PDMS

SEPC

INFORMATION BOOKLET

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OTHER SERVICES ON OFFER BY SEPC
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• EQUIPMENT DESIGN USING PV ELITE
• ISOMETRIC & P&ID IN AUTOCAD version 2012
• MATERIAL INSPECTION FOR PROJECT AND PLANT
• WELDING TECHNIQUES & SOLUTIONS
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A fully interactive, colour shaded 3D plant design environment. Many designers can work concurrently on a project, in a fully controlled manner, with visibility of the entire design at all times. Designers progressively create a highly intelligent 3D design by selecting and positioning parametric components from an extensive catalogue. Clash checking and configurable integrity checking rules help a designer create 'right first time' design and enable effective overall design quality assurance. A configurable Status Management function provides visual highlighting and clear reporting of design maturity status of PDMS objects. A standard model library saves design time and effort, by making it easier to reuse designs from existing built-in complex components. Highly configurable, automatic generation of a wide range of reports and drawings direct from the PDMS database SEPC utilizes two software systems for detail design and drafting of industrial facilities: PDMS and AutoCAD. PDMS is a three-dimensional (3D) design engineering system for the process plant, oil, gas and power related industries. PDMS dramatically increases efficiency and reduces costs throughout the engineering life cycle, from design through fabrication, operation and maintenance. PDMS does this by creating an accurate full color 3D computer engineering model which can be accessed by designers, engineers, project managers and clients. Project deliverables, such as drawings and bills of material.
General Information

Information across all design documents.

At the heart of PDMS is a powerful multi-user project database coupled to a full scale 3D solid modeling system. As the design is developing, a database is built up containing detