension labels is indicated below



# 18 Schematic 3D Integrator

## 18.1 Introduction

This is a new product at PDMS 12.0 and was originally called P&ID 3D Integrator. The Integrator provides schematic and 3D model data in an integrated environment, enabling quick and easy browsing and reporting on that data. Schematic data will usually have been imported using the P&ID Manager product.

Integrator can also perform the following key functions:

- Compare 3D model objects against their corresponding schematic objects, highlighting any inconsistencies in connectivity or attributes according to easily configured rules.
- Build 3D model objects using data from their corresponding schematic objects, connect objects such as equipment and pipes, and set key attributes such as tags and process data using easily configured rules.
- Link 3D model objects with their corresponding schematic objects, enabling verification of consistency of the 3D design against the schematic.

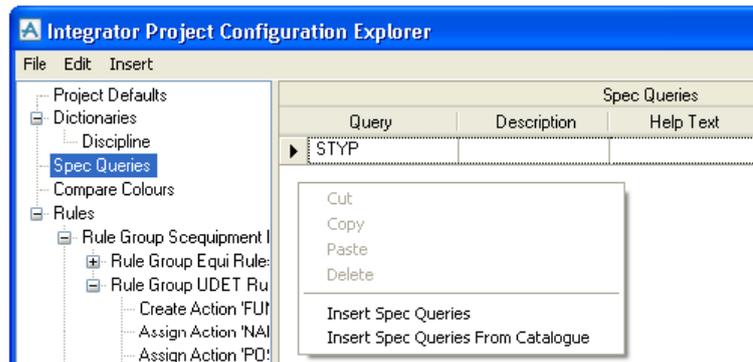
Full details can be found in the *AVEVA Schematic 3D Integrator User Guide*. Note that SCHEMATIC MODEL Manager is not covered in this document; please refer to the *AVEVA Schematic Model Manager User Guide*.

## 18.2 Updates for \*12.0.sp3\*

### 18.2.1 Spec Queries Configuration

Prior to 12.0.SP3, Integrator searched all specs on start up to validate any selectors used within rules in its configuration file. This no longer takes place, enabling faster start up of the Integrator add-in. Instead, a new configuration section has been added for Spec Queries, to allow administrators to insert an individual selector or to find all selectors available.

The example here shows a single query for STYP as provided in the out-of-the-box configuration file. Any selector used in the file must be included in the Spec Queries section, so that it can be recognised as allowable syntax by Intellisense. If Integrator reports syntax errors in the configuration file, it may be that there are rules defined using selectors that have not been entered in the Spec Queries section.



## 18.2.2 Upgrading Existing Projects

Integrator requires the file ProjectConfiguration.xml to be available in the folder <project>dflts\ModelManagement. If this folder does not exist, as might be the case for an upgraded project, administrators will need to create it and ensure the appropriate environment variable, e.g. xxxdflts, is set. The Integrator configuration file should then be copied from the installed executable folder.

If syntax errors are reported on start up or following Integrator > Show from the main menu, the ProjectConfiguration.xml file is an old version and must be modified or replaced.

For more information, please see the example in the supplied samdflts project folder.

## 18.2.3 Robustness and Usability

A number of fixes have been implemented to improve product robustness and usability.

Error trapping code in the customisable IntegratorProjectHandler.pmlobj has been improved to trap commands with syntax errors containing quotes.

Objects in the Integrator 3D view coloured by the compare function now revert correctly to those colours when no longer highlighted by selection in the main table.

When the Integrator 3D view has not yet been displayed, a build of cable only will no longer show this view. This is because the cable has not yet been routed, and so has no representation and there is nothing to see.

An effect of mouse-over on a diagram symbol with an arrowhead giving a disproportionate magnification has been fixed.

An incident of Integrator reporting unset dbref when determining tube spec during build of a pipeline has been fixed.

An incident of Integrator reporting internal error 1115 when building equipment or cables with core connections has been fixed.

An incident of Integrator hanging when building equipment and encountering the error No valid HREF on SCSEG has been fixed.

An incident of Integrator reporting internal error Key already exists when comparing pipelines has been fixed.

An incident of Integrator reporting incompatible types assigning an attribute value to a nozzle when building equipment has been fixed.

## 18.3 Updates for \*12.0.sp4\*

P&ID 3D Integrator has been renamed Schematic 3D Integrator. This reflects its capability to handle a range of schematic diagrams for piping, HVAC and cables.

### 18.3.1 Duplicate Naming

Integrator supports duplicate names for objects in the schematic and design databases. For example, an SCEQUI and an EQUI can have the same name, allowing a duplicate equipment tag on the diagram and in the 3D model.

Integrator takes advantage of this with the supplied default configuration using duplicate names for equipment, sub-equipment, nozzles, electrical connections, offline instruments, inline instruments, valves and cables.

The special treatment of the DISTAG attribute, to override any rule defined for name, has been removed. If this functionality is still required, a rule group should be defined with the condition `DISTAG ne ''`, containing a rule to set NAME from DISTAG of source.

### 18.3.1.1 Compatibility Constraints

Once duplicate names have been used, the project data and configuration rules should not be used with versions earlier than 12.0.SP4.

Duplicate names should be used with care. There are no constraints for equivalent type checking between the schematic and 3D databases. For example, it is possible to have the same name for an SCEQUI and a VALV.

### 18.3.2 Key Attributes

From version 12.0.SP4, Integrator can use a combination of several attribute values to identify matching 3D objects for a source schematic object.

For example, several pipes may be matched to a single schematic pipeline according to their values for line number, bore, pipe specification and duty. Any attributes may be identified as key attributes for a particular type in the configuration rules. Objects that have all their values for their key attributes matching the values generated by the rules will be shown as matching in the compare report.

In the Configuration Explorer, define rules for key attributes by setting their compare action to **matchaskeyattribute**.

### 18.3.3 Comparing Piping Networks

Integrator 12.0.SP4 includes a large number of fixes to improve its capability to compare networks of piping. This applies in particular to the situation where:

- The 3D piping model has been created separately from the schematic model
- A schematic pipeline has been modelled in 3D by multiple pipes
- Branches are divided up differently in the 3D and schematic models but the networks are consistent
- Some branches have been modelled in reverse flow order

### 18.3.4 Diagram Viewer Toolbar

This has been improved to enable easier investigation of differences reported by Integrator. The toolbar has been moved from the main toolbar area to the Diagram Viewer.



The information button provides tooltip help describing pan and zoom key combinations.



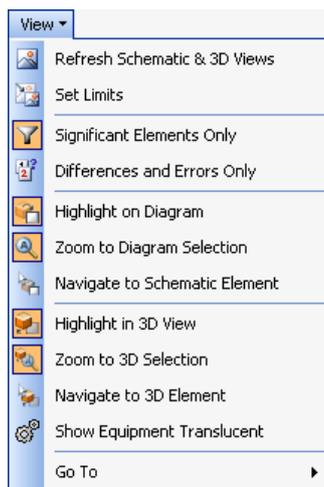
The options to reset diagram colours have been added to the Integrator main bar menu.

### 18.3.5 Compare Report Options

The Integrator Compare Report View menu has new options, to enable easier investigation of differences reported by Integrator

In addition to the modal settings to zoom to and highlight in the diagram and 3D views, there are new modal settings to navigate to the schematic or 3D object as it is selected in the compare report (which navigation is performed depends on which tree, schematic or 3D, is visible in the tree panel).

There is also a new option to show equipment translucent in the Integrator 3D view. This can make it easier to see nozzles and piping components, particularly if they have been created inside the equipment and would otherwise be invisible.



### 18.3.6 Compare Status Attribute

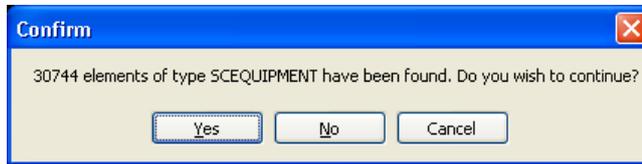
Integrator has a new Compare Status pseudo attribute CMPSTS that returns a description of the compare status of any linked schematic or 3D object, or of its linked ancestor. This is included in the Main Table by default.

	NAME	TYPE	OWNER	CMPSTS
	/HLD121-A150-03-...	SCPLIN	/PIPELINES	Attribute mismatch
	/HLD121-A150-02-...	SCPLIN	/PIPELINES	Problems in one or more members

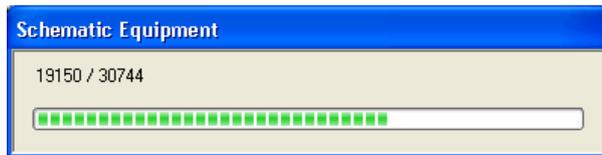
### 18.3.7 Loading Large Data Volumes

At 12.0.SP4, Integrator's performance when loading large numbers of objects into the main table has been dramatically improved. Integrator will now load a table of 30,000 schematic equipment rows with 14 attribute columns in around 25 seconds.

Whenever a main table is reloaded, if it will have more than 1000 rows, Integrator will ask the user to confirm that he wants to continue. If they do not, they will get an empty table.

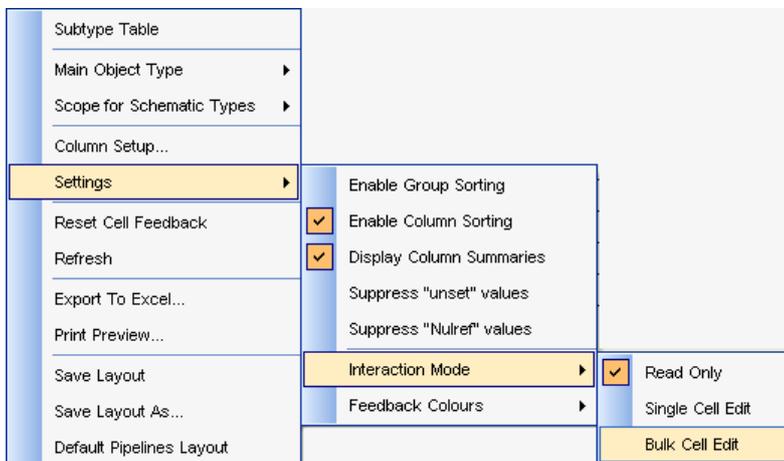


If they choose to continue, a bar will indicate the progress of the operation:



### 18.3.8 Edit Modes in Tables

You can edit attribute data in the Main and Subtype Tables by selecting an appropriate Interaction Mode. In Single Cell Edit mode, clicking on a cell places that cell in edit mode. In Bulk Cell Edit mode, double clicking on a cell places that cell in edit mode. A single click on a cell selects the cell itself, and standard Windows selection methods (left mouse click plus Ctrl and Shift keys) select multiple groups of cells. A left mouse drag operation can also be used to select multiple cells. In Bulk Cell Edit mode, Fill Down, Fill Up and Copy/Paste operations apply to all cells currently selected.



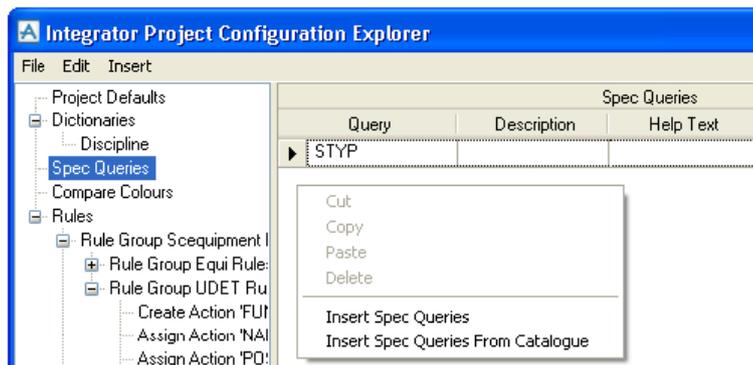
Read only cells are shown with grey background (or the selected colour if Feedback Colours have been changed). Cells may be read only for a variety of reasons, including data from a read only database, an object claimed by another user, or non-editable attributes such as Owner or Type. In Bulk Cell Edit mode, Name is read only. Following an edit, the results (success or failure) are displayed using cell colours and tooltips. These can be cleared by selecting Reset Cell Feedback.

### 18.3.9 Upgrading Existing Projects

This version of Integrator has a new ProjectConfiguration.xml file in the installed executable folder. The main change is to use duplicate names for tagged items in the schematic and design databases.

Existing projects may copy the new ProjectConfiguration.xml file to the <project>dflts\ModelManagement folder and then modify it according to their own requirements. Alternatively, the existing file may be modified if required. Administrators should ensure the appropriate environment variable, e.g. xxxdflts, is set.

If syntax errors are reported following **Integrator** > **Show** from the main menu, the ProjectConfiguration.xml file is an old version and must be modified or replaced. The probable reason is that there are rules defined using selectors that have not been entered in the Spec Queries section. Here is an example with STYP added.



If existing projects have their own copy of the HVACStypeTable.xml file in the <project>dflts\ModelManagement folder, this should be deleted. Integrator will then look for this file in the installed executable folder. This file should only be copied to the <project>dflts\ModelManagement folder if it is to be modified to suit project requirements.

## 18.4 Updates for \*12.0.sp5\*

There are many enhancements at SP5, which are fully detailed in the updated Integrator User Guide.

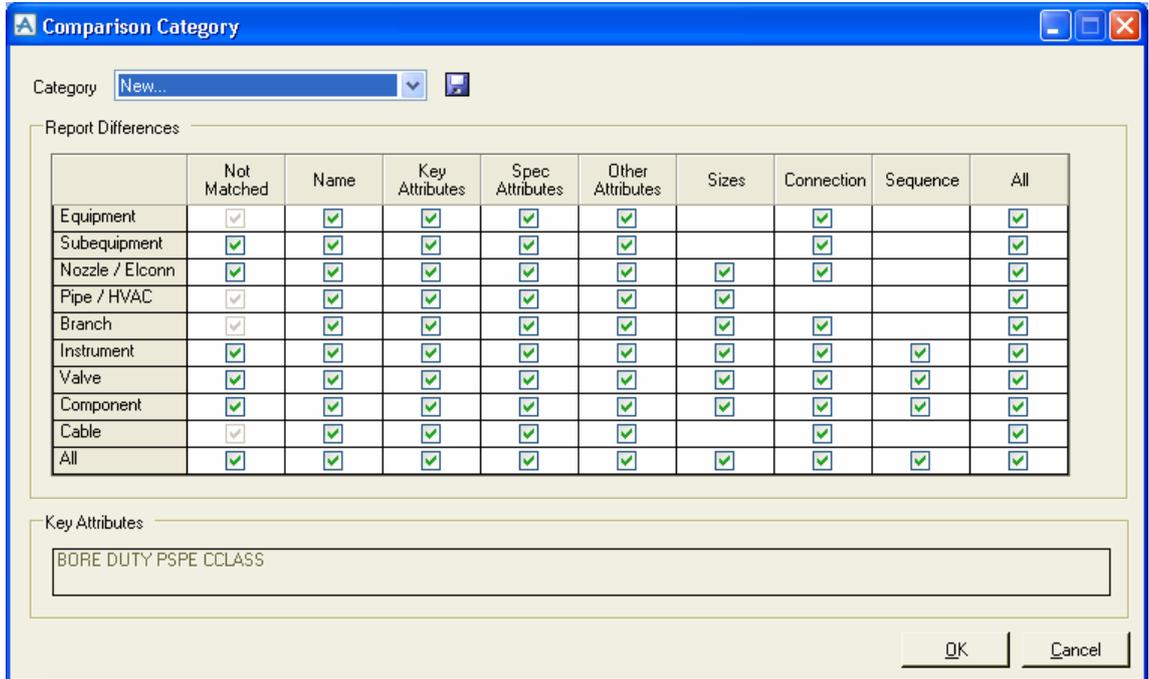
### 18.4.1 Bar Menu

The Integrator main bar menu has some new entries and some changes in terminology and order. The main addition is for Comparison Categories, described below.

### 18.4.2 Comparison Categories

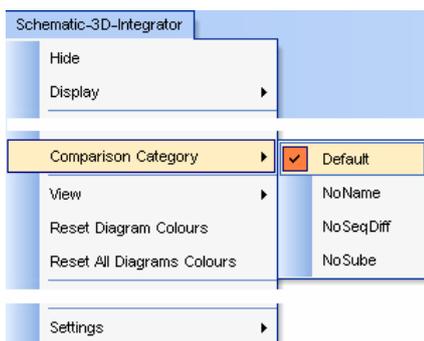
The new Comparison Category settings allow you to specify which categories of differences will be reported against which types of objects. By ignoring certain categories, they will not be reported, and you can focus attention on priority differences.

Select **Bar Menu** > **Settings** > **Comparison Category** to display this form.

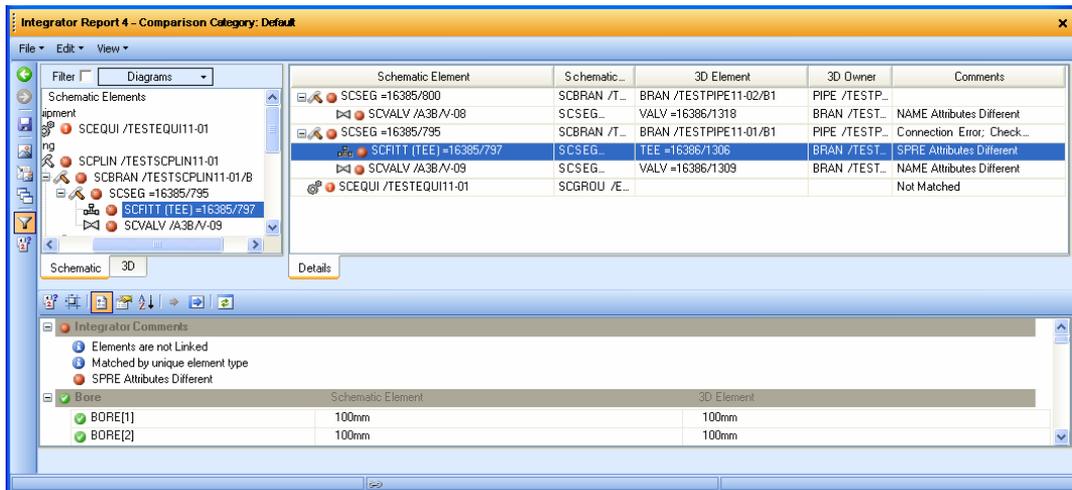


The Comparison Category settings allow you to switch off certain categories of differences for certain types of objects. You cannot switch off the reporting of non-matched main type objects such as pipelines and equipment. The **Key Attributes** column applies when matching by key attributes according to the configuration rules, and the **Key Attributes** text panel lists attributes included in such rules. The **Spec Attributes** column applies to all specification attributes including PSPE, SPRE and CATR.

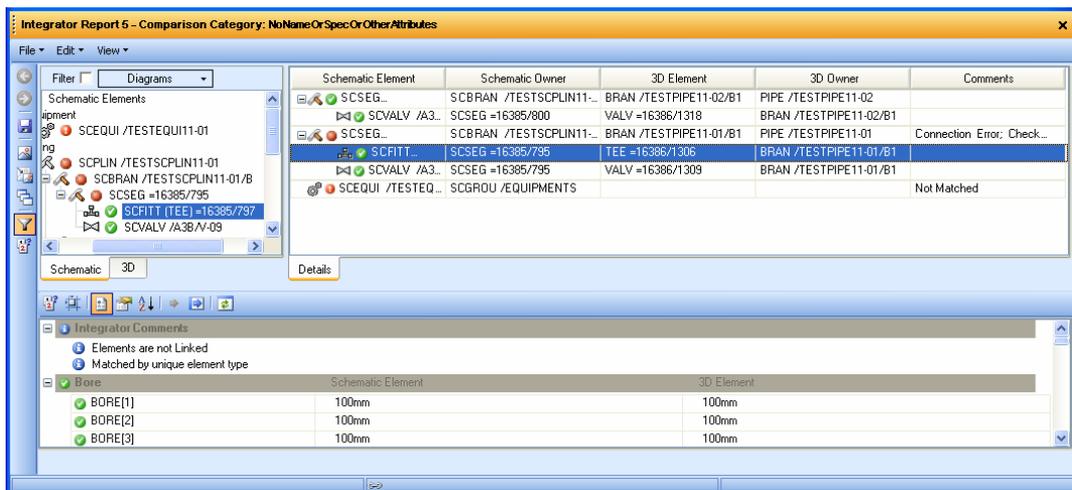
**Note:** This will not set the Comparison Category to be used - that is done from the **Main Bar Menu > Comparison Categories** sub-menu selection.



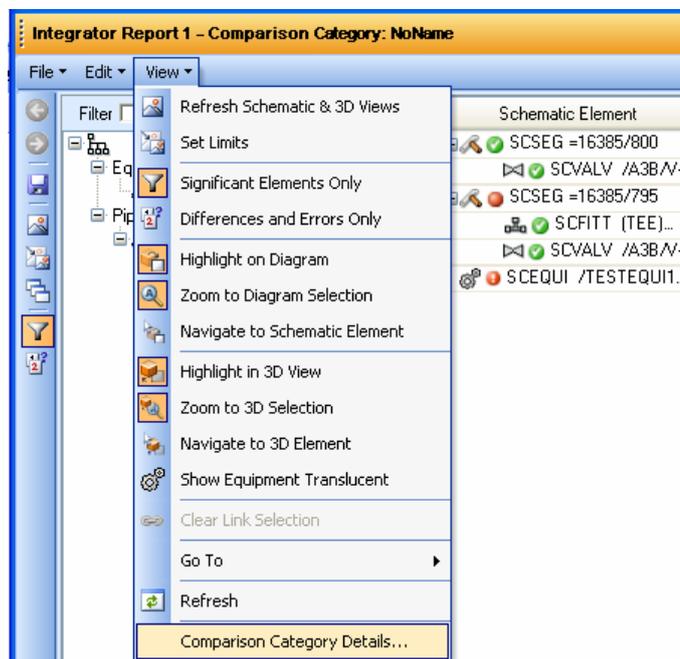
Selecting **Default** means all differences will be reported. For example in the report shown below there are a number of differences reported on NAME and SPRE of components.



If a Comparison Category is defined to ignore differences of Names, Spec Attributes and Other Attributes, the report then appears as below. Note that the Comparison Category used is included in the report title (it also appears in the title of the Main Table). The differences concerned no longer appear as comments or as red icons, and will not participate in the aggregation of differences reported up the hierarchy (the worst case report). The actual data will still be visible in the report content.



The Comparison Report also has a menu option to display (in a read only form) the current settings for the comparison category used in the report (note these may have changed since the report was made).

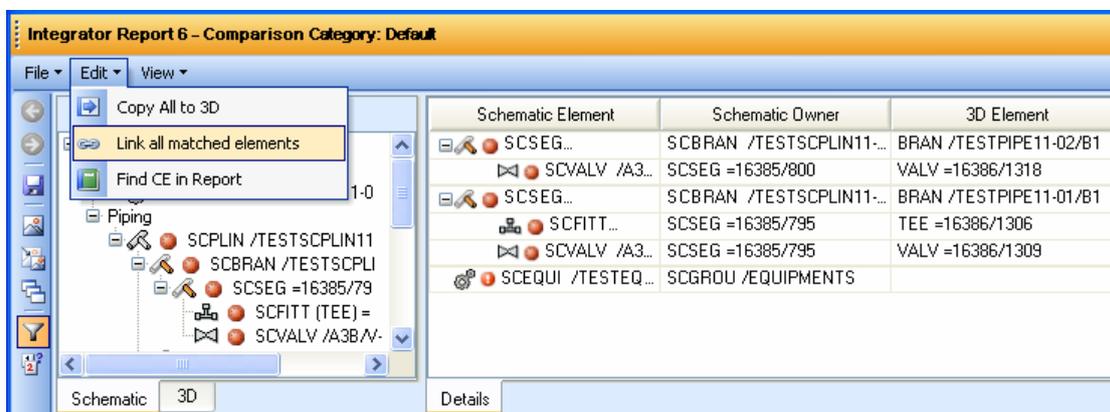


For use in macros, a new command line method has been provided to select a comparison category. To use it, call the new method then call the existing compare method.

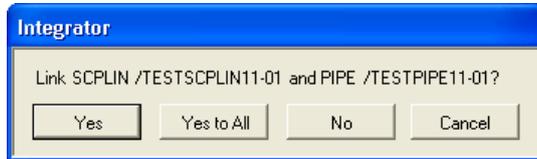
```
!!integrator.setreportvisible(false)
!!integrator.setreportpath(!reportFilename)
!!integrator.setComparisonCategory('NoNameOrOtherAttributes')
!!integrator.compare(!items)
```

### 18.4.3 Auto Linking Matched Objects

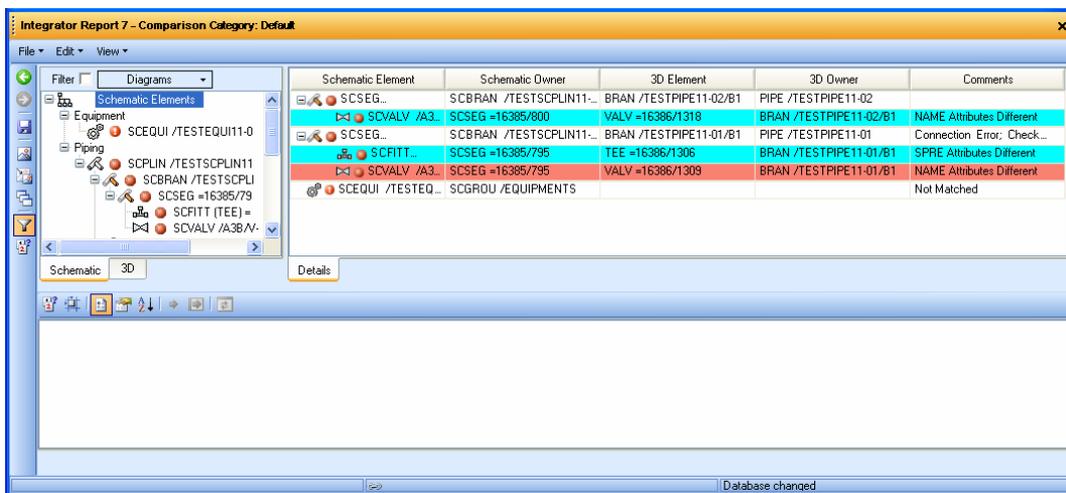
Integrator can automatically link all matched objects from a comparison report. Click on **Edit > Link all matched elements**.



Integrator will work through the report content prompting to link matched objects.



You can choose to link or skip individual objects, or click **Yes to All** to automatically link all matches. On completion, the report will indicate newly linked objects in cyan and any failed or skipped links in red.



A log of the linking actions is output to the command line.

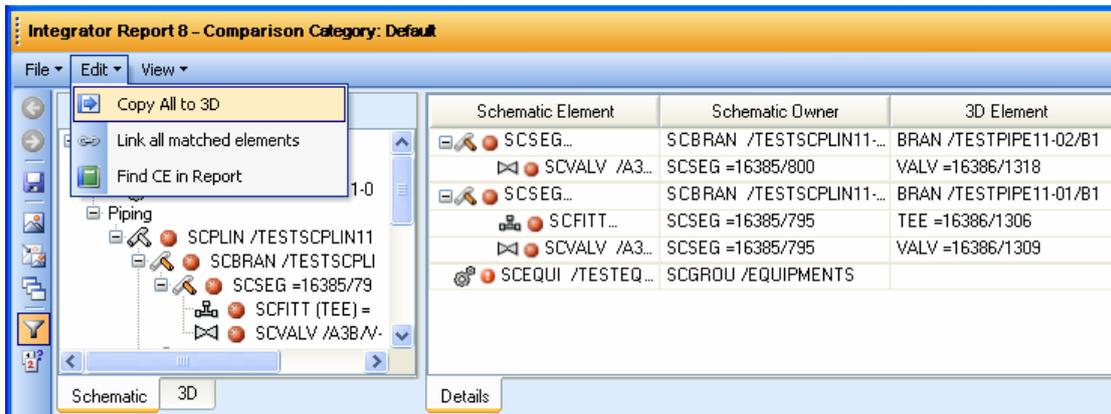
```
Beginning Auto-link
SCPLINE /TESTSCPLIN11-01 linked to PIPE /TESTPIPE11-01
SCPLINE /TESTSCPLIN11-01 linked to PIPE /TESTPIPE11-02
SCFITTING 1 of SCSEGMENT 1 of SCBRANCH /TESTSCPLIN11-01/B-1 linked to TEE 1 of BRANCH /TESTPIPE11-01/B1
Warning - SCVALV /A3B/V-09 and VALVE 1 of BRANCH /TESTPIPE11-01/B1 not linked - link attempt failed
SCVALV /A3B/V-08 linked to VALVE 1 of BRANCH /TESTPIPE11-02/B1
Auto-link complete
```

For use in macros, a new command line method has been provided to set a flag to auto-link matched objects. To use it, call the new method to set the flag then call the existing compare method.

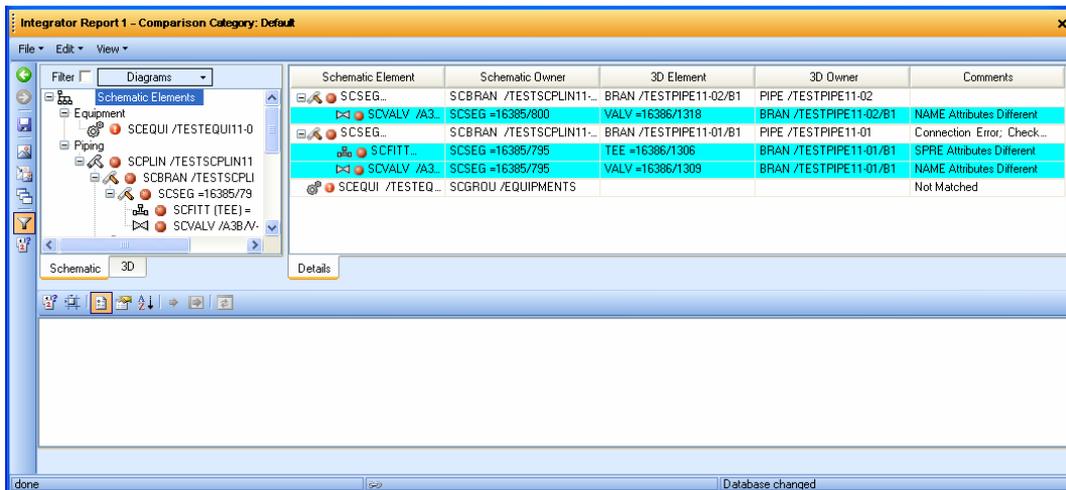
```
!!integrator.setreportvisible(false)
!!integrator.setreportpath(!reportFilename)
!!integrator.setCompareAutoLinkMatches(true)
!!integrator.compare(!items)
```

## 18.4.4 Auto Update of Attributes

Integrator can automatically update attributes on matched or linked objects from a comparison report. Click on **Edit > Copy All to 3D**.



Integrator will work through the report content updating any attribute differences on linked or matched objects. On completion, the report will indicate newly updated objects in cyan and any failed or skipped updates in red.



A log of the updating actions is output to the command line.

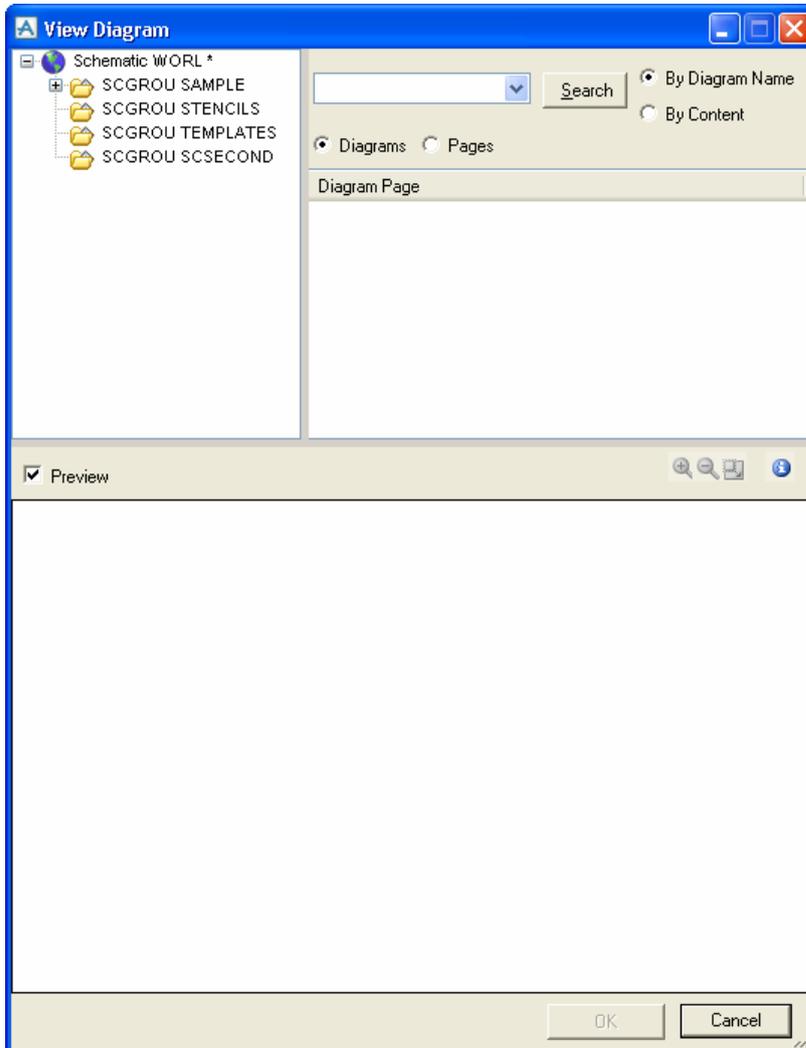
```
Beginning Auto-update of attributes
DESC of PIPE /TESTPIPE11-01 set to Test11
SPRE of TEE 1 of BRANCH /TESTPIPE11-01/B1 set to /A3B/Tv100
NAME of VALVE /A3B/V-09 set to /A3B/V-09
NAME of VALVE /A3B/V-08 set to /A3B/V-08
Auto-update of attributes complete
```

For use in macros, a new command line method has been provided to set a flag to auto-update attributes. To use it, call the new method to set the flag then call the existing compare method.

```
!!integrator.setreportvisible(false)
!!integrator.setreportpath(!reportFilename)
!!integrator.setCompareAutoUpdateAttributes(true)
!!integrator.compare(!items)
```

## 18.4.5 View Diagram Dialogue

The new View Diagram dialogue allows you to browse for diagrams using the tree panel or search for diagrams using the search controls.



Click on the **Search** button with blank text in the **Search For** field to get a list of all diagrams available.

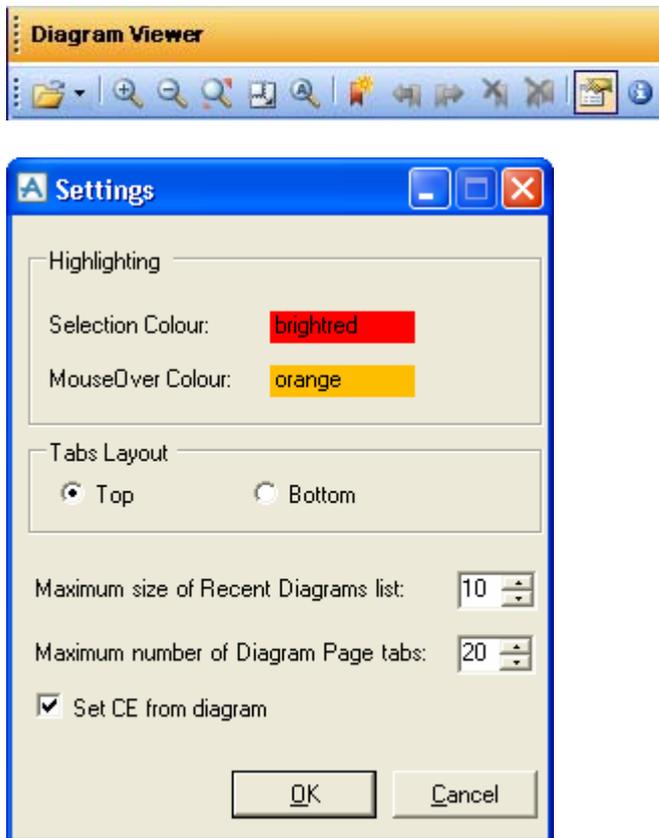
Select **Diagram** or **Pages** to see one entry per diagram or one entry per page.

Select **By Diagram Name** to perform a wildcard search using the name of the diagram. Select **By Content** to perform a search using the name of an object such as schematic equipment to find the diagrams it appears on.

Select the required diagram or page. If the **Preview** option was checked, and either a page was selected or a single page diagram was selected, then the diagram will be displayed in the Preview panel. Use the pan and zoom functions to inspect the diagram.

## 18.4.6 Diagram Viewer Settings

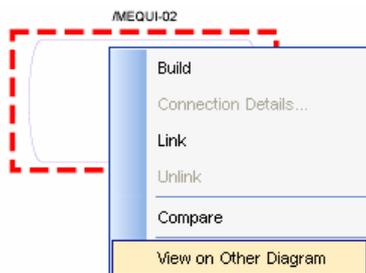
The Diagram Viewer has an additional button on the toolbar for its own Settings form.



The settings for selection and mouseOver colours have moved here from the earlier Settings form. The middle sections allow you to control where the diagram tabs appear, the number of recent diagrams that will be remembered, and the number of tabs that can be displayed simultaneously. The Set CE from diagram option controls whether the current element will track the object you click on in the diagram viewer.

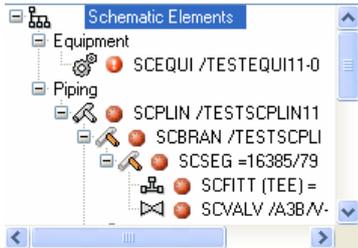
## 18.4.7 Diagram Viewer Context Menu

The Diagram Viewer context menu has a new option to view the selected object on other diagrams. This is active only if the object appears on more than one diagram.

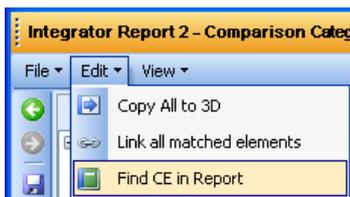


## 18.4.8 Comparison Report Options

The Comparison Report has some new features. The tree panel shows folders for Equipment, Piping, HVAC and Electrical.



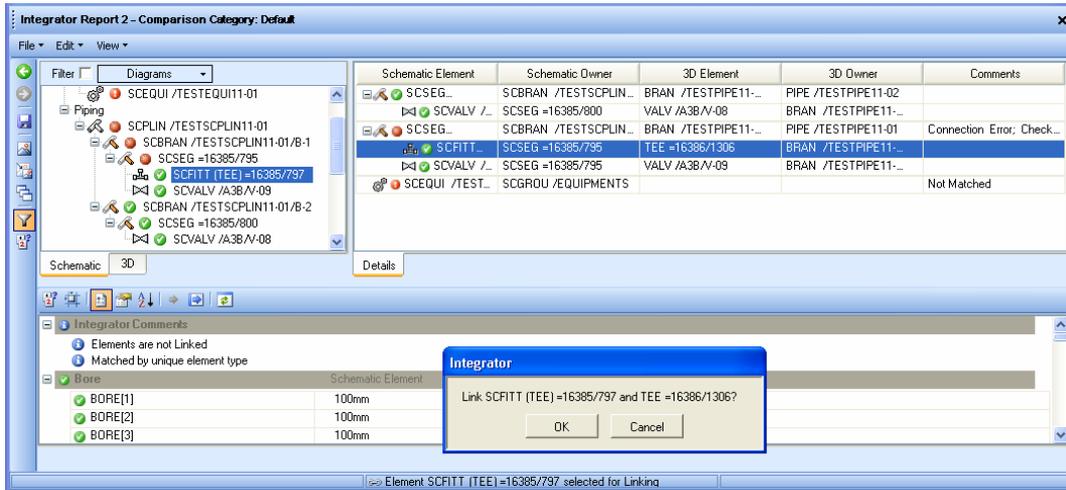
The new Edit menu has a **Find CE in Report** option which focuses the report on the current element (if it is contained within the report).



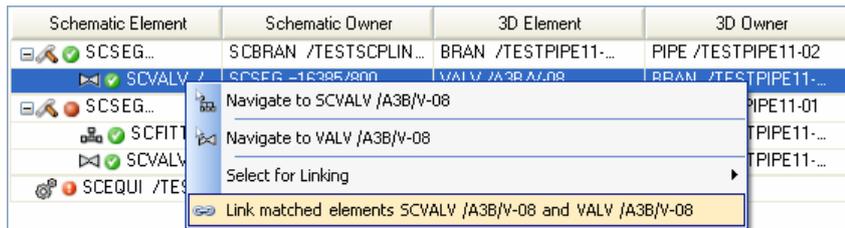
The context menu has a **Find in Report** option as well **Navigate to**. The former focuses the report on the connected object and the latter sets it as the current element.

Schematic Element	Schematic Owner	3D Element	3D Owner	Comments
SCSEG...	SCBRAN /TESTSCPLIN...	BRAN /TESTPIPE11-...	PIPE /TESTPIPE11-02	
SCVALV /...	SCSEG =16385/800	VALV /A3B/V-08	BRAN /TESTPIPE11-...	
SCSEG...	SCBRAN /TESTSCPLIN...	BRAN /TESTPIPE11-...	PIPE /TESTPIPE11-01	Connection Error; Check...
SCFITT	SCSEG =16385/795	TEE =16386/1306	BRAN /TESTPIPE11-...	
<ul style="list-style-type: none"> <li>Navigate to SCFITT (TEE) =16385/797</li> <li>Navigate to TEE =16386/1306</li> <li>Connections</li> <li>Select for Linking</li> <li>Link matched elements SCFITT (TEE) =16385/797 and TEE =16386/1306</li> </ul>				<ul style="list-style-type: none"> <li>Navigate to SCSEG =16385/800</li> <li>Find in Report SCSEG =16385/800</li> <li>Navigate to BRAN /TESTPIPE11-02/B1</li> </ul>
				Not Matched

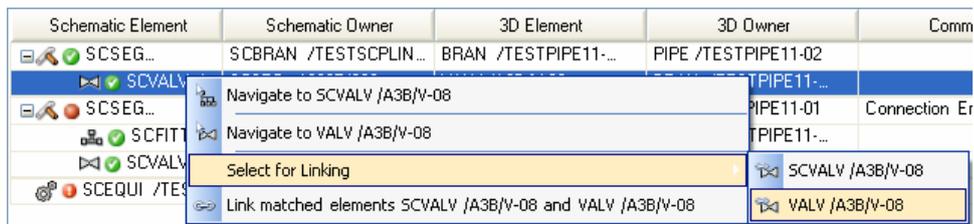
The report has a drop site for linking, at the base of the report. An object can be dragged from the drawing viewer, design explorer, or from the report grid panel, and dropped in the drop site. If dragged from the report grid panel, the drag must start on either the Schematic Element cell or the 3D Element cell to determine which object is dragged. A subsequent drop onto the drop site will either replace the object selected for linking, or offer to link to it, depending on the relative types.



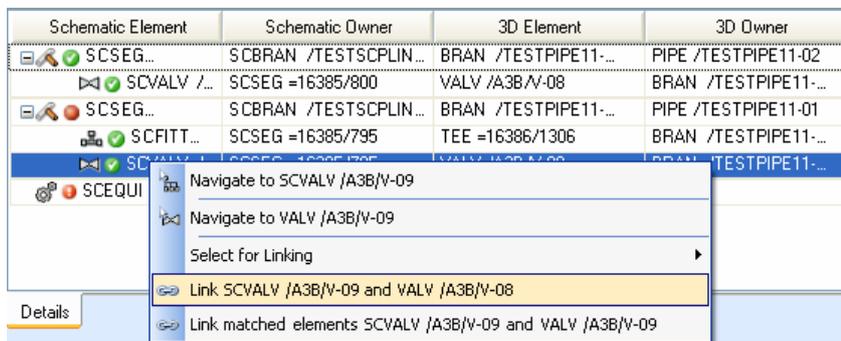
The context menu offers the option to link a pair of matched objects.



The context menu offers the option to select an object for linking (which adds it to the drop site for linking) ...



... and then select another object and link to the saved selection.



### 18.4.9 Schematic Multi Cable

Integrator can handle Schematic Multi-Cables (SCMCAB). Integrator builds the individual cables for a Schematic Multi-Cable. There is no 3D equivalent of SCMCAB.

When a Schematic Multi-Cable (SCMCAB) is selected in the Diagram View, all its child Schematic Cables (SCCAB) will be selected in the Main Table. When an SCCAB that is a member of an SCMCAB is selected in the Main Table, its owning SCMCAB will be selected in the Diagram View. Its sibling SCCABs may be automatically selected in the Main Table via the right click option **Select All Cables in Multi-Cable**.

### 18.4.10 Comparing SUBEs and NOZZLES

Integrator will report unmatched 3D SUBEs for information and not as errors, on the basis that there are likely to be more sub-equipment in 3D than on a diagram as there will be more detail. However, unmatched SCSUBEs will be reported as errors.

Integrator will match nozzles at different levels in the hierarchy, for example a NOZZ in a TMPL below a SUBE may be matched to an SCNOZZ directly below an SCEQUI. This allows nozzles in 3D to be grouped on SUBEs even though there is no parallel schematic hierarchy.

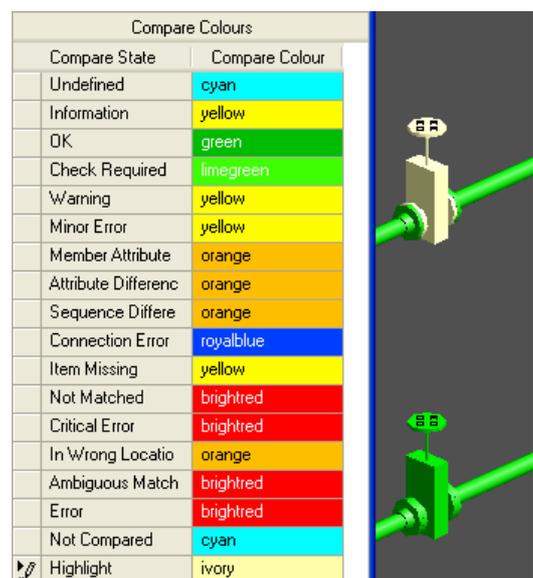
### 18.4.11 Branch Linking

Object types BRAN and SCBRAN no longer have the pseudo attributes **schlnk** and **deslnk** as they are not linked directly like other object types. This is because the relationship can be many-to-many in a complex piping network where the branches are divided up differently in 3D and schematic.

BRAN and SCBRAN have the array pseudo attribute **braln** which uses the owning SCBRANs or BRANs of the member components to generate the possibilities.

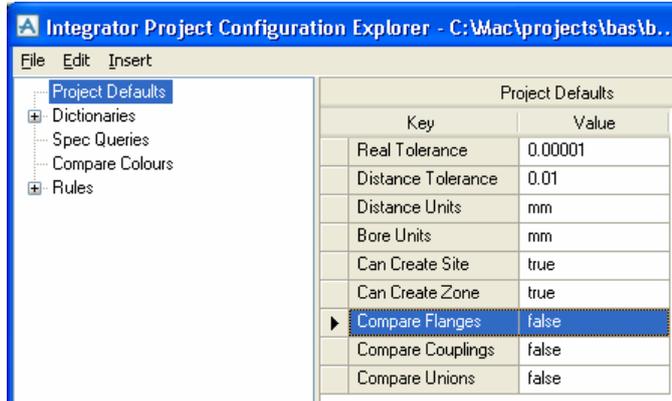
### 18.4.12 Highlight Colour

Integrator now has its own highlight colour used when an object is selected in the Main Table or Comparison Report. Since the Graphics Settings highlight colour is typically set to red, which indicates an error for Integrator, a more suitable colour such as Ivory can be used for the Integrator highlight colour. It is set in the Compare Colours section of the Project Configuration Explorer.



### 18.4.13 Comparing Flanges, Couplings and Unions

By default, flanges, couplings and unions are treated as insignificant for compare. This can be changed in the Project Configuration Explorer Defaults.



If the diagrams show these items then they can be set true so that they will be treated as significant for compare.

# 19 Schematic Model Manager

**\*12.0.sp5\***

AVEVA Schematic Model Manager is a new product at PDMS 12.0.SP5, which replaces AVEVA P&ID Manager and is used to import P&ID data into PDMS Schematic databases. The P&ID data may have been exported from AVEVA P&ID, or from other supported P&ID systems, and is imported via an XML file, the content of which complies with ISO 15926.

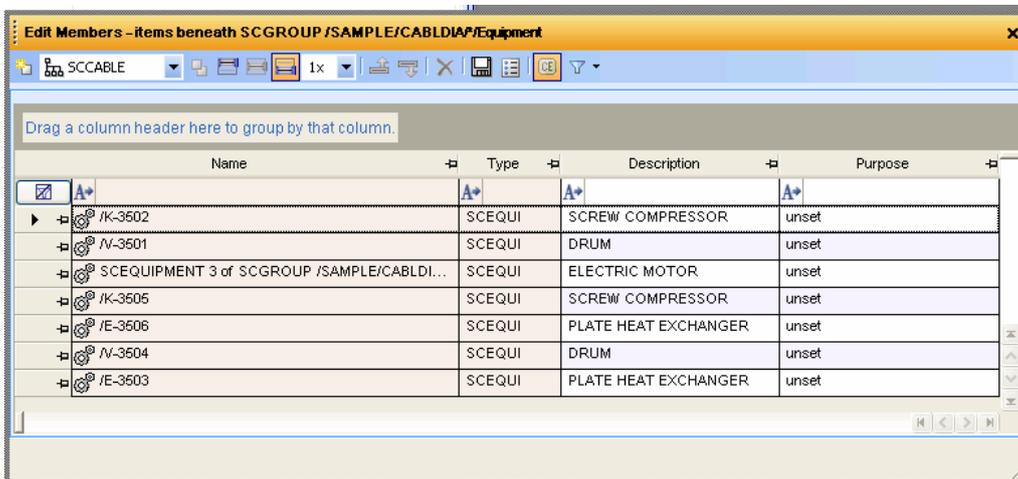
Please note that Schematic Model Manager 12.0.SP5 does not fully support the use of UDETs in the Schematics database. In particular, there is a limitation that it cannot create instances of UDETs on import.

Schematic Model Manager, unlike its forerunner P&ID Manager, is accessed via the PDMS login dialogue or by the module change mechanism. This section notes other significant changes from P&ID Manager. For full details, please refer to the *Schematic Model Manager user guide*.

## 19.1 Edit Elements

A new grid based data entry and editing feature has been added to support the bulk entry and editing of schematic elements such as Equipment. This is accessed via the schematic explorer right click menu, or from **Edit> Edit Members**.

The grid includes features such as fill down, and is designed to support the manual creation and editing of schematic items.



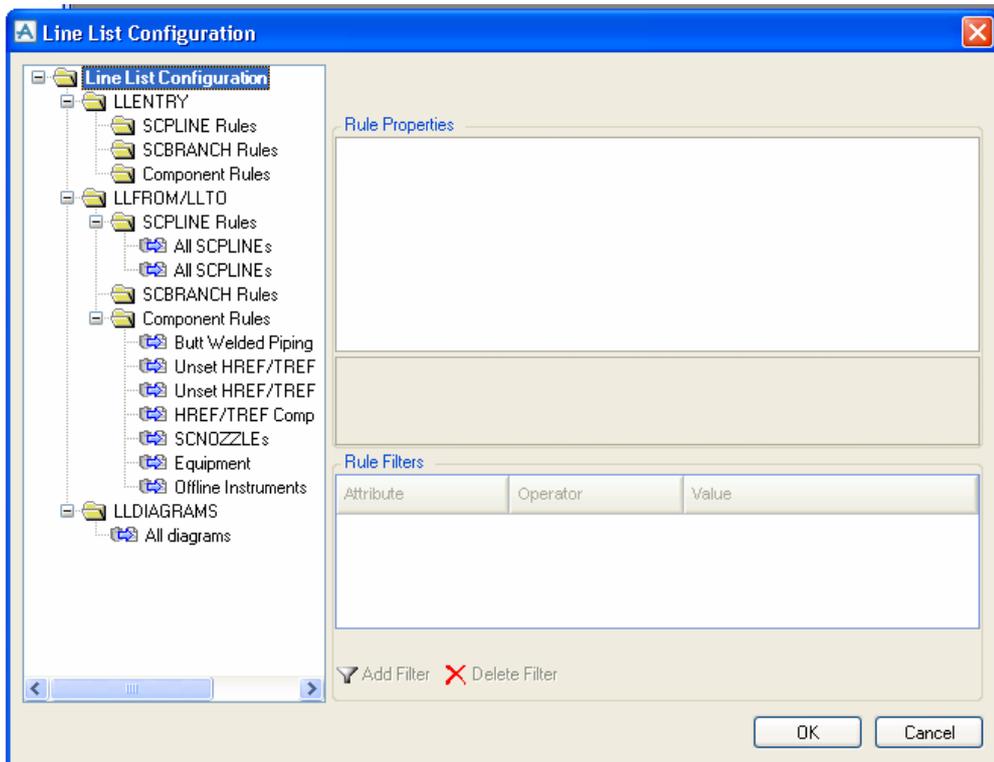
## 19.2 Line List Configuration

To support the generation of line related project deliverables, pseudo attributes have been added to line related elements. These pseudo attributes are:

Element	Pseudo Attribute	Type	Purpose
---------	------------------	------	---------

SCPLIN	LLDIAGRAMS	Text	Calculated value. This is the combined DIAREF attributes of the SCSEGMENT elements within the SCBRANCH and any subsequent branches between the branch and LLTBANCH, formatted as a text field to meet the user's format requirements
SCBRAN			
SCPLIN	LLENTY	Bool	Determines if the SCPLINE and SCBRANCH should be used in a line list deliverable. Pipeline and Branch selection may be user defined using a rule or manually set.
SCBRAN			
SCPLIN	LLFROM	Text	Derives the text which indicates the source of the SCPLINE or SCBRANCH. The method used to derive the contents is user defined
SCBRAN			
SCBRAN	LLTBANCH		Derived value. This is the SCBRANCH element where the main flow from the current branch terminates or leaves the current SCPLINE. This enables the user to get at the attributes at the end of the line list entry such as the terminating BORE size (TBORE OF LLTBANCH)
SCPLIN	LLTO		Derives the text which indicates the destination of the SCPLINE or SCBRANCH. The method used to derive the contents is user defined.
SCBRAN			

The derivation of the values held in these pseudo attributes can be user defined using the line List Configuration form, which is accessible from **Tools> Line List Configuration**.



The pseudo attributes may be used as part of the output of a Search or Report, for inclusion in a line related search or report, with:

- Configurable from and to values
- Derived and calculated field containing a list of diagrams a line related element spans.

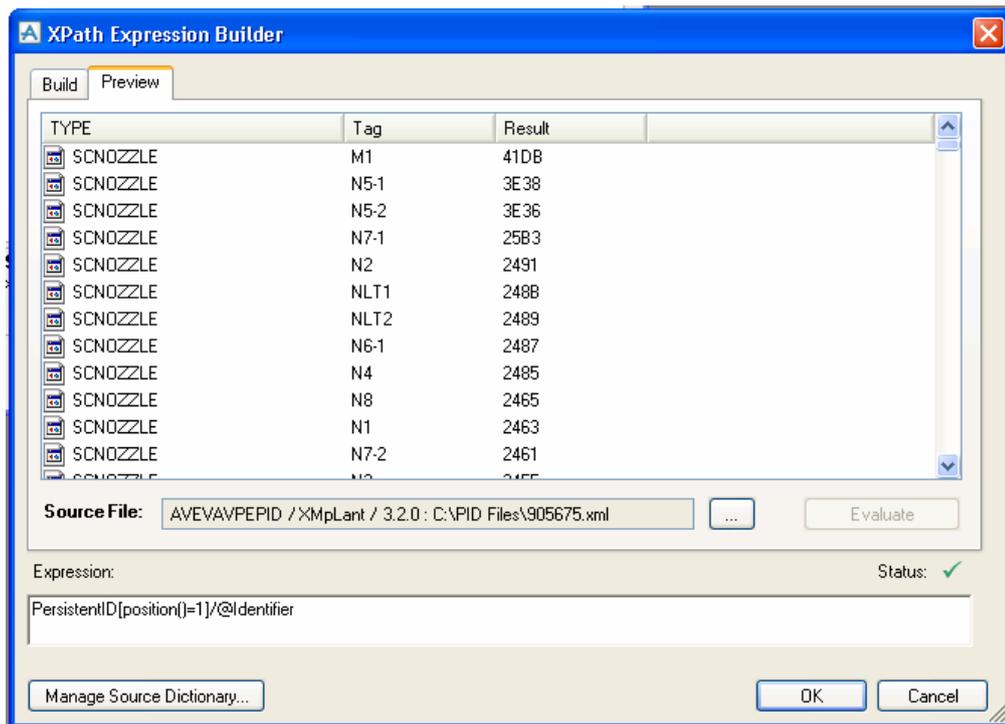
- Derivation and replacement of “from” and “to” values. For example where a pipe ends at a component such as an end cap the “to” reference can be replaced with the component type name “End Cap”.

### 19.3 XPath Prover

Attribute mappings between source data and schematic database attributes are configured and maintained using attribute mappings. These mappings use XPath, a language that describes how to locate specific elements (and attributes, processing instructions, etc.) in an XML document, and which may be used to calculate and derive values.

Schematic Model Manager (and Lexicon) now supports the proving of XPath expressions directly from the attribute matching feature, to determine what the results of the XPath expressions will be without the need to import a diagram.

The XPath Prover can be accessed from **Tools> Attribute Mappings** and then opening an attribute mapping condition or source attribute.



A Source file may be selected and the attribute mapping trialled against this file to determine what the results of the mapping will be, without the need to import the file.

### 19.4 Saved Searches

Two new Line deliverable related saved searches have been included with Schematic Model Manager, for use in conjunction with the Search tool. These saved searches may be used for reporting purposes and can be directly exported to CSV or MS Excel format from the search results grid, for use as the basis for deliverables.

In addition Schematic Model Manager users may create and save their own searches, for use generally, or as the basis for project reports and deliverables.

These searches use the new line related pseudo attributes.

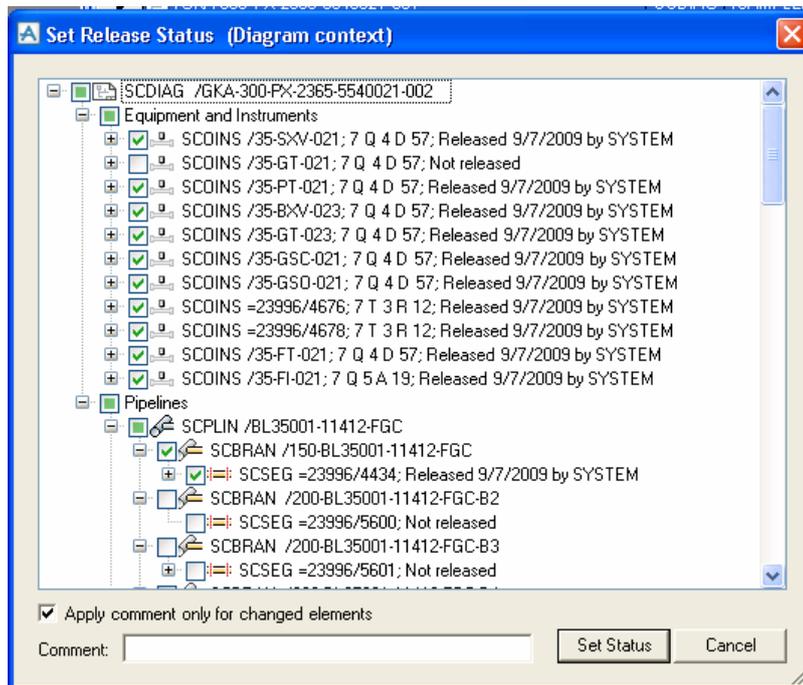
- Line List – SCBRAN
- Line List – SCPLIN

These are in addition to the Schematic Model manager saved searches already provided:

- Connected Off Page Connectors
- Equipment List
- Instrument Index
- Manually Connected Page Connectors
- Pipe Specials
- Release to 3D Status – Off
- Release to 3D Status – On
- Unconnected Off Page Connectors
- Valve Count

## 19.5 Set Release Status

This feature has been added to support the visualisation and management of schematic element release to 3D status and allow Better management of the release of schematic data for use in Design. It is accessible from **Tools> Set Release Status**.



Child items of an element are grouped and their release status may be changed collectively at group level. Information relating to elements Release Status is shown graphically, along with data relating to the last release related activity carried out on each element.

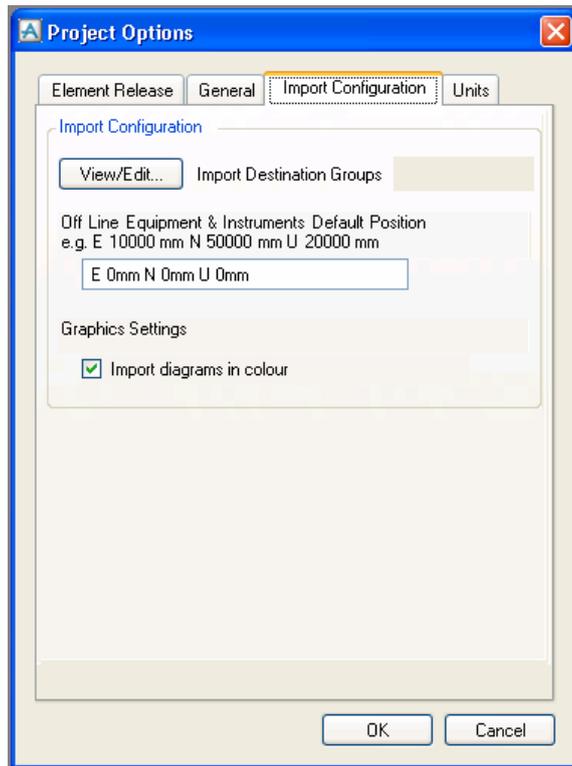
## 19.6 Support for XMpLant 3.3

Schematic Model Manager now supports version 3.3 of XMpLant in addition to version 3.2. Attribute mappings may be defined for each version and run in parallel, to support environments where both formats are being generated by different source drafting tools, but imported into the same Plant (or Marine) project.

## 19.7 Support for Colour SVG

The Schematic Model Manager import routine, and the Diagram Viewer now support colour SVG representations of P&ID.

By default colour SVG files are generated on import. This feature may be disabled by selecting **Tools> Project Options> Import Configuration** and un-checking the **Import diagrams in colour** check box.



## 19.8 General Improvements

Incorporation of core system functionality, such as check CE, enables users to carry out key schematic and element creation and management tasks from Schematic Model Manager, reducing the need to use other modules.

## 20 AVEVA Diagrams

**\*12.0.SP5\***

The following enhancements have been included in the 12.0.SP5 release.

### 20.1 Visio 2007 support

From SP5, Diagrams is supported only on Visio 2007; it will not be possible to run it with Visio 2003. Visio 2007 provides some new features, for example 'Auto Connect', 'Link Data to Shapes'.

### 20.2 Enhanced Instrumentation Support

The Schematic data model has little support for designing advanced instrumentation diagrams. Typically, users need to define separate lines/systems (instrumentation loops) which are clearly differentiated from Pipelines and the main flows. However, in some cases, inline components such as valves, may need to participate in both the main flow as well as in an instrumentation loop.

The Diagrams application allows users to create low and high level control systems. There are now several special elements in the database that can be easily used to create an instrumentation data model. Those elements can be grouped into schematic loops and can be easily found and modified.

### 20.3 Title block

New Title Block shape has been introduced for annotating a diagram or template. Its behaviour is similar to Multi-label, but it cannot be connected to any shape – instead it displays db attributes of the containing drawing. A shape for Title Block can be created using the Import Shape Wizard and then be dropped on a drawing as any other shape.

### 20.4 Multi-cables

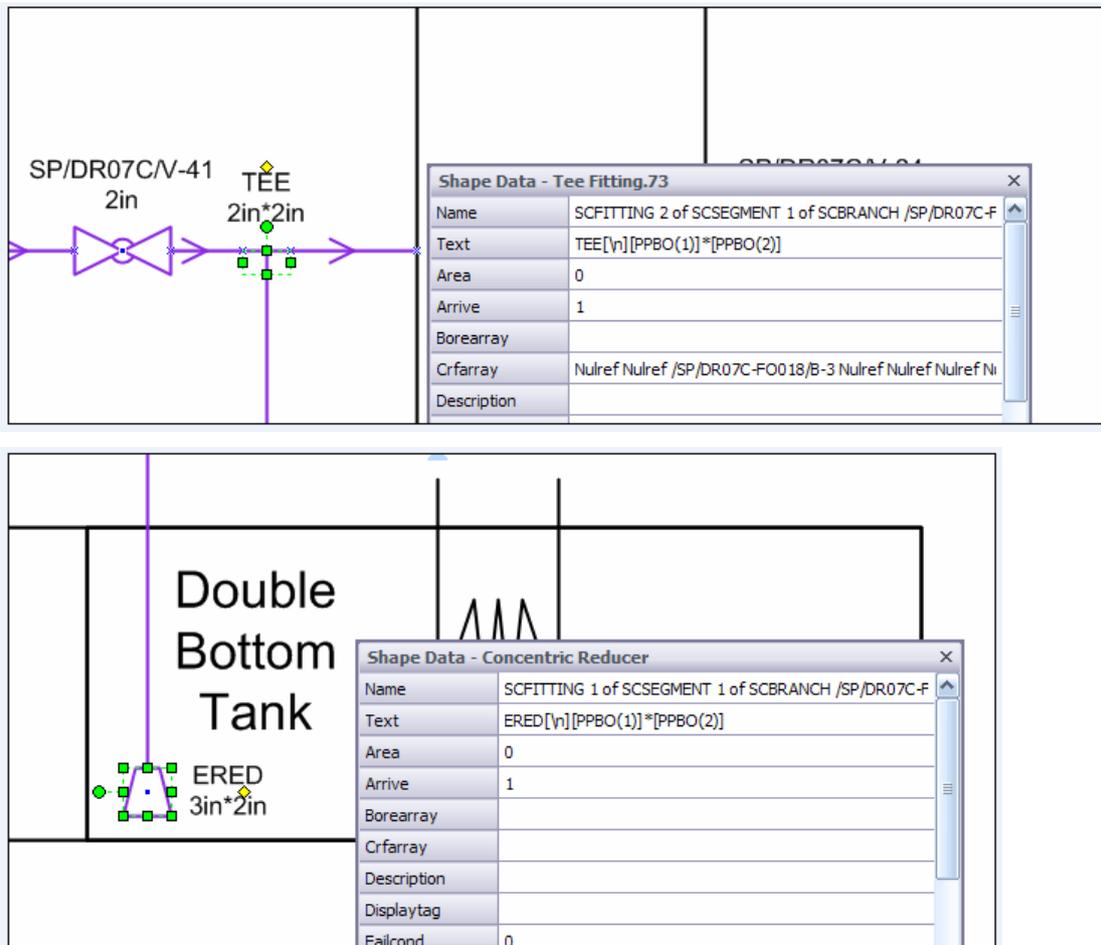
A new SCMCAB schematic db element type has been introduced. It represents Multi-cable; is to be placed below SCGROUP and can own a number of SCCABLE elements. The quantity of cable members and values of their attributes are controlled by appropriate attributes of SCMCAB. On the drawing SCMCAB is represented by Multi-cable shape which can be created using Import Shape Wizard and then dropped on the drawing like any other shape. Multi-cable is usually represented by a single connector line.

### 20.5 Support for Imperial Units

AVEVA Diagrams now supports the use of Imperial units.

Attribute values and input fields are presented according to the current units setting.

It is now also possible to enter units with numbers in the input fields – if a unit value is specified the system will try to interpret that value and convert it to the current units setting.



## 20.6 Cable Connection to Nested Symbol

This new feature makes it possible to establish a connection between Cable or Multi-cable and Equipment item using symbols being part of the Equipment shape's group.

- By connecting the Cable element to a connection point on a symbol being part of the Equipment, Sub-equipment or Electrical Connection group.
- By dragging a symbol that is already connected to a Cable element into the Equipment, Sub-equipment or Electrical connection group (the behaviour of the Containing Group should be set to **Accept dropped shapes** and nested symbol should be set to the **Add shape to group** option).

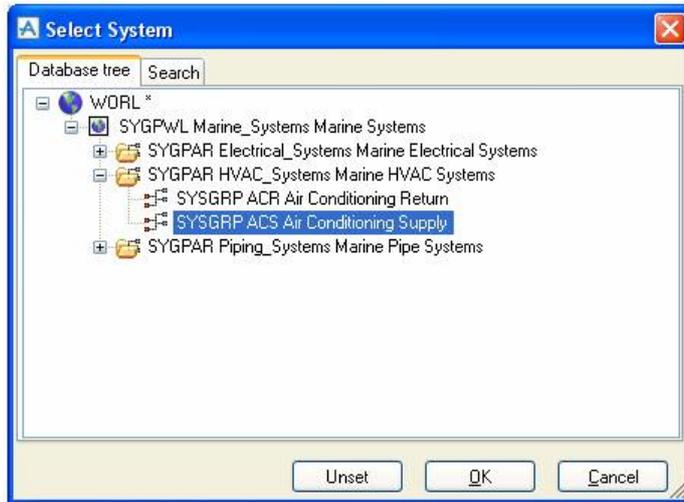
Also automatic disconnect in db is supported when the Cable element is disconnected from the nested symbol or the symbol is moved out of the Equipment item group.

## 20.7 Line List Configuration

For more information refer to *Status Control / Line List Configuration* in this User Bulletin.

## 20.8 The Default System can be Unset

A new **Unset** button has been added:

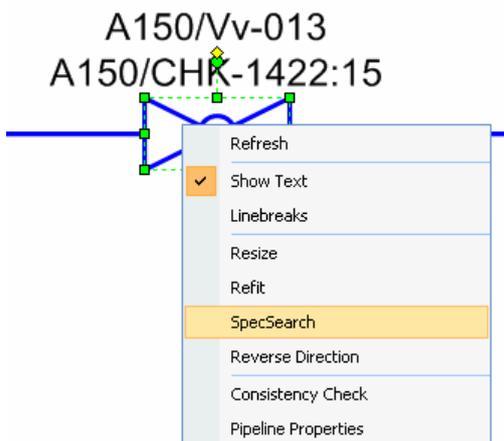


## 20.9 Pipe Splitting

Pipelines with sub-branches (branches having both HREF and TREF set to the split-of branch) may now be split in a better way. The sub-branch(es) are moved to the new pipeline in the split operation.

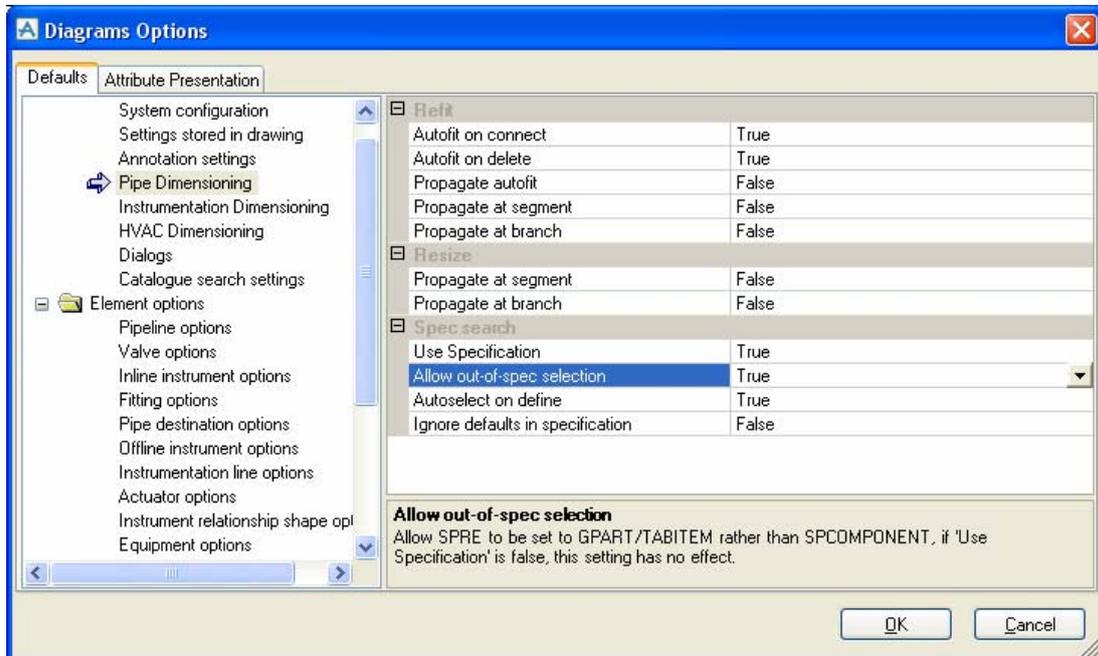
## 20.10 ReSelect Method

A new option, Spec Search, has been implemented. This option is available from the context menu and gives a possibility to re-select SPREF in the diagram in an easy way. The option can be useful when i.e. specification will change or the user removes a current SPREF by accident.



## 20.11 Out-of-Spec Components

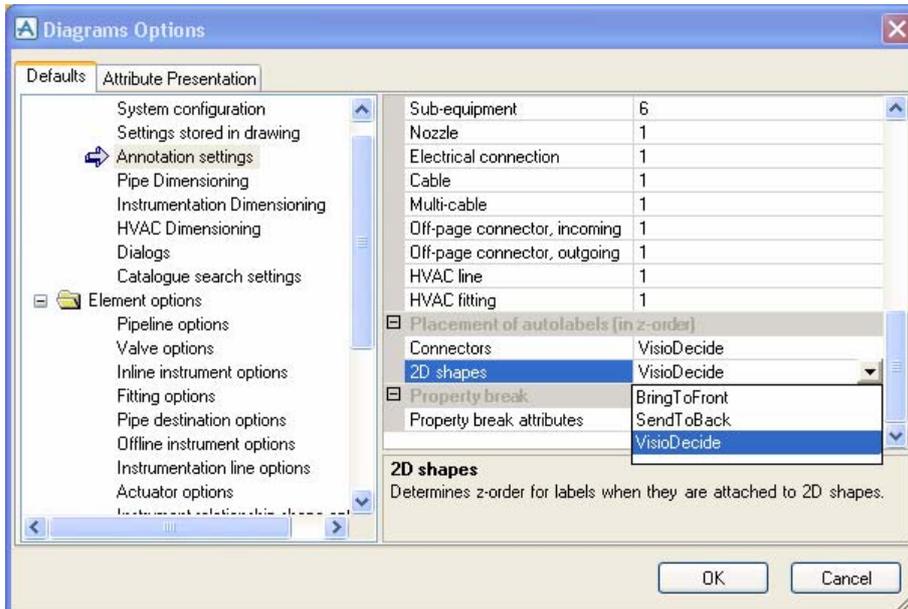
A new setting ‘Allow out-of-spec’ is available to control selection of inline elements. When Use Specification is set *True*, it is possible to determine the type of SPREF via the ‘Allow out-of-spec’ option.



If ‘Allow out-of-spec’ is set to *False* the system accepts only SPCO elements, otherwise GPART and SCOM are also accepted.

## 20.12 Default Placement for Auto Labels

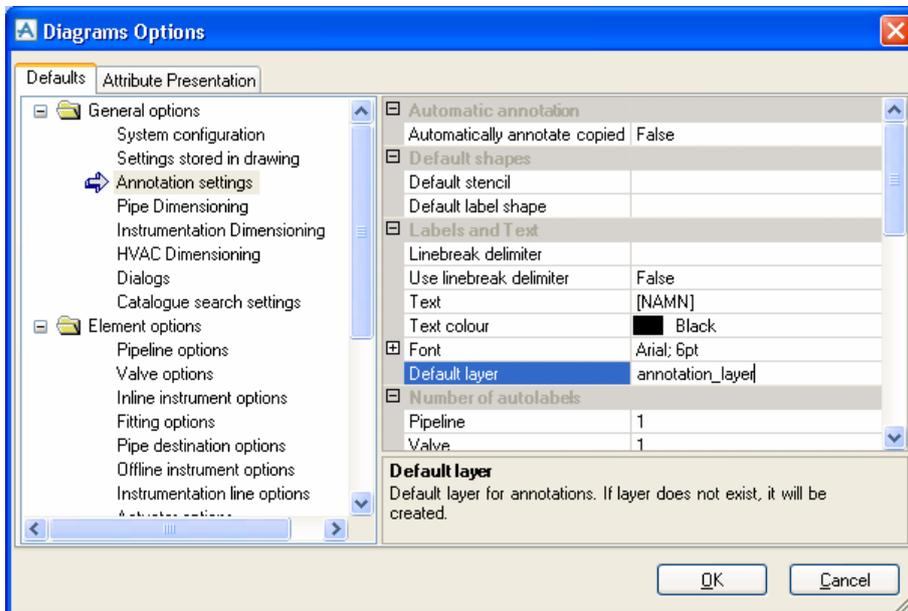
A possibility to set default placement for auto labels has been added. There are two separate options for connector and 2D shapes and the user is able to specify if the label should be placed behind the shape, in front of it or let Visio decide:



If label is set behind shape being annotated (SendToBack), the shape can be selected more easily.

## 20.13 Default Layer for Annotation

The Default layer for annotation shapes can now be set in Diagrams Defaults:

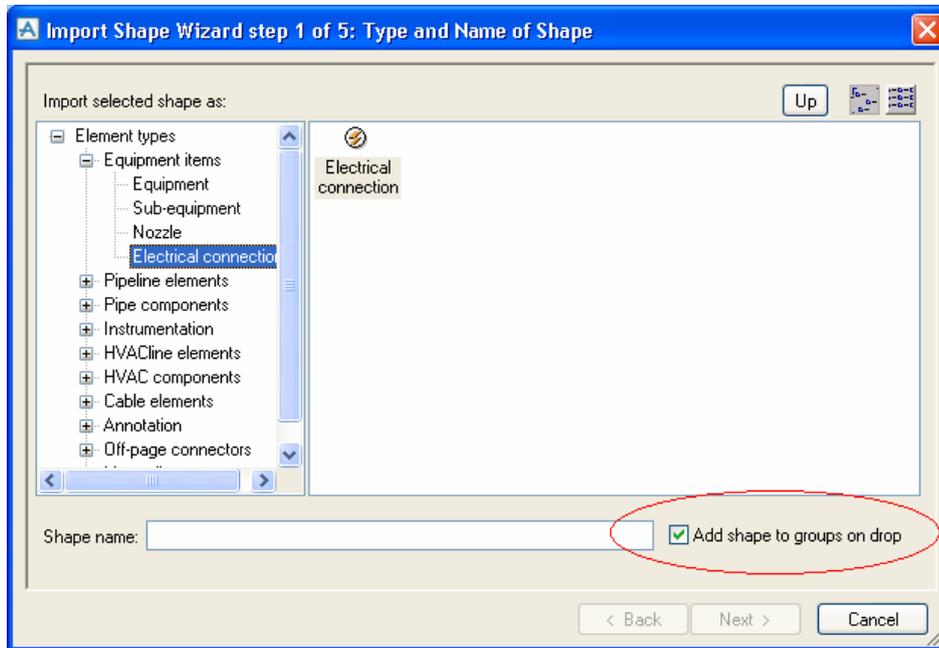


After the annotation shape is dropped on the drawing, it will be automatically added to the layer set in Defaults. If a layer with the given name does not exist, it will be created.

If it is necessary to have separate layers for different annotation types, it is possible to set the Default layer locally (for master of shape) using the Import Shape Wizard.

## 20.14 Import Shape Wizard for Electrical Connections

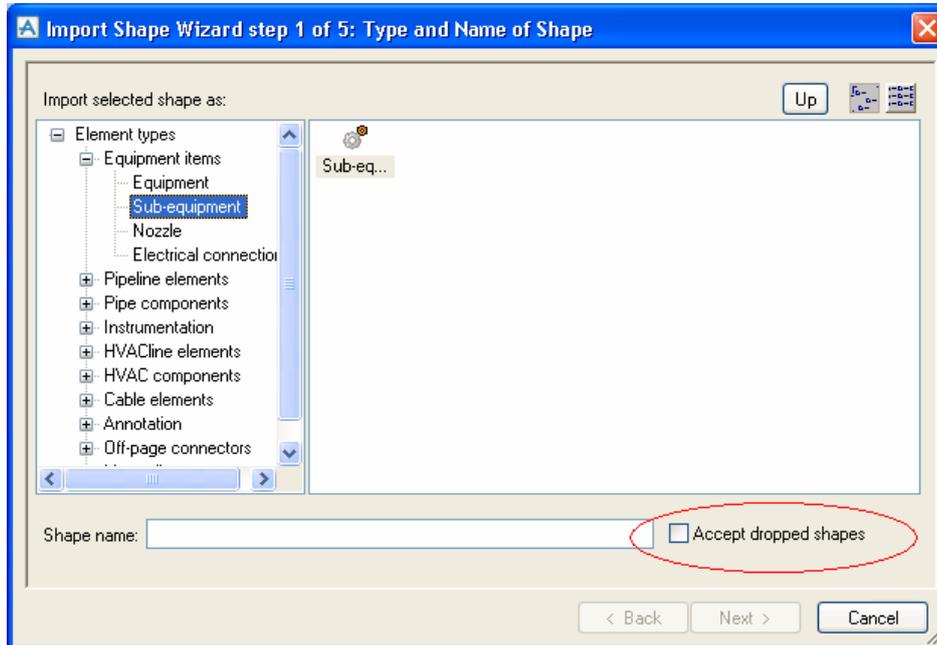
A new option has been added to Import Shape Wizard which controls whether Electrical Connection shape should have 'Add to group on drop' property set to true:



If the user checks this option it allows easier connection to Equipment item as Elconn is included automatically into the group if an Equipment group accepts dropped shapes.

## 20.15 Import Shape Wizard for Equipments

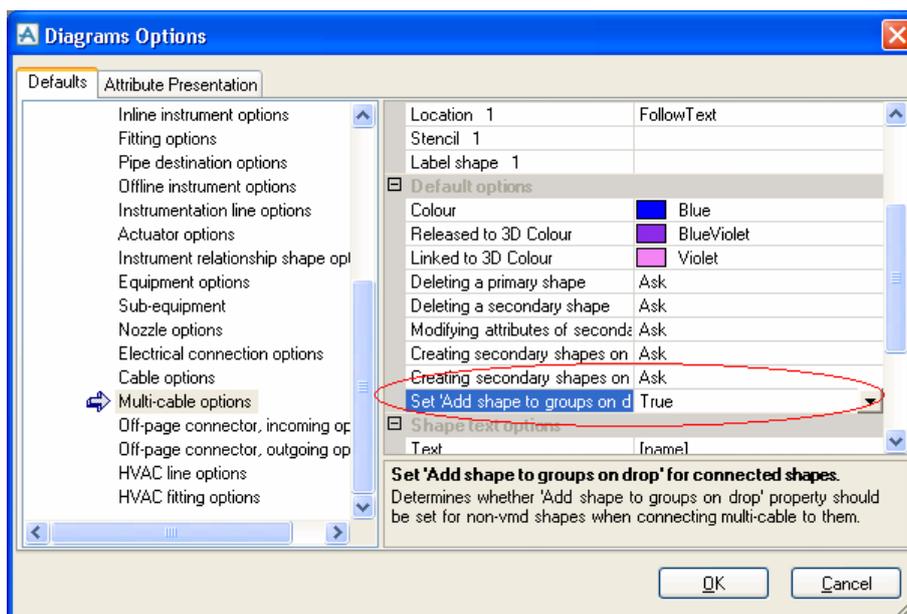
A new option has been added to Import Shape Wizard which control whether Equipment or Sub-equipment shape should have 'Accept dropped shapes' property set to true:



If the user checks this option it allows easier connection to the Equipment item as other shapes are automatically included into its group (if they have 'Add to group on drop' set to true). This functionality also gives better support to 'Cable connection to nested symbol feature' as there is no need to manually change Equipment properties.

## 20.16 Connecting Cables to Plain Symbols

When a Cable element is connected to a 'plain symbol' which is not a part of equipment/sub-equipment group the 'Add to group on drop' property of that symbol could be automatically set to true. It provides better support for the 'cable connection to nested symbol' feature. The behaviour is controlled by default settings possible to set separately for Cables and Multi-cables:



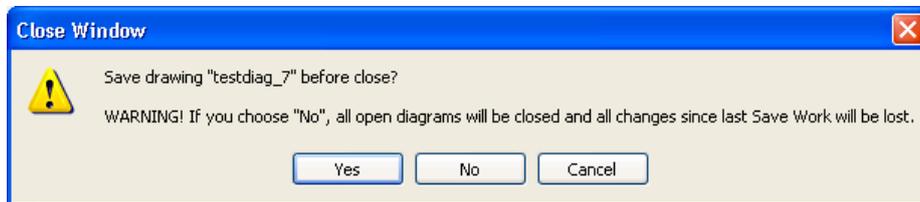
## 20.17 Storing Options Files in Project Defaults Folder

Diagrams options files (DiagramsDefaultSettings.xml and DiagramsAttributePresentation.xml) were previously read from the installation directory and it was not possible to have them project-specific.

This has been changed and now, if there is a need to have project-specific settings, the files could be manually copied by the administrator to `%XXXdflts%/Diagrams/` and the application will use settings from there and ignore files in the installation directory. The `XXXdflts` is an environment variable pointing to the defaults folder for project `XXX`.

## 20.18 Improvements to ‘Quit Work warning’

The warning message displayed when closing diagram with unsaved changes has been improved:



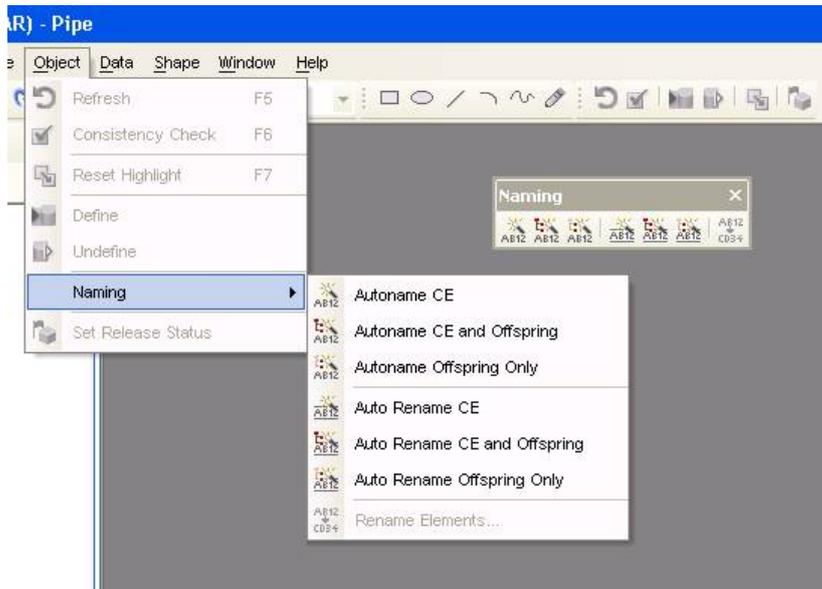
Also other messages containing the phrase ‘Quit Work’ have been changed: “Quit Work starting: ...” and “Quit Work completed” are now replaced by the following:

Message Log						
Message	Shape	Connecti...	DB elem...	Pa...	Time	
Reverting changes completed					14:28:25	
Reverting changes starting: closing all document windows					14:28:25	

## 20.19 Autaname (Auto Rename) Offspring Only

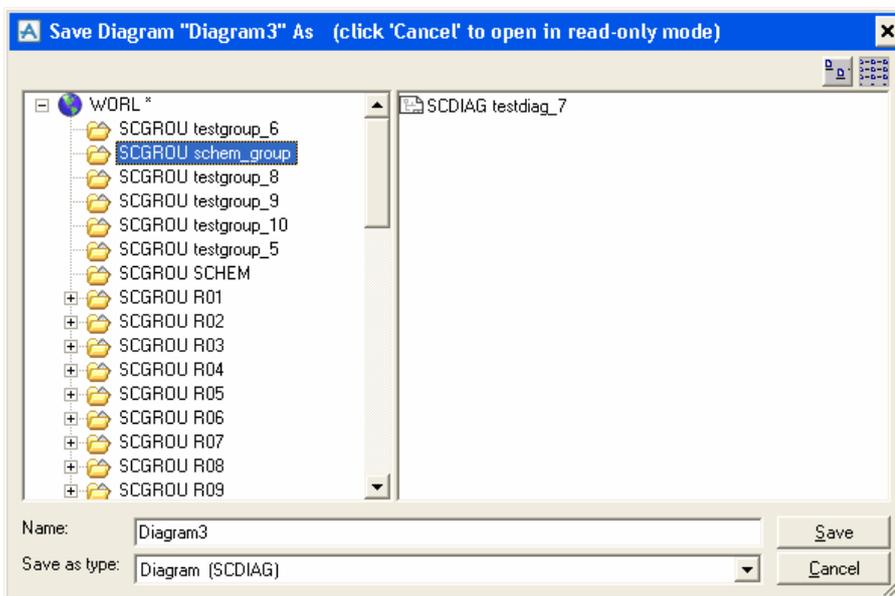
Two additional options were added (toolbar and menu):

- Autaname Offspring Only.
- Auto Rename Offspring Only.



## 20.20 Diagrams Saved to DB After Create / Open

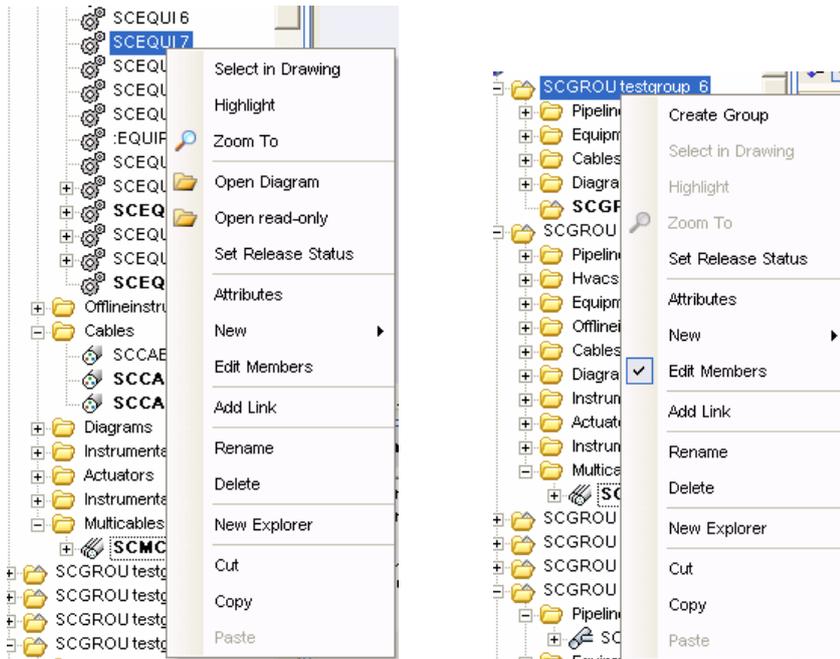
To better support integrity between data on drawing and db representation, changes have been made to 'New drawing' and 'Import drawing' functionality. Now, after a new drawing is created or imported, there is a prompt for name and db location in order to save the document to the database – the standard 'Save as' dialogue is used:



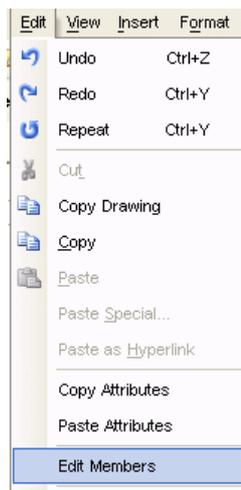
- There is a possibility to import a drawing (or create new one) without saving it to the database (by clicking the **Cancel** button), but then the document is considered read-only and any db-related changes to its content are not allowed.
- The user is informed about such possibility in the title bar of the dialogue.

## 20.21 New and Edit Members Commands in Explorer

The New and Edit Members commands were missing in the Explorer context menu. To solve the problem changes have been made to use the common Schematic Explorer context menu instead of the one defined in Diagrams.uic. Now the missing commands are available and the Schematic Explorer context menu is consistent in all modules. The functionality is displayed as seen below:

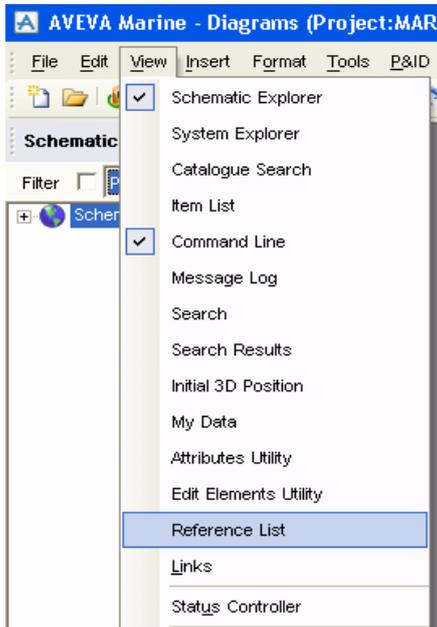


In addition, the Edit Members option has been added to the Edit menu and the duplicated Edit Elements Utility has been removed from the View menu.

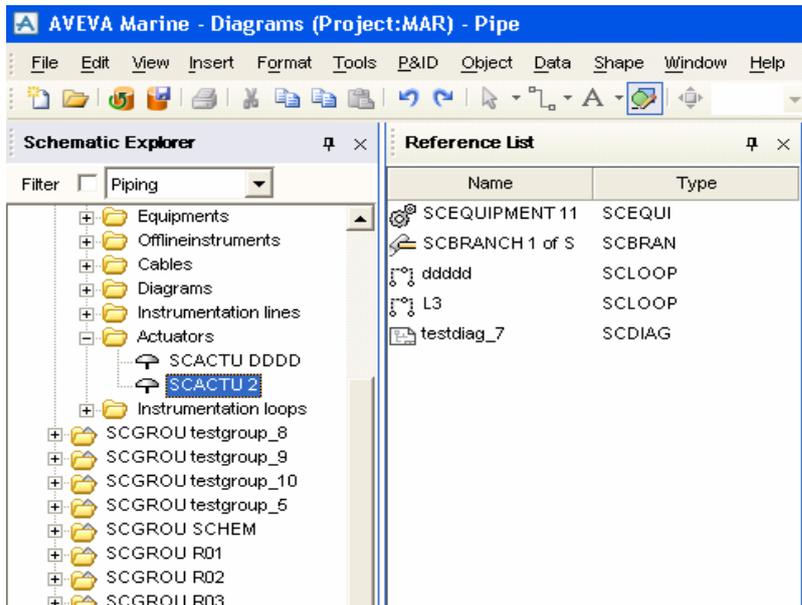


## 20.1 Reference List Addin

A new Reference List feature is now available, accessed through the View menu:



The Reference List window shows a list of elements referenced by the Current Element:



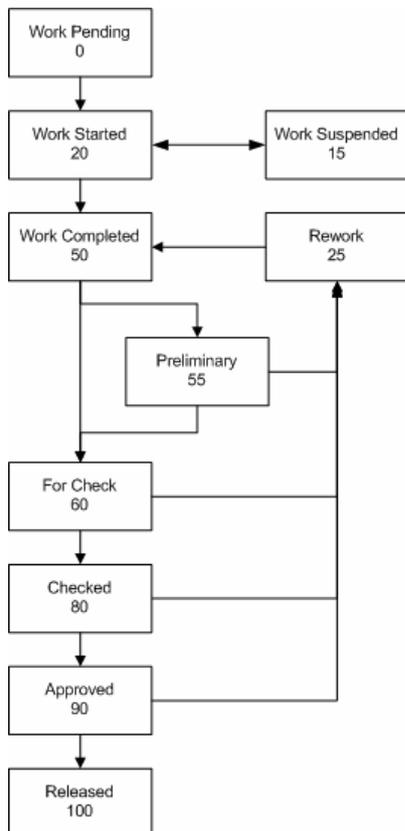
## 21 Status Control

**\*12.0.SP5\***

### 21.1 Description

Status Control provides control of model object status that fits with project processes and systems. It affects most of the PDMS Modules (as well as their Marine equivalents): Design, Spooler, Paragon, Draft, Diagrams, Schematic Model Manager, and Lexicon.

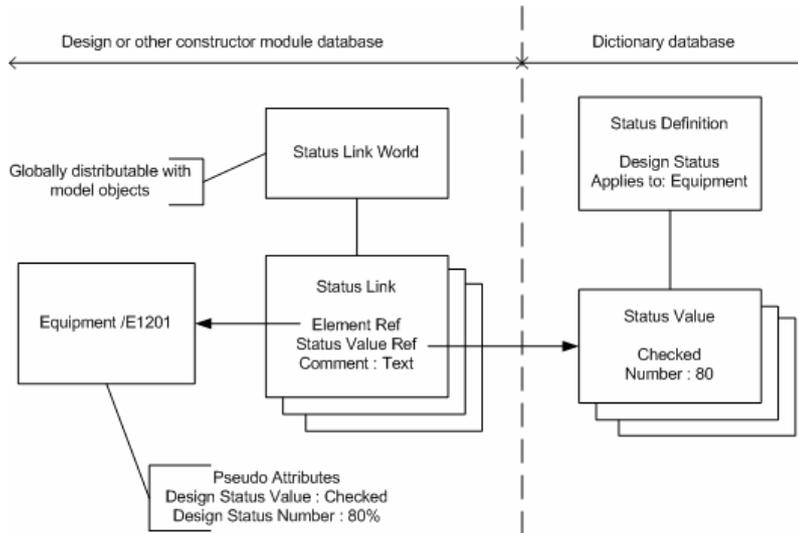
Status Control enables the user to control and report on the status of individual model objects as they progress through their lifecycles. It can be applied to any model objects, e.g. tagged items, catalogue components, drawings, etc. Consider for example the following workflow.



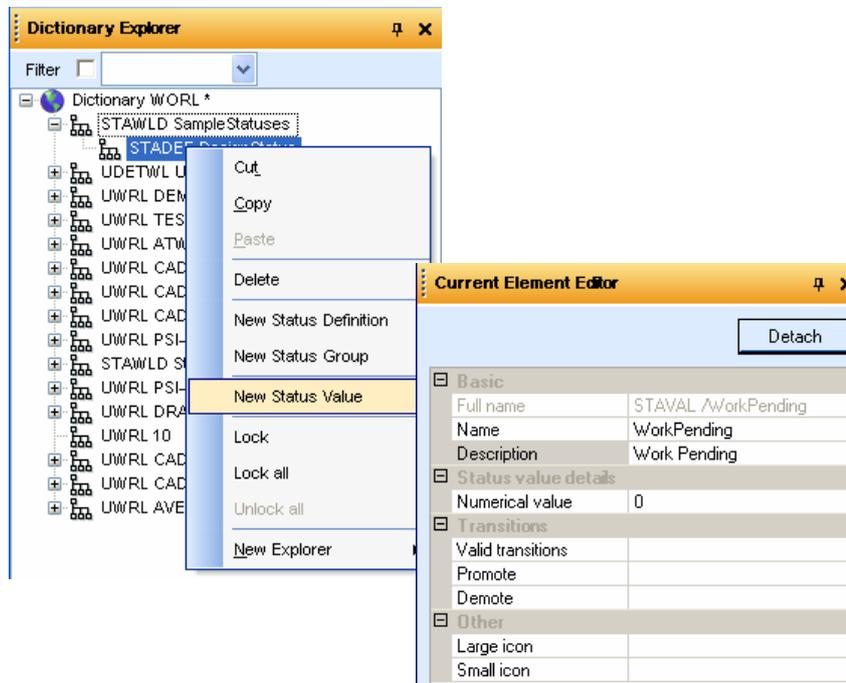
The Status Control data model defines a workflow, such as the example above, as a Status Definition owning a set of Status Values.

## 21.2 Setting up object status

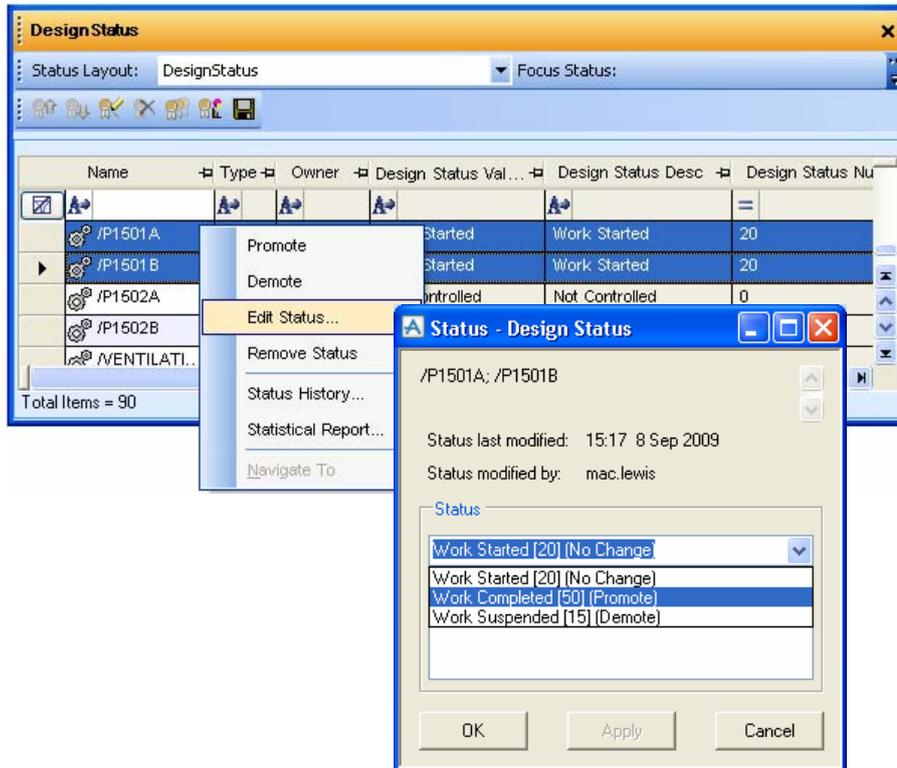
Individual model objects reference the Status Values via Status Link objects, as illustrated below. Status data is stored on Status Link objects so you do not need write access to the model object in order to set its status. Status Link objects are distributed globally with the model objects to which they refer. They are not visible to the end user, but the status data is available as pseudo attributes.



Status Definitions are configured in Lexicon.

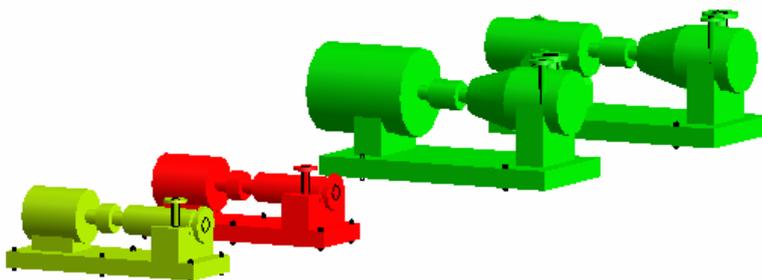


Model objects are controlled in the constructor modules using the Status Controller.

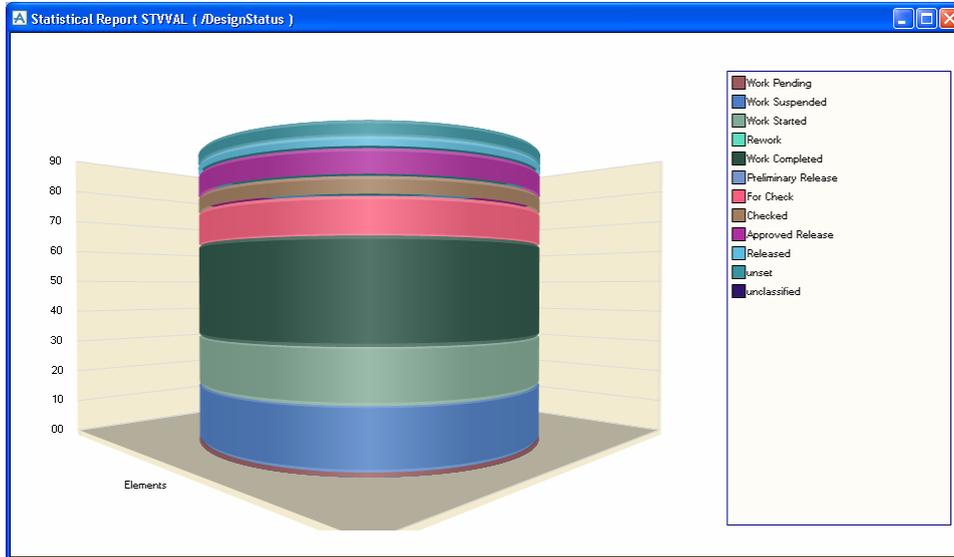


## 21.3 Using status values

From the Status Controller you can display Status History, navigate to a selected object, or drag and drop it into the 3D graphical view. Autocolours can be configured to reflect status values.



You can also display a variety of charts for Statistical Reporting purposes.



Status Control can be tightly coupled with Data Access Control. For example, it can be configured so that only certain users may approve an object, or to prevent changes to an object once it has achieved a particular status.

It should be noted that records of the full Status history depend on the relevant sessions being preserved in the database. Users should therefore be aware that information can be lost if databases are reconfigured or have their sessions merged.

## 21.4 Customisation

Customisation is supported for PML and C# developers with a rich set of objects and methods. Status Events provides a means for projects to add functionality such as additional checks before changing status (and abort the change if necessary), additional actions after a change (such as cascading values to dependent objects), and to synchronise external systems on Savework and Flush of database changes.

## 21.5 Summary

For more information, please refer to the *Status Control Guide*. The documentation suggests an approach to upgrading status data created by AVEVA Model Manager.

## 22 AVEVA Mechanical Equipment Interfaces

### 22.1 Introduction

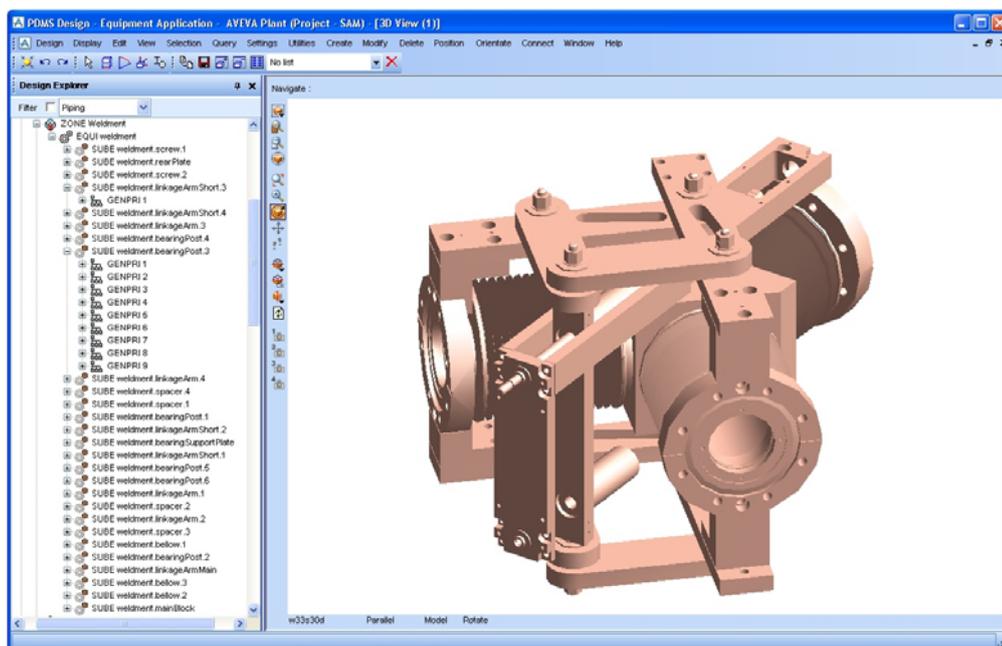
**\*12.0.SP5\***

These new interfaces provide both an import and an export function for PDMS using the STEP Application Protocol (AP) 203 format. Full details are given in the new *AVEVA Mechanical Equipment Interface* manual.

### 22.2 Import

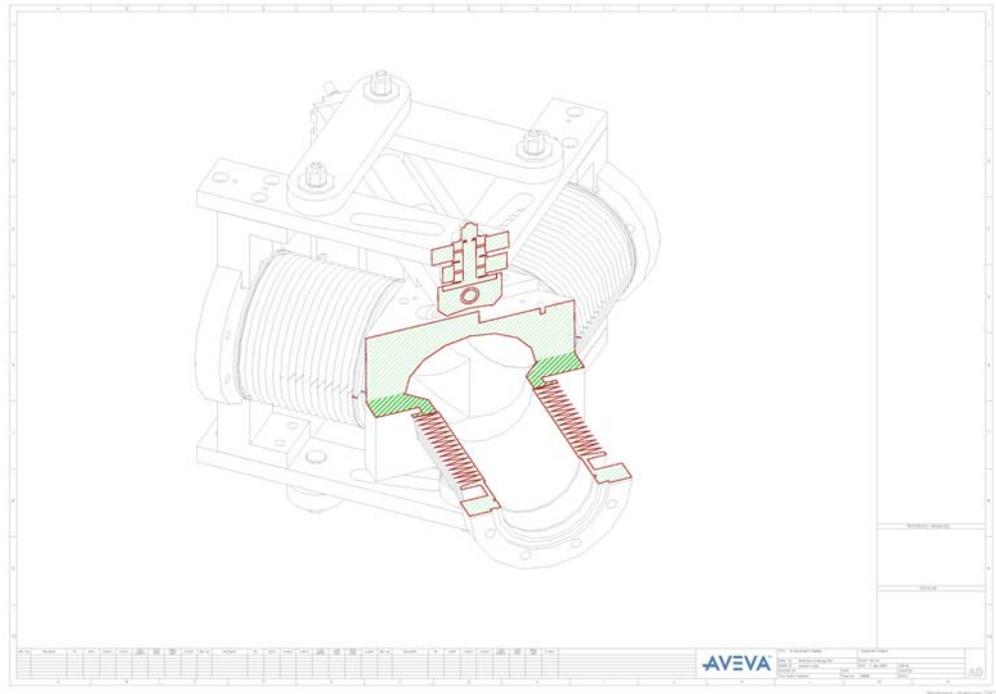
**\*12.0.SP5\***

The new import interface enables the import of geometric models of Mechanical Equipment (to either an EQUI or VOLM element) in order for them to be included in PDMS for accurate clash detection, visualisation and drawing production. Imported models are stored in new GENPRI and GENCUR geometric primitives designed for this purpose; they enable the storage of B-spline solids and curves rather than the simple geometric shapes used by the PDMS CSG modeller.



Although the system has been optimised for the incorporation of these new primitives, it is obvious that the use of very complex models may have a detrimental effect on performance. It is recommended that the models are simplified as much as possible before import so that only the appropriate geometry is transferred. It may be appropriate to use 'skin' operations in the originating system to remove unnecessary internal geometry.

The new primitives may not be edited in PDMS, though their attributes may be set, nor subjected to any Boolean operations such as penetration by holes (negative volumes). The imported models may be drawn in Draft alongside 'native' geometry and behave in a similar manner for sectioning etc. It is of course more appropriate to draw the detailed drawings of these models in the originating system.



The interface currently transfers the geometry but does not maintain a detailed assembly tree or many of the other details such as names and colours in the STEP file. It is possible to import a folder hierarchy to provide some structure in the PDMS model.

Models may be imported to a holding area for organisation, for example by engineering function, and for addition of geometry. This geometry might include connection points for Drafting dimensions and Design Associations; primitives representing reserved space for clash checking; and nozzles for piping connections. The imported primitives may themselves be modified to change name, drawing level and obstruction level attributes to conform to company standards. It is obviously beneficial to arrange for the appropriate (minimum) number of primitives to be used for clash detection and drawing representation at the various drawing levels.

## 22.3 Export

**\*12.0.SP5\***

The new Export interface allows any part of the PDMS model to be exported in STEP AP203 format, perhaps for use by suppliers. It should be noted that much of the non-geometric information will be lost. It is therefore not recommended that users export and re-import, though this will work for the geometry only. Re-imported models will be stored in the new primitives and not as regular PDMS geometry.

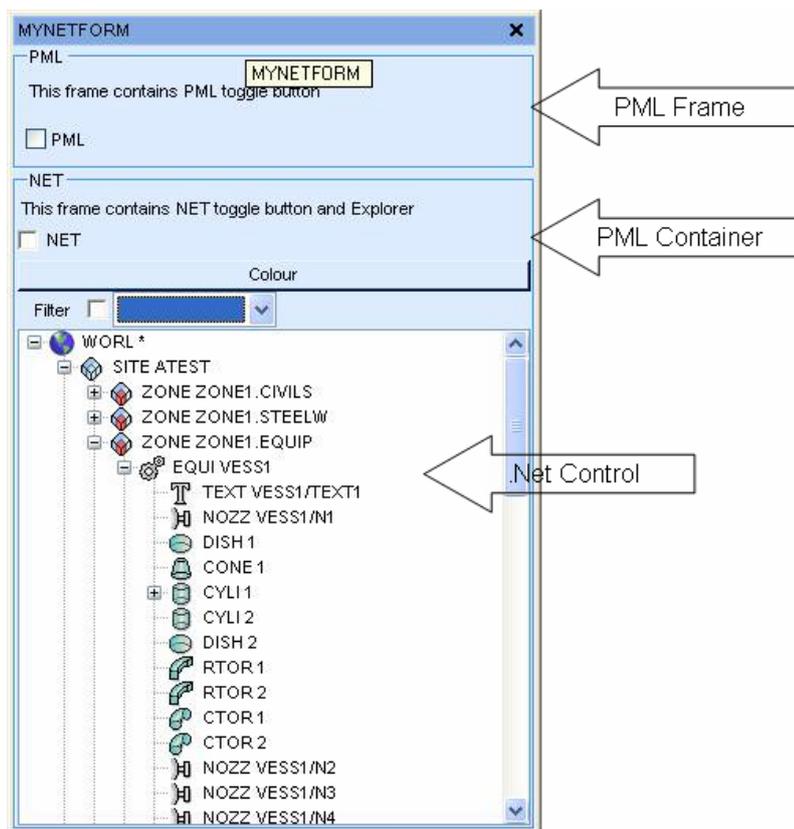
## 23 Customisation

### 23.1 PML.NET

The AVEVA Design Platform now allows the free mixing of compiled .NET assemblies and PML scripts within the same application. PML can call .NET assemblies and .NET can call PML. A specialisation of a .NET User Control can be included within a PML form to provide more advanced GUI features than is possible with PML alone.

This allows use of a mix of technologies for developing new applications that benefit from PML for customisable and extensible user interfaces, and from .NET for a sophisticated user interface, with good performance and security.

The platform uses ‘.NET reflection’ to create a PML class definition and invoke methods so that the .NET object behaves just like any other PML object. The .NET User Control exposes its object model and events to PML, so that a user can add PML scripts to extend or customise the form’s initiation and action.



#### 23.1.1 Note for developers of .NET assemblies

**\*12.0.SP5\***

*This applies mainly to those who have written PML.NET applications for PDMS 12.0.SP3 or earlier releases.*

In order to allow these applications to work through service pack and fix release updates, for PDMS 12.0.SP4 and later, the service pack and patch versions have been removed from all published .NET interface assemblies and PMLNet.dll. For these assemblies, the assembly version will therefore remain at 12.0.0.0 for all versions of 12.0 (the file version will contain the full version number including the service pack and patch).

To avoid rebuilding assemblies which reference 12.0.3.0 or earlier versions of PMLNet.dll this version may be redirected to 12.0.0.0 using the <bindingRedirect> element in the .exe's config file. For example, you could use a *des.exe.config* file such as this:

```
<?xml version="1.0"?>
<configuration>
  <startup>
    <supportedRuntime version="v2.0.50727" />
  </startup>
  <runtime>
    <assemblyBinding xmlns="urn:schemas-microsoft-com:asm.v1">
      <dependentAssembly>
        <assemblyIdentity name="PMLNet"
          publicKeyToken="17c64733a9775004"
          culture="neutral" />
        <bindingRedirect oldVersion="12.0.3.0"
          newVersion="12.0.0.0"/>
      </dependentAssembly>
    </assemblyBinding>
  </runtime>
</configuration>
```

## 23.2 XML Toolbars and Menus

A new way of defining Toolbars and menus in XML simplifies their customisation; the commands may be defined in PML, C++ or C#.

## 23.3 Enhanced pseudo attribute queries

Queries for pseudo attributes may have a qualifier. This qualifier was limited to:

- An integer and a reference for POS/ORI/DIR attributes
- An integer for all other types

The qualifier is now much more flexible, in order to allow for more sophisticated queries.

## 23.4 PML enhancements

### 23.4.1 PDMS expression enhancements

Any number of qualifiers may be passed when querying an attribute. The facility is available only when using the 'attribute' method, which now takes an array of qualifiers in addition to the attribute name.

### Examples:

To query PPOS 1:

```
!q=object array()
!q[1] = 1
q var !!ce.attribute('PPOS', !q)
```

To query list of nominal bores:

```
!q=object array()
!q[1] = 'BORE'
q var !!ce.attribute('NOMBMM', !q)
```

To query Equipment members:

```
!q=object array()
!q[1] = object elementtype('EQUI')
q var !!ce.attribute('MEMBER', !q)
```

The qualifiers may be any of the following types:

- Real
- Logical
- String
- DBREF
- ElementType
- Attribute
- Position
- Direction
- Orientation

The new qualifiers may be used instead of existing mechanisms for entering qualifiers, though the existing mechanisms will continue to work.

### 23.4.2 Generic qualifiers

Generic qualifiers are now handled in the expression library. They go in brackets and are comma separated, for example:

```
MYATT(1, /VESS1 , 99, ATTID XLEN, N 100 E 50, true)
```

The qualifier may be one of the following:

- Any expression resulting in a string, real, logical, element, pos, dir, ori
- ATTID keyword followed by attribute name
- TYPEID keyword followed by element type

### Notes:

1) The ATTID, TYPEID keyword is needed to differentiate between passing an attribute or element type name rather than passing the result of a query. For example:

- (a) MYATT(DESC)
- (b) MYATT( ATTID DESC)

(a) would give a string qualifier containing the value of DESC. E.g. 'My description'

(b) would give an attribute qualifier denoting the 'Description attribute'.

2) There is a slight change in the query functionality. Previously 'Q MEMBER (BOX)' would be treated as 'Q LEN' followed by 'Q (BOX)'. Now it will be treated as a query of MEMBER with qualifier of BOX. In the unlikely event that this causes a problem, the workaround is to change the query to be:

```
Q (MEMBER) (BOX)
```

As with the PML changes, the existing qualifier syntax will still work.

## Examples

To query Equipment members:

```
q MEMBER (TYPENAME EQUI)
```

To query when description was last modified:

```
q LASTMOD (ATTNAME DESC)
```

To query PPOS 1:

```
q PPOS (1)
```

To query list of nominal bores:

```
q NOMBMM ('BORE')
```

### 23.4.3 IFTRUE

A new construct has been added to the <expre> syntax:

```
IFT/RUE ( logical1, typeX1, typeX2 ) -> typeX
```

where typeX1 and typeX2 are two arguments of the same type, which may be Logical, Logical Array, Real, Real Array, ID, ID Array, Text, Position, Direction or Orientation.

The result is the value of the typeX1 expression if logical1 expression is true, otherwise it is the value of typeX2.

## 23.5 General PML enhancements

This section summarises changes, removals and enhancements, which are detailed in the *Software Customisation User Guide* and the *Software Customisation Reference Manual*.

### 23.5.1 File Browser

The **PMLFileBrowser** class provides a PML.NET wrapper onto the standard WinForms open/save file dialog to enable it to be called from PML.

For example,

```
Import 'pmlfilebrowser'
Using namespace 'Aveva.Pdms.Presentation'
!f=object pmlfilebrowser('OPEN')
```

```
!f.show('C:\temp', 'xxx', 'save my file', false, 'txt files
(*.txt)|*.txt|exe files (*.exe)|*.exe', 2)
```

```
q var !f.file()
```

Note that the File() method returns an empty string if the dialog is cancelled.

## 23.5.2 List gadget enhancements

Single column and multi-column List gadgets now appear the same, and the number of columns is deduced from the user specified headings or list display text. Interactive behavioural differences between them have been removed. The COLUMN keyword is now redundant. The ZEROSEL keyword now implies a single choice list.

Single choice Lists:

- De-selection of the current field is now supported for Lists with the ZeroSelection option.
- UNSELECT events are now available for all list types in Open callbacks.
- Re-selection of the selected field is now an optional attribute.
- Deletion of fields now supported.

## 23.5.3 Option gadget enhancements

- General Changes
- ZeroSelection property is now valid for Option gadgets (as for Lists).
- Interactive de-selection is not supported.
- UNSELECT events are now available in Open callbacks.
- Re-selection of the selected field is now an optional attribute
- Deletion of fields now supported.
- Popup (context) menus now supported

## 23.5.4 New ComboBox

There is a new gadget ComboBox. This is a combination of an option list and an editable text field (similar to a Windows ComboBox). This allows interactive addition of new items to the list and enhanced location options for long lists.

## 23.5.5 Frame gadget enhancements

### Frame type 'Panel'

This allows the definition of a rectangular panel within a form which can contain any PML gadgets. The panel has the following properties:

- By default, it has no visible enclosing box, though it may optionally be given an indented appearance.
- It has no displayed tag text.

- It supports the standard frame gadget notion of a radio button group.

## Frame type 'FoldUpPanel'

This is a rectangular panel with a visible title bar, and border. It offers the ability to show and hide the contained gadget's when the title bar is picked. It can contain any PML gadgets except another Fold Up Panel.

There are some restrictions as to how and where this can be used, as the expanding and collapsing has a positional affect on gadgets not contained within the panel.

## New Tabbed Page Frame attributes

New Visible property allows a tabbed page to be selected and given focus.

When a tabbed page frame's tab is interactively selected, there is now a HIDDEN event raised for the currently shown page, followed by a SHOWN event for the newly selected page.

## 23.5.6 Alpha view gadget enhancements

The Alpha view gadget has been enhanced to allow multi-line copy and paste.

## 23.5.7 Button gadget enhancements

The Button gadget has an additional Link Label sub-type, which provides a purely textual button presentation, used to indicate a link to some application item, e.g. a hyperlink to a file, a link to an associated form etc.

## 23.5.8 New separator Line gadget

This gadget gives the ability to display a horizontal or vertical separator line to improve the layout of gadgets on a form. It does not apply to toolbars.

## 23.5.9 New Numeric Input gadget

The NumericInput gadget allows numeric input within a specified range, with given granularity.

## 23.5.10 New Container gadget

The new Container gadget allows the hosting of a PMLNET control inside a PML defined form. The Container supports the usual size, dock and anchor attributes to allow intelligent resize behaviour. It allows the user to add an external .Net control, which may raise events that can be handled by PML. In order to customise the context menus of the .NET control, the Container may have a PML popup menu assigned to it. This is shown when the .NET control raises a 'popup' event.

See the PMLNET user documentation for details of creating PMLNET controls.

## 23.5.11 Miscellaneous Gadget changes

1. Extend Method AddPixmap(...) for Button and Toggle gadgets to allow pixmaps to be changed after the gadget is displayed.
2. Add new method SubType() to Form and Gadget objects.

3. Add new method Container() to Gadget objects.
4. RToggle UNSELECT event only raised for open callbacks.
5. Add new TEXT gadget member Editable.

### 23.5.12 Form changes

The following FORM enhancements have been added:

1. New attribute AutoScroll
2. New events FirstShown and Killing
3. New method SetOpacity to control form transparency

### 23.5.13 Forms & Menus (FMSYS object) enhancements

Further details and examples are available in the *Software Customisation* documentation.

#### Progress Bar

The application main window now has an inbuilt progress indicator in the status bar along its base. This can be accessed from PML via methods on the FMSYS object.

Method Name	Result	Purpose
Progress( )	real	Get the current Integer value in percent shown by the progress bar, in the range 0 to 100. Zero means the bars is invisible.
SetProgress( !percent )	no result	Set the Integer value in percent to be displayed in the progress bar. Values will be forced into the range 0 to 100. Resultant value of 0 will cause the bar to become invisible.

The progress bar can be used in conjunction with the FMSYS object's INTERRUPT methods.

#### Cursor Function Support

New methods are available to improve cursor function handling. The system now prevents a cursor function from being executed if there are no appropriate graphical views displayed; it raises the usual 'quit' error (61, 528): 'User exit from submode' so that this can be handled, and then raises error (61, 115): 'Invalid command when GRAPHICS OFF or no suitable view available', which will alert the user unless trapped.

Only the application knows exactly which graphical views can handle the specific cursor command, so the OKCurfnView methods are available to allow it to use this knowledge intelligently.

Method Name	Result	Purpose
OKCurfnView( !viewtype is STRING )	boolean	Queries whether graphical views of the specified view type are displayed. Graphical view types supported are: 'G2D'; 'G3D'; 'ANY' and any view subtype is implied.
OKCurfnView( !viewtype is STRING, subtype is STRING )	boolean	Queries whether graphical views of the specified view type and subtype are displayed. Graphical view types supported are: 'G2D'; 'G3D'; 'ANY'. View subtypes supported are: 'ANY' and for G2D: 'NORMAL' (Draft); 'PLOT'; 'ISOSPOOL' G3D: 'NORMAL' (Design)

### 23.5.14 String handling

#### New method on STRING object: SplitString(STRING delim)

Result: ARRAY

Purpose: An alternative to Split(STRING delim), taking the full contents of the delim string as the separator, and not only its first character.

NOTE: Currently, the methods Split(STRING delim) and SplitString(STRING delim) differ only in the way they handle multi-character delimiters. The customer is advised to review his PML code for any occurrences of the method Split(STRING delim) that use a multi-character delimiter as an argument. Any code similar to:

```
!string.split(!delimiter)
```

where !delimiter could be a multi-character string, should be replaced either by the explicit code:

```
!string.split(!delimiter.substring(1,1))
```

if the intention was to use only the first character of the delimiter as the separator, or by:

```
!string.splitString(!delimiter)
```

if the intention was to use the full multi-character delimiter. Note that in the latter case, the original code was not performing the proper splitting, as the full length of the delimiter was not being taken into account.

In future releases, these two functions may be merged into one, providing the functionality of the new splitString(STRING delim) method.

#### New method on ARRAY object: Join(STRING delim)

Name: Join(STRING delim)

Result: STRING

Purpose: Concatenates the elements of the array, using delim as the delimiter. Non-string or unset array elements are skipped.

## 23.6 PML support for Secure Login

**\*12.0.SP5\***

Additional PML support has been introduced in all modules. A new object, PMLSECURELOGIN, controls the encrypted command script generation functionality. This object is used in the new Admin Command Script Generate form. The methods on this object are:

```
<PMLSECURELOGIN> PMLSECURELOGIN
  ASSIGN(PMLSECURELOGIN)
  EMBEDMACRO(BOOLEAN)
  HASLICENCETOEMBEDMACRO( )
  MACRO(STRING)
  MDB(STRING)
  PASSWORD(STRING)
  PMLSECURELOGIN( )
  PROJECT(STRING)
  SAVETOFILE(STRING)
  USER(STRING)
  VALID( )
  VERIFYAFTER(DATETIME)
  VERIFYBEFORE(DATETIME)
  VERIFYHOSTNAMES(ARRAY)
  VERIFYWINUSERS(ARRAY)
```

In addition the “environmental” conditions applied to generated command scripts make use of a new PML object, VERIFY. This object can also be used directly to verify that the executing user is on a list of approved users and is running on an approved host computer, and is running within a given time period. If the condition is not met the command script terminates immediately with a “Verification error”. The methods on this object are:

```
<VERIFY> VERIFY
  AFTER(DATETIME)
  ASSIGN(VERIFY)
  BEFORE(DATETIME)
  HOSTNAME(STRING)
  HOSTNAME(ARRAY)
  VALID( )
  VERIFY( )
  VERIFY(BOOLEAN)
  WINUSER(STRING)
  WINUSER(ARRAY)
```

A further PML addition allows the Appware developer to test whether a password entered is correct for the current user. This is provided by a new method on the existing SESSION object, ConfirmID(). This method 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 current user. The method is only valid for the current session object. Example:

```
!s = CURRENT SESSION( )
if !s.ConfirmID( |/SESAME| ) then $*...
```

## 23.7 Incompatible PML changes

Great effort has been made to maintain upwards compatibility between the current and previous versions, while introducing major changes. The following are known potentially non-upwards compatible changes, most of which were advised in the PDMS 11.6 Bulletin.

### 23.7.1 Toolbar based Option gadget field reselection

Reselection of the selected field of an Option gadget on a toolbar no longer constitutes a change of value. This provides better conformance with Windows style GUI; the expectation is that there has been no selection change, so no action should result.

The effect is that the gadget's SELECT callback will not be run.

Possible workarounds:

- Add a do-it button to achieve the reselection callback.
- Make use of the new ZeroSelection property of Option gadgets.

### 23.7.2 Single choice list gadget reselection behaviour

See List gadget enhancements

### 23.7.3 Old RADIOgroup gadget removed

The old RADIOgroup gadget has been removed from the core code and from all AVEVA Appware. Users will need to replace any RADIO gadgets in their own Appware by use of the Frame gadget with its radio group behaviour.

### 23.7.4 Removal of Save and Restore using .bin files

This has become unsafe because many system PML objects are core-code based rather than pure PML and these cannot be saved and restored by the PML binary-dump. Increasingly, Form, Menu and Gadget objects hold instances of such PML objects and so also cannot be restored correctly.

PDMS11.6 introduced layout preservation, which ensures that a session starts up with the same forms and layout that were present at the end of the last session. The content on graphical views could be saved and restored manually using .disp files.

User syntax to save and restore using .bin and .disp files has been removed. New mechanisms to automatically save the contents of graphical view gadgets at session close and to allow users to (optionally) restore them at start up will be provided.

#### 2.2 Form layout changes

##### 2.2.1 Frame gadget size must follow position setting

The syntax for defining a Frame gadget has been modified to make it consistent with all other gadgets and to prepare for enhancement of gadget size setting to the extent positions of other gadgets. Setting

the frame's position (AT syntax) must now precede the setting of width or height. Setting the frame's size before the position will now generate a syntax error.

### 23.7.5 Cursor Functions use in Docking Dialogs

Cursor functions such as ID@ are no longer supported for graphical view gadgets in Docking Dialog forms, although this change was not announced in advance. AVEVA applications made little use of them and have been revised as necessary. Users with their own customised applications may also need to make adjustments – see below.

There have been some serious difficulties in maintaining the older demand driven input facilities in what is now an event driven environment. In particular, it is tricky to control the use of other functions while cursor functions are in use, without causing performance issues. Docking dialogs are an up-to-date feature in PDMS and the use of archaic demand driven inputs is inappropriate to the new look and feel of the interface.

Cursor functions continue to be supported at PDMS12.0 for document forms and simple dialog forms, so users' applications can easily be amended to use these at PDMS 12.0. However, we intend to replace them with better event-driven graphical interaction mechanism in future releases – see section 2.9.3.

Possible workarounds (both are simple one line changes):

- Convert the form type docking dialog to a document in the 'setup form' command. The resulting document form appears as an MDI child form in the client area of the main window. The child forms' layout and accessibility are then managed via the Window pull-down menu on the main menu bar, just like the main PDMS graphical views. These child forms can be floated outside of the client region.
- Convert the form type docking dialog to a (simple) dialog in the 'setup form' command. These forms exist independently of the main window.

In both cases, the form can be placed on alternate screens in a multi screen configuration.

### 23.7.6 Opsystem Function

**\*12.0.SP5\***

This function was used to distinguish between UNIX and Windows, so it is no longer required and has been removed. Any references to it should also be removed. A consequence is that a global variable !!NT, which it used to set, will no longer be available. If this is used in custom PML applications, it should also be removed, or alternatively it can be set to TRUE.

## 24 Updates to standard projects

### 24.1 PDMS Test Projects

The table below lists the test projects supplied with PDMS 12.0, and shows where to find the test data.

Project	Description	MDB
SAM	Sample project – Metric units	Sample
IMP	Sample project – English / Imperial units	Sample
MAS	Master project including Catalogue	

Note: In future releases it is intended to withdraw the IMP project and customers wishing to use sample data in imperial mode should work in the MDB /IMPSAMPLE within SAM.

These projects can be accessed using the standard system username and password:

SYSTEM/XXXXXX

### 24.2 Project Updates for 12.0

All the test projects have been extensively updated for PDMS 12.0.

## 25 Product Faults & User Requests

### 25.1 Known faults & Outstanding Issues

#### 25.1.1 Warnings

##### RECREATE command

*Warning for customers using both AVEVA Plant and AVEVA Marine:*

A Plant project XYZ should not have the environment variable XYZMAR set, as this is required only for Marine projects. An attempt to recreate a Plant project while the variable is set will result in failure with messages similar to:

```

replicate XYZ
The correct d065 file was not found in the replicated project directory.
(1,702) Error preparing directory structure for the replicated project.
In line 3 of Command/Form Input
    
```

#### 25.1.2 Faults & limitations – future corrections

**\*12.0.sp5\***

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 possible, by the time of the next service pack.

<i>Defect Reference</i>	<i>Incident Reference</i>	<i>Description</i>	<i>Workaround</i>
		Difficulties may be encountered exchanging data with Excel using Windows locales that use the comma (,) as decimal separator	<i>Change the Region to English (UK) or other using dot (.) separator</i>
P-4232		Using 'Paste as macro' in the PDMS command window currently works only with ASCII text – not all character sets. This should be resolved at PDMS 12.1.	<i>The context menu item 'Paste', rather than 'Paste as macro', works correctly.</i>
P-4233		The PML Add-in mechanism works only with ASCII text – not all character sets.	
P-26438	SI-18173	The SAM sample project has incorrect Cable-tray Property data for variable length straights, leading to incorrect weight & centre-of-gravity.	<i>AVEVA can supply a correction macro on request. This creates new CMPD elements in place of TUBDs for variable length straights; a formula multiplies the length by the CWEI used. It also updates the CMPREFs for the GPARTs and SPCOs and deletes the old TUBDs.</i>

### 25.1.3 Global – known limitation

<i>Reference</i>	<i>Description</i>	<i>Workaround</i>
P-11751 KB 737	Global update crashes with Dabacon 578 when session history in the secondary database is incompatible with that in the primary database.	This may happen when importing from other projects or restoring old versions of a database from backup.

### 25.1.4 DICE reports errors in some upgraded projects

**\*12.0.sp5\***

Reports by DICE (Database Integrity Checker) utility in PDMS 12 report more issues than earlier versions of PDMS. It is therefore possible that PDMS projects which were DICE “clean” may, after the upgrade to PDMS 12, report errors.

This is likely to be the case where projects have been upgraded from 11.2 or 11.3 when elements that have attributes CATREF, LSTU, SPREF did not exist in database tables as they do today.

These errors will be of the format:

Entry missing from Dabacon table CATR. Element =8196/8420 has reference to element =8223/38681 which is not recorded in the table.

Please use patch option or reconfigure this DB to resolve the problem

The patch option does not in fact resolve the issue and users should reconfigure the database(s) using the SAMEREF option. For example, for a database MASTER/DESI

```
FROM DB MASTER/DESI
TO FILES /REC1 /REC2
RCFCOPY ALL
RECON
BACKTRACK MASTER/DESI TO SESSION 2
FROM FILES /REC1 /REC2
TO DB MASTER/DESI
RECON SAMEREF
```

Projects created using PDMS 11.4, 11.5 and 11.6 should be unaffected.

At the time of writing, there is no intention to modify the PDMS upgrade process described in section 2.5 of this User bulletin.

### 25.1.5 Isometric ADP (Automatic Drawing Production)

**\*12.0.sp5\***

The Isometric Automatic Drawing Production add-on application is being upgraded for version 12.1. Existing users who need to use it at version 12.0 might like to consider modifying the 11.6 version. The upgrade is fairly simple, but has some limitations;

1. Because of the change in the handling of colour at Draft 12.0, all colours used within the application revert to grey. If you wish to recover the original colours, you have to reset all necessary drawing templates, backing sheets, representation styles and label templates used by the application.
2. The application will not handle any new HVAC components, either those supplied as standard since PDMS 11.2 or those created using the HVAC user-defined mechanism.
3. The application will not handle spaces in file names.

4. There may be some conflicts if you are using user-defined element types (UDET) that are based on the HVAC group of element types.
5. AVEVA Marine grid and location systems will not function correctly.
6. You cannot print using the application print options, but must instead use the print mechanism supplied with PDMS 12.

Detailed instructions are available on request.

## 25.2 Corrections & minor enhancements **\*12.0.sp2\***

A large number of improvements have been made in response to user feedback: the table below lists the significant defects corrected in PDMS 12.0 – up to service pack 2. Some have also been corrected in later releases of 11.6 or 11.5.

<i>Internal ref.</i>	<i>Remedy ref.</i>	<i>Reported in</i>	<i>Fixed in</i>	<i>Description</i>
2031		DRAFT 11.5	12.0	Removed duplicate polygons from design views. Particularly noticeable to users who export to DXF or DGN files.
6961	HPD 19570	DESIGN 11.5	12.0	During equipment creation the positioning control form is used to position the equipment. If the Explicit Position form is shown but a graphical pick used, the positioning control form disappears but the explicit position forms remains, greyed out.
7092	HPD 27531	ADMIN 11.4.SP2	12.0	Attempting to reconfigure a properties database could cause an error message: (24,19) Copy List full - Maximum number 300. This was due to the maximum number of root elements allowed being 300
7104	HPD 19506	11.5	12.0	User-defined HVAC joints now available
7368		11.6.SP1	12.0	GENSEC limits box improved – gives improved view behaviour
9101	HPD 31731	DESIGN 11.6.SP2	12.0	Result from these two lines in a macro comes up in the wrong order: !!CDCMEMBER.show() !Answer = !!Alert.Confirm ("")
9347	HPD 32217	DESIGN 11.6.SP2	12.0	Error message when measuring distances from insulation graphics of bend or elbow - causes crash
9838	HPD 33779	PARAGON 11.6.SP3	12.0	When you display a component, KILL the relevant window and bring it back up again, you cannot see any component or the AXES
9951	HPD 33961	DESIGN 11.6.SP3	12.0	Measure Error when using Graphics Snap on Panels
10082	HPD 34048	DRAFT 11.6.SP3	12.0	Rectangular opening on a wall modelled as a fitting has p-points defined but only a negative geometry set. I cannot pick any of the p-points to measure or dimension in DRAFT. The opening can be highlighted, but the p-points do not display, either with holes on or off. The p-points do appear in DESIGN.

<i>Internal ref.</i>	<i>Remedy ref.</i>	<i>Reported in</i>	<i>Fixed in</i>	<i>Description</i>
10150	HPD 34216	DESIGN 11.5.SP2	12.0	EXTRACT FLUSH RESET can no longer be used on an Extract Master - it is meaningless and caused PDMS to crash
10252	HPD 34398	DESIGN 11.6.SP3	12.0	Corrected an error the convertdbar object
10268	HPD 34492	DESIGN 11.6.SP3	12.0	Attempting to modify the justification line or joint line of a Gensec with the appware Modify>Sections>Justification... or Joint Line no longer gives a Syntax error.
10277	HPD 34552	PARAGON 11.6.SP3	12.0	Improved accuracy in calculator
10279	HPD 34522	DESIGN 11.6.SP3	12.0	Pull down colour form stopped working.
10334	HPD 34448	DESIGN 11.6.SP3	12.0	Feature points are now shown on pipe components if insulation is switched on
10354	HPD 34803	DESIGN 11.6.SP4	12.0	Penetration did not re-orientate to suit re-oriented panel when using the Orientate>Align with ref. option from the Penetration application menu. An error message 'Unable to orientate to reference item' is displayed
10518	HPD 35068	11.6.SP4	12.0	Bolt weights in VPRM did not transfer to PDMS for display on the isometric. Fixed in GATEWAY 5.1.0.1
11607	HPD 36222	ADMIN 11.6.SP4	12.0	No longer crashes when Expunging a User Process.
9946	HPD 33950	SPOOLER 11.5.SP2	12.0, 11.5.SP2	Field weld was not created following a lug.
10422	HPD 34927	ISODRAFT 11.5.SP2	12.0, 11.5.SP2	Overall dimension on isometric was wrong, possibly because of the fact that the flange is dotted.
10301	HPD 34637	ISODRAFT 11.5.SP2	12.0, 11.5.SP2	Incorrect dimensions.
10151	HPD 34219	ISODRAFT 11.5.SP2	12.0, 11.5.SP2	Overall dimension is missing on isometric.
10131	HPD 34169	ISODRAFT 11.5.SP2	12.0, 11.5.SP2	Weld number was incorrectly shown in middle of pipe, where there wasn't any weld.
9958	HPD 33981	ISODRAFT 11.5.SP2	12.0, 11.5.SP2	Wrong dimension on isometric, where the flange on the left of the dimension has attribute MTOC equal to DOTU.
10047	HPD 34062	11.5.SP2	12.0, 11.5.SP2	Extra checks are now included in Undo Failed Flush (removes Dabacon error 516 session page not found).
9975	HPD 33984	ISODRAFT 11.5.SP2	12.0,11.5. SP2	Continuation notes are no longer wrongly positioned on OLETS.
7121	HPD 26805	ISODRAFT 11.5.SP1	12.0,11.5. SP2	Split ATTA no longer causes wrong dimensions – these were caused by a Flow arrow before hanger with composite dimension on
2879	HPD 16305	DICE 11.5.SP1	12.0 11.6.SP2 11.5.SP1	Spurious errors no longer shown in large Dabacon tables Error in level 2 INDEX table, session no. 332, page no. 186243 - incorrect value of first key on lower level page no. 186423 (extract 1)
9095	HPD 31744	11.5.SP1	12.0 11.6.SP3 11.5.SP1	Corrected a name clash when flushing.

<i>Internal ref.</i>	<i>Remedy ref.</i>	<i>Reported in</i>	<i>Fixed in</i>	<i>Description</i>
9091	HPD 31711	ISODRAFT 11.5.SP1	12.0 11.6.SP3 11.6.SP2	Corrected dimensional error on isometric under certain cases.
8790	HPD 31125	ADMIN 11.5.SP1	12.0 11.6.SP2 11.5.SP1	Reconfigurer was crashing with kerror 41
7089	HPD 27267	ADMIN 11.5.SP1	12.0 11.6.SP2 11.5.SP1	Database growth during ISSUING or FLUSHING has been corrected.
7141	HPD 28795	ADMIN 11.5.SP1	12.0 11.6.SP1 11.5.SP1 11.4.SP2	Extract info no longer lost on Merge changes.
7076		DESIGN 11.6.SP1	12.0 11.6.SP4	Settings > Defaults > Main option gave error due to missing DES-SUPP-DFLT5 file
6776	HPD 30600	ISODRAFT 11.4.SP1	12.0 11.6.SP4	Incorrect tube weights were given in the material list. The new weights & Centre of Gravity feature resolves this.
3342	HPD 16691	DESIGN 11.5.SP1	12.0 11.6.SP4	Hangers & Supports problems with Imperial units
3356		DESIGN 11.6	12.0 11.6.SP4	Faster operation of the explorer on elements with large member lists
3359	DFN2796	DESIGN 11.6	12.0 11.6.SP4	Penetration display form improved
8870		DESIGN 11.6.SP2	12.0, 11.6.SP4	Quick Pipe Routing now works better with insulated pipes
8996 8997	HPD 31508/9	DRAFT 11.6.SP2	12.0 11.6.SP4	FRMW is now consistently added as a FRMW when you drag it into the 3D view
9022	HPD 31551	DESIGN 11.6.SP2	12.0 11.6.SP4	Blocking form with an OK button behaved differently in PDMS 11.5 & 11.6. A subsequent graphical pick was no longer possible - the form was still displayed and ESCAPE did not work. This limitation is now resolved. but the use of Blocking forms is not recommended.
9369	HPD 32362	DESIGN 11.6.SP2	12.0, 11.6.SP4	Textpane test limit removed
9593	HPD 32975	DESIGN 11.6.SP3	12.0, 11.6.SP4	ATTA was reordered using when moving components using model editor
9713	HPD 33441	DESIGN 11.5.SP2	12.0, 11.6.SP4	Corrections to volume calculations so that Map build MDB command is no longer required to get the correct volume when modifying spec. of a SCTN under a TMPL.
9223	HPD 32010	DESIGN 11.6.SP2	12.0, 11.6.SP4	Performance improvements in several areas, especially graphics and explorer.
9291		SPOOLER 11.6.SP3	12.0, 11.6.SP4	No longer crashes on switching module from Spooler to Design - on Global projects.
9652	HPD 33312	PARAGON 11.6.SP3	12.0, 11.6.SP4	Performance improvements – especially for large catalogues.
10303	HPD 34554	DESIGN 11.6.SP3	12.0, 11.6.SP4	No longer gets stuck in Isodraft mode

<i>Internal ref.</i>	<i>Remedy ref.</i>	<i>Reported in</i>	<i>Fixed in</i>	<i>Description</i>
10329	HPD 34668	Design 11.6.SP3	12.0, 11.6.SP4	Volumes of cable tray or pipe made up of two welds and no other components are now calculated correctly. This means that they clash correctly
10629	HPD 35255	11.6.SP4	12.0, 11.6.SP4	Horizontal Slider for the Command Line window.
9665	HPD 33195	DRAFT 11.6.SP2	12.0 11.6.SP4 11.6.SP3	Corrected runtime errors when deleting Draft objects and using multi-write databases
9639	HPD 33170	DESIGN 11.6.SP3	12.0, 11.6.SP4 11.6.SP3	Primitives with translucent obstruction were displayed offset from their correct position when REPR HOLES ON.
9106	HPD 31780	DESIGN 11.6.SP2	12.0 11.6.SP4 11.6.SP3	Splash errors were occurring when running a macro creating multiple isometrics in Isodraft mode.
9607	HPD 33068	SPOOLER 11.5.SP1	12.0, 11.6.SP3 11.5.SP2	IWELD at LUG no longer omitted from SPLDRG.
10442	HPD 33873	DESIGN 11.6.SP3	12.0 11.6.SP5	No longer crashes calculating weight of 0mm long objects
11121	HPD 35722	DESIGN 11.6.SP4	12.0.SP1	Improved specification selection
11706	HPD 37566	11.6.SP4	12.0.SP1	Corrected HVAC insulation sample project
9705	HPD 33443	PARAGON 11.6.SP3	12.0.SP1	Display--Component did not show component in the 3D view when used after the first time.
6965	HPD 22387	DESIGN 11.5.SP1	12.0.SP1	Corrected Syntax Error when trying to "Rename All" from Modify > Name form menu if / not used in name.
7050	HPD 28734	ISODRAFT 11.5.SP1	12.0.SP1 11.6.SP4	Option to show dimensions on Isometrics above the dimension
7933	HPD 29406	ISODRAFT 11.5.SP1	12.0.SP1 11.6.SP4	Option to show the drawing number of the continuation not just sheet no.
7934	HPD 29407	ISODRAFT 11.5.SP1	12.0.SP1 11.6.SP4	Option to show continuation of the LINE Number not the PIPE number.
7964 8519	HPD 29405 30460	ISODRAFT 11.5.SP1	12.0.SP1 11.6.SP4	Option to have coordinates shown at start and end points of sheets.
9614	HPD 33088	ISODRAFT 11.6.SP3	12.0.SP1 11.6.SP4	Weights and totals can now be displayed on Isometrics.
11613	HPD 36284	ISODRAFT 11.6.SP4	12.0.SP1 11.6.SP4	Correction to the Dimensions Composite option
8906 11615	HPD 31255 36613	ISODRAFT 11.6.SP2	12.0.SP1 11.6.SP4 11.5.SP2	Incorrect dimension caused by additional weld inserted by Spooler. Correct isometric was produced from Design (using Pipe Isometric),
11434	HPD 35876	DESIGN 11.6.SP4	12.0.SP1 11.6.SP4	Incorrect centre of gravity on a SCTN when its owner is a TMPL owned by an SJOI.
11549	HPD 36069	ISODRAFT 11.6.SP4	12.0.SP1 11.6.SP4	Corrected fixed length tube weights.
11578	HPD 36362	ISODRAFT 11.6.SP4	12.0.SP1 11.6.SP4	Corrected continuation number when field weld added to SPLDRG
11596	HPD 36497	ISODRAFT 11.6.SP4	12.0.SP1 11.6.SP4	ATTA no longer shown as bend

<i>Internal ref.</i>	<i>Remedy ref.</i>	<i>Reported in</i>	<i>Fixed in</i>	<i>Description</i>
11604	HPD 36563	ISODRAFT 11.6.SP4	12.0.SP1 11.6.SP4	Reducer ISO Symbol takes account of component eccentricity where necessary
8868	HPD 30838	SPOOLER 11.5.SP1	12.0.SP1 11.6.SP4 11.5.SP2	Spool breaks now correct when an OLET is connected to an ATTA
7777 7990	HPD 29415 29847	11.5.SP1	12.0, 11.6.SP2 11.5.SP1	Corrected problems with extract refresh/flush related to UDA name length
9029	HPD 31571	ISODRAFT 11.6	12.0.SP1 11.6.SP4	New SKEY for a branching OLET with offset P3
10617 11130	HPD 35218 35736	ISODRAFT 11.5.SP2	12.0.SP1 11.6.SP4 11.5.SP2	Error in display of elbow angle no longer occurs when angleaccuracy is set to 1. The problem occurred if the value had a zero at its first decimal place, e.g. 45.091 was shown as 45.9

## 25.3 Corrections & minor enhancements **\*12.0.sp3\***

These include the following:

Incident number	Defect number	Description
I-4434	P-8205	Bolting only accepts length to 2 dp
I-4386	P-8207	Bolting Utility Precision/Accuracy errors using imperial projects
I-4387	P-8369	DBREF error on adding INSU category to spec.
	P-8682	TUFLAG on negative primitives in Paragon
I-4917	P-11695	PDMS 12.0.sp2.2 Add TEE to Spec using Branch Table
I-4920	P-11752	PDMS 12.0.sp2.2 Add COUPLING to PSPEC
HPD 38167	P-12286	Quick pipe router does not detect change of spec i
HPD 37796	P-12253	PDMS generated DXF file has errors for Japanese
HPD 32183	P-7848	No status flag error
HPD 32763	P-8225	ISODRAFT and SPOOLER error
HPD 35321	P-8228	Check valve dimension is wrong on isometric
HPD 35905	P-8229	Duplicate part numbers for tubi connected to seton
HPD 36110	P-8230	Weld Numbering Error
HPD 36484	P-8231	Wrong dimensions on pipe legs with olets
HPD 36585	P-8232	Problem using weld for small slopes an pipes
HPD 36260	P-8233	Isodraft reporting wrong dimension
HPD 36969	P-8234	Isodraft produces an FATAL ERROR while processing
HPD 34236	P-8236	Missing Bends in Part List
HPD 37298	P-8237	Connections to 6-way components do not always show correctly
HPD 37347	P-8238	Spooler deletes the WLDGRP or JNTGRP
HPD 37612	P-8239	Isos not up to date
HPD 37697	P-8241	Spooling dimension
HPD 37060	P-8242	IWELD not shown on SPLDRG
HPD 37836	P-8243	Partno 2 is shown in Part List but not on the Iso
HPD 37190	P-8245	Piping quantity incorrect on Spool Drawing iso
	P-8247	Isodraw hangs when processing "busy" isometric
HPD 37941	P-8248	ATTA cause wrong dimension value
HPD 37994	P-8250	dimension line of overall length points to wrong p
HPD 37171	P-8251	A fatal error has occurred in ISODRAW (Signal 11 trapped)
HPD 38120	P-8252	Spurious length of pipe and bad Skewbox triangle representation
HPD 38119	P-8253	Bad Skewbox dimensioning

Incident number	Defect number	Description
HPD 38200	P-8254	Material control files in error
HPD 38211	P-8255	Missing dimensions on 11.6 Isometrics
HPD 38347	P-8257	Dimension line of overall length points to wrong position while MTOC attribute of first part in flow direction is set to DOTD
	P-8258	Problem using weld for small slopes on pipes
	P-8259	Centreline length output to file only works for metric.
HPD 38472	P-8348	ERROR in SPLASH routine HQTYPE Area:'NULL SPLASH AREA' Error:5 ELM ELMNT does not exist
HPD 37946	P-8350	Offset TEE - offset shown in inches
HPD 34955	P-8351	Wrong dimension and wrong representation on isometric.
HPD 27771	P-11982	Opposite symbol when split drawing at bottom flat reducer
HPD 34769	P-11983	Incorrect bore value shown on Iso
HPD 37648	P-11985	MATL error when outputting Simplified Chinese
HPD 38179	P-11989	Bolt part numbers incorrectly consolidated by Gateway
HPD 38638	P-11990	Bolting problems with Isodraft equipment detailing
HPD 38929	P-12188	Number of character mismatch errors
HPD 38718	P-12343	Isodraft-error on Valve with offset between P1 and p2
HPD 38850	P-12346	Wrong dimensions with offset skew in Isodraft
HPD 35577	P-12542	Imperial System Isometric Options file missing
HPD 36568	P-12545	Isodraft - too many Z Coordinates on lugs
HPD 28166	P-9208	Modify > Component > Route
	P-9380	Modify Clearance Form window is not displaying
HPD 36834	P-10232	Report Details form error
HPD 38373	P-10336	SPCOM doesn't has FLUREF attribute
I-4619	P-10632	Pipe creation form Forward/Afterward was not ticked.
HPD 36978	P-11462	When the clearance is set to 12 or larger on Imper
	P-11601	Imperial units problem using Position Control
I-4242	P-11905	Cannot select a Datum Ppoint on positive or negative BOX primitive when in wireline mode.
I-5052	P-12597	When Long EVAR paths are present the whereIs.pmlfnc fails
I-3460	P-6506	Couplings require a LOFF attribute
I-3247	P-6945	Pipe Assemblies can not select STYPE of type string for example 'EL90'
	P-7421	Test 71 FLUSH attempts to flush a different db
I-2340	P-7429	Split Pipe by moving Components does not do anything
I-4274	P-7840	text needs aligning with Radio button
	P-8180	DNF Not found error if Router is not installed
HPD 37174	P-10260	Alternate Pipe Spec not selecting correctly

Please see also Global product release letter d51797.

## 25.4 Corrections & minor enhancements **\*12.0.sp4\***

A significant number of corrections have been made in this service pack. Particular attention has been paid to the use of Imperial units and some of the new applications such as Cable Design.

Some of the most significant are documented below.

<i>Incident number</i>	<i>Defect number</i>	<i>Description</i>
	P-12263	Default Specification disappears behind PDMS main window when cursor run over the graphical view.
I-2930	P-6948	Router Create Pipe Rack fails

<i>Incident number</i>	<i>Defect number</i>	<i>Description</i>
HPD 38668	P-11986	Tube numbering problem for Pulled Bends with no leave tube
	P-11987	IWELD created when COCO not defined
HPD 38849	P-11991	We have a problem with numbering if after the spool break are (support) ATTAs
	P-12085	Error message is displayed when saving the Numbering and Spool settings defaults
	P-2236	Imperial Units now work better in the Paragon Modify>CATE form
	P-6302	Schematic element CONARRAY can now be set correctly using Datal output
4434	P-8205	Bolt table utilities form now accepts more accurate values – useful for imperial fractions
HPD 34214	P-10036	
HPD 34899	P-10102	Model Editor Increments now use more appropriate defaults for imperial units
	P-11816	A more appropriate error message is given when picking Go to > Owner from the Members form ends up at WORLD
	P-11967	Corrected a defect in PML Profile object union() method causing hole management failure in imperial units
5095	P-12337	Enhanced Size Range table allows non- standard nominal bores; this overcomes a spec creation problem with imperial units
5233	P-12373	Modification of the value of any parameter of SCOM in Model View no longer causes all the parameters to become zero.
	P-12868	Improved error message shown when entering Offset dist in Move Cableway Segment form
4009	P-13019	Can now define equal TEEs in the Branch Table
5797	P-13222	Resolved a pipe spool generation problem
5798	P-13223	When inserting a support ATTA, the generation of additional pipe spools now takes account of SHOP attributes to ensure correct pipe spool sketches.
	P-13339	Crash and SGL errors when drawing negative revolution is now resolved.
	P-13470	SGL Errors and invisible equipment with Holes Drawn and Obstruction set
5751	P-13474	On GMSE creation, if Piping Detail representation is selected, the OBST value is now HARD (2) rather than NONE.
	P-13497	Corrected AccessViolationException when accessing attributes via .NET API
	P-13540	Corrected error in command window when running PDMS script.
	P-13556	PANELs under TMPLs in ASL no longer misplaced
	P-13681	Corrected Random crash entering modules
	P-13782	Corrected PML error when using MDS Application Defaults in paragon
6452	P-13807	Pipe Penetrations now work correctly in Imperial Units
6404	P-13864	Upgrade script now upgrades LEXICON with IMACRO
	P-13374	Problem with cable way material when inserting a POINTR element.
4386	P-8207	Precision and Accuracy errors using bolt sizes in imperial units
	P-14111	Apply changes changed the values of tray width - imperial
	P-14455	GUI calculator errors
7041	P-14777	The coaming of Cabling Penetration System (defined by a FIXING) was not drawn
	P-13975	Error message stating ‘Variable !LOOKWESTDIR does not exist’ when generating ADP dwg.
	P-14123	Error with Equipment Import utility.
	P-14328	Pipe - Model Editor Crash.
	P-14330	Pipe - Measure with Insulation Crash.
	P-14381	PML: Invalid array expression error message is displayed and specification form Task Section becomes blank when clicking on Add Items Link under the Items section in the Specification form of the Paragon Module.

<i>Incident number</i>	<i>Defect number</i>	<i>Description</i>
	P-14419	An error message “Variable !LIST does not exist” was displayed when the Add Selected button was clicked in the Split Pipe form.
	P-14420	Pipe Splitting Button ‘ID Selection’ did not make any selection.
	P-14421	Pipe - Modify Components Form Modify Insulation and Tracing Spec was not working.
	P-14571	Ceiling tiles were not being drawn in the correctly position, and holes in them were not being drawn.
	P-14596	Validation of managed hole fitting in Panels & Plates failed with syntax error.
5549	P-13192	A new attribute RANEQ controls the threshold distance for routing directly EQUI-EQUI rather than through cableways. This means that short cableway branches that are not close to equipment start/end point can still be routed
6895	P-14908	The cableway branch is no longer rotated if the cableway is pulled down or pulled up when creating the branch using quick routing
2741	P-15499	Outfitting entry speeded up – system doesn't load Integrator if no SCHE DB in MDB
5549	P-15530	Free route between equipments is now considered during Cable Routing
	P-13114	RECTANGULARGRID is now split when passing through the start/end position of the ARC shaping the circular opening
	P-14329	Application no longer exits when a pipe is moved using the Model Editor handle.
7079	P-14820 P-14863	Runtime error due to degenerate arc no longer occurs while modifying Stair Tower. Handles PML error due to above when modifying the Stair Flight Spacing
	P-15151	Paragon GUI: setting parameters at CATE level using Imperial units no longer gives error message ‘String is too long. Truncating to 4 characters’
	P-15152	Reducer table no longer allows equal Main and Reducing Bores
4917	P-15471	Can now add TEE to SPEC using Branch Table
	P-15528	Fixed some cases where the cables were not re-routed after moving the CWBRAN Segment
7068	P-15532	Can now add COUPLING to PSPEC
5548	P-15523	Cable Design: cable can no longer be routed through a cableway branch that is not connected to the main network
5548	P-15525	Cable Design: cableway network checking has been much improved to make it more robust so that unconnected branches do not prevent auto routing
5797	P-16345	Pipe sketch: a pipe spool with a head tubi no longer causes the whole of the BRAN to be drawn
3310	P-16873	Cable Design: There is now a warning if YDIR is the same as direction of first RAIL segment
4783	P-16877	Cable Design: There is now more flexibility for the radius of Rail as distinct from Rpath.
7651	P-15795	UDAs on UDETs now work correctly again after Getwork. Note that the correction to this problem may mean that the wrong type of elements can be created under UDETs (P-7342) – this will be further investigated.
7340	P-15945	Equipment: Modify ATT form now lets you amend the value of USERWEI and USERWWEI attributes.
8101	P-16566	Improvement to Paragon Spec Editor: with units set to INCH BORE FINCH DIST and the Spec Editor form active, the “Apply” button no longer causes the PBOR answers to change by a factor of 25.4, each time it’s selected!
4297	8147	ASL: Platform internal frame created in wrong orientation
4298	8149	ASL: Platform internal frame is lost when creating an opening where spref set
4267	8167	ASL: Deleting ladder side exit renames LADDER element to db ref. no

<i>Incident number</i>	<i>Defect number</i>	<i>Description</i>
4263	8168	ASL: Ladder evaluation/creation does not offset ladder centreline to 'Clearance from Obstruction' value
4017	8170	ASL: Multiple Attached Sctn Copy problem
4266	8181	ASL: Missing ladder cage hoop bars
4271	8362	ASL: Platform Intermediate span profiles not complete when Connect sections checkbox on
4434	8567	Cats & Specs - Bolting only accepts length to 2 decimals – not enough for inches / fractions
4250	11608	ASL: Create Stair Landing Layout Definition form - Select Plate Specification link label not working
4025	11895	Negative Extrusion GUI Enhanced for unnamed items
5290	12143	Plane Positioning not working correctly on Branch Connections
5304	12213	Creating a Split Plane using Element Intersect gets stuck in loop
5055	12279	File Browser in v12 does not behave the same as in 11.6
4275	12295	Assembly Form now defaults to last assembly used
5395	12515	Function("Extend through feature") is required for quick routing of cable way
5511	12686	SOP Directions: for element used to centre a grid, the prompt is now -Y, -X etc.
3714	12803	GPART should be referenced in "Sub Element Ref" to make SUBE in TMPL
5346	12807	Corrected cable material error - "(2,813) Cannot convert string to DBREF"
5550	13035	Cable can not be un-routed, when cable is routed by free route cable function
5750	13366	Error on parameter creation - grid for input of parameter values is not updating
5315	13454	Cableway Branch Create Tasks form needs additional attribute for the IClass (Interference Class)
5342	13738	Cabletray tier material does not get dressed correctly
6474	13943	ASL: Error when creating or modify Stairtower Landing Configurations
6579	13979	Create > Copy > Offset with "to Rel. Adjacent to Object" option on a pipe with a Spool List causes an error – the result is the Pipe will be copied but the offset will not be applied and the new pipe will not have a spool list
6599	14132	Cannot select different tube SPCO with same size (Nominal Bore)
6261	14194	Templates that use constants fail in Imperial – changed sample data
5313	14348	Cable Design - Additional defaults for excess for cables and fill level for cableways
6863	14488	ASL: Ladders - Crossed Stringers
6860	14489	ASL: Ladders - Work Point Markers
6825	14498	ASL: Stair Flights - Preview of stair flight
6851	14538	ASL: Stair Flight - Installation sense error
6814	14604	ASL: Stair Towers - stair flights - centre line spacing
6937	14609	ASL: Ladders - Side Exit Height
6868	14780	Quick Pipe Routing - HSTUBE and LSTUBE revert to default SPCO if the spec has several tube SPCO with same bore,
5314	14823	Cableway Branch Create form now has two options for Othogonal Route –routing in a X, Y, Z or a Y, X, Z direction
6660	14845	Quick Routing - starting from a Nozzle and finishing with piece of tube open: connecting PT to last member causes error
6928	14912	Cable should be routed from a route point to another route point by defining PRPS
6918	14913	Cableway branch creation using branch off or route attachment point incorrect
6930	15026	Cableway branch is incorrectly dressed using straight material between first and second components by picking component - the position of this material is incorrect
6929	15027	Part of a cableway branch cannot be dressed with material by picking point
3960	15033	When inputed parameter in paragon, do not become preview to graphic view.

<i>Incident number</i>	<i>Defect number</i>	<i>Description</i>
7053	15103	AVEVA plot application is missing MSVCR71D.dll
7260	15154	Cable Design – some functions fail if Region setting uses ‘,’ as decimal separator.
7173	15161	Incorrect operation of 'Add to Drawlist Colour'
7269	15189	Access Control Assistant form does not read User Security correctly
7287	15301	Paragon : Form data duplicated for Create/Modify Text Details
7124	15306	Data Consistency Check Form does not navigate to component selected in the form
6961	15330	ASL: Platform - Trimmed sections - platform openings.
6423	15354	Under some circumstances, Utilities>Sketch Drafting to set the 2D element Attributes gave a PML error
7170	15379	Wrong descriptions for p-point attributes in Design
7340	15469	Equipment, Modify ATT form improved – notably for weights, imperial units
6862	15480	ASL: Ladders - Side Exit aborted
7337	15567	Paragon Modify CATEGORY using ‘ Import CSV file’ to add SCOMs to a CATE does not work correctly
7410	15837	Compound Joint not displaying correctly
6270	15856	Query Attribute Tracking error in Catalogue Explorer
7464	15874	Panel Loop Editor Vertex Coordinate display improvements
6844	15939	ASL: Stair Flights - Handrail Connectivity
6846	15940	ASL: Stair Flights - Handrail Alignment
6897	15941	When cable is unrouted, the free line between start and end equipment is removed
7758	15943	Replicate Project Structure Error
7622	16039	User defined Linestyles plot with wrong scalefactor when using Windows Plotting
7544	16154	Query attributes output incorrect for parameters
5415	16172	GUI for Cable Properties added
7862	16363	Corrections to Modify Equipment Specification form
6861	16443	ASL: Ladders - Command Line error messages
7975	16493	Curved Sections Creation form layout correction
7796	16506	Update Names fails when a GLAB references an unnamed and deleted element
8066	16525	Modify>Cate, with tracking ON loops when navigating to a parameter.
7054	16565	Improved PDMS 12 upgrade macro for Draft – option to upgrade picture files
8443	17070	Model Editor - “Align with Feature” or move model-editor’s handle to particular snap points did not catch P-point of each element
8357	17089	Pipework application: 'Component Selection' has an error with TUBI in Explorer.
8604	17441	Quick Router does not move the RNODE created at the head/tail when a change in direction occurs
8073	17460	Error message on Modify>Spec – now removed
9286	18226	Cableway CWLIST now has members in order, sorted by distance from the beginning of cable in the right direction
8974	18267	Paragon - Data set not updating on Model View form
8976	18268	Unable to create Insulation Specs using the appware
9288	18276	CLIST now ordered correctly
9279	18411	Cableway Branch table form - changed TAB order of Textboxes
9446	18414	RATTA position affected by Fillet Radius on neighbouring POINTRs
9377	18420	Unable to create Bolt Specs using the UI
9284	18427	Cable reconnected between start equipment and head / between end equipment and tail changed, after the equipment is moved
9752	18850	Inserting a route point on cableway using model editor now updates affected RNODEs (changing ZDIS and leaving PKDIS unaltered) consistent with model editor.
9619	18890	Equipment Import errors and hangs after selecting the csv file to import

<i>Incident number</i>	<i>Defect number</i>	<i>Description</i>
6769	19190	Merge changes fails with dbnames over 49 characters
10869	20226	HVAC Assemblies - when placing assembly in model, application returns to Monitor, if the user selects the assembly component displayed in the 3d assembly view.

### 25.4.1 Fixes to Global Daemon

<i>User incident</i>	<i>Defect</i>	<i>Details</i>
HPD 34926 HPD 36158 HPD 36489	P-10101 P-10184 P-11399	Corrected a problem causing Global to freeze PDMS during updates
HPD 38428	P-10421	Prevent crash for 100+ Inter-db macros
HPD 29322	P-9535; P-9439	Missing file no longer stalls Change primary; command now fails if DB File is missing
	P-14520	Recover command stalls when recovering to an Offline location
	P-14829	Daemon crashes when Global DB is not available during a Synchronise command
	P-8855	Unable to create extract at Satellite locations due to timing issues on the Global Database
	P-14971	Propagation of Databases leads to Dabacon Error 578 on secondary databases
HPD 37489	P-10281 P-7465	Spurious "Dabacon 10 – Invalid reference" errors in Daemon

### 25.4.2 Fixes to PDMS Global Admin

<i>User incident</i>	<i>Defect</i>	<i>Details</i>
HPD 33573	P-11576	Reverse Propagation after Generate; removed automatic Expunge except for new system db
HPD 38385	P-11575	CHANGE ACCESS crash (Deleted user) – relates to ADMINISTER command
HPD 26298	P-9274	Replicate System Satellite errors
	P-14828	Crash on MAKE GLOBAL when no TRANSACTION DB exists
	P-14836	Crash on EXTRACT FLUSH when daemon is down
	P-16553	Implicit Global claim leads to crash on heavily loaded machines
SI-8136	P-16817	Admin Elements Form (Databases) Sort By Location is not correct for Satellites
SI-8163	P-16669	It is not possible to Filter on Location for a number of Admin forms: <ul style="list-style-type: none"> <li>• Create MDB</li> <li>• Database Allocation (By Location)</li> <li>• Database Integrity Check</li> </ul>

### 25.4.3 Fixes to PDMS Global Admin – Offline Locations

<i>User incident</i>	<i>Defect</i>	<i>Details</i>
HPD 37152	P-6578	Unable to transfer Global Database

HPD 37069	P-6583	Transfer of inter-DB macros with NULL references causes the Offline Transfer process to crash
	P-7420	Ensure that the system databases are copied correctly during Transfer process
	DFN 1486	Option to propagate non-propagating databases during Transfer process
	P-15524	“Database not open error (1,267)” reported on TRANSFER FROM command

## 25.5 Corrections & minor enhancements **\*12.0.sp5\***

The following corrections were made in PDMS 12.0.SP4 fix releases and were also applied to SP5. Details of a number of the other corrections to SP5 are given in the release letter.

### 12.0.SP4.7:

<i>Incident number</i>	<i>Defect number</i>	<i>Description</i>
SI-16151	P-24452	Error message was given when a valve, fitting, etc. was included

### 12.0.SP4.7

<i>Incident number</i>	<i>Defect number</i>	<i>Description</i>
SI-9508	P-24933	Model editor uses incorrect handle for some components when the pipe route is incomplete – 11.6 behaviour has been restored
SI-7099	P-14939	Diagrams: The valve number wrapping with symbol should be able to be created.

### 12.0.SP4.6

<i>Incident number</i>	<i>Defect number</i>	<i>Description</i>
SI-11081	P-22822	DRAFT: Justification and Alignment have been corrected for standard DXF output

### 12.0.SP4.5:

<i>Incident number</i>	<i>Defect number</i>	<i>Description</i>
SI-15001	P-23540	GUI forms did not work correctly if imperial distances including a foot mark ‘ were entered
SI-13404	P-24063	Clash missed in some circumstances for primitive with a <i>minimum</i> dimension greater than 20 metres
	P-24187	Diagrams: Refresh doesn't work for referenced attributes.
SI-14804	P-24191	ISODRAFT entry crashed if an ATTA has more than 100 UDAs
SI-15863	P-24223	Database crash under certain specific conditions – initially identified for Global Daemon Flush DB (see also release 51896 – Global Server 12.0.SP4.5)
SI-8838	P-24457	Admin: Performance problem merging System and Global databases

### 12.0.SP4.4:

<i>Incident number</i>	<i>Defect number</i>	<i>Description</i>
	P-14025	Diagrams: Primary-Secondary shape handling dialog should be more easily understood

	P-21805	Diagrams: The label offset is no longer cleared by Edit Master
	P-22589	P&ID Manager: Incorrect branch head and tail refs no longer set on import
SI-14259	P-22876	Correction to <project>DFLTS path – caused problem with Global Satellite location creation (and possibly similar issues with Replicate function).
	P-23297	AVEVA PMLFileBrowser now supports UNC file paths
SI-14890	P-23524	Piping: GUI problems with pipe bores in imperial units
	P-23579	P&ID Manager: UUNI not set properly in Lexicon
	P-23580	P&ID Manager: Imperial Distance/Bore units on UDAs were not correctly imported
	P-23581	P&ID Manager: unqualified values were not correctly interpreted when setting UDAs
SI-14560	P-23641	GUI problems setting some text attributes that include a foot mark ‘
SI-9943	P-23777	‘Production Checks’ now produce correct spool
SI-15397	P-23798	Draft: Limits defined view not working with Imperial units

#### 12.0.SP4.2:

<i>Incident number</i>	<i>Defect number</i>	<i>Description</i>
SI-11830	P-21360	Diagrams: Consistency Check Error for Cable Connection to geometry end
	P-21669	Diagrams: Highlight highlight resets user defined formula for line width (& colour)
SI-9943	P-20221	Pipe 'Production Checks' produces incorrect spool
SI-7937	P-16550	Pipe Piece Cutting is not Correct for Branch and Tee Point
SI-11431	P-22321	Diagrams: Copy - paste to Custom Properties causes crash
SI-8665	P-20834	When generating pipe spool, the pipe component connected to TEE becomes a separate pipe spool.
SI-10053	P-20251	Isodraft: sheet continuations shown at coordinates E 0 N 0 EL 0.
SI-9891	P-20564	Isodraft: Missing label for support plates on isometrics
SI-12057	P-22310	Isodraft: Parameterized Weights on isometrics incorrect
SI-11337	P-22320	Isodraft: Wrong Dimensions on iso with Overallskews ON
HPD 38939	P-22331	Isodraft: Spool Drawing with several Spools, plotted using ISOTYPE SPOOL and SpoolNumbers PREF FROMDB options, means that Spool n does not necessarily correspond to the nth Plot File
SI-3231	P-22839	Specon OUTPUT command ignores database IPR protection
	P-22864	Draft: Corrupt Cyrillic DXF output when using TrueType text
	P-22921	Paragon: Error when modifying specifications (introduced by fix for P-20455)
SI-6600	P-22941	It is now possible to replace the default system (software defined) popup menu on the command line form using a user defined PML menu.
SI-13027	P-22253	Integrator: Connections not set on Build SCPLINs connected branch head to tail

#### 12.0.SP4.1:

<i>Incident number</i>	<i>Defect number</i>	<i>Description</i>
SI-9284	P-18427 P-19183	Cable Design – can now reconnect the head or tail of the cable with any precedence of the legs in orthogonal free route (e.g. 'xyz' 'zyx' 'zxy' and so on...).
	P-21821	DRAFT: Pipe sketches wrong when SITE or ZONE not at Pos (0,0,0)
	P-21828	DRAFT: PSPOOLS accidentally drawn when PIPEs included in IDList
SI-10083	P-20455	PARAGON: User interface error with Russian characters:
	P-21467	PARAGON: If we use the 'underbar' for SCOM and display it in ModelView, Command Window displays errors.
SI-11549	P-21622	DIAGRAMS: Unable to reference templates from the Master Project
SI-13737	P-22448	UDA values were lost after upgrade from PDMS 11.6 if the type of data had been changed from an array to a scalar at some point. This unusual situation is now handled correctly.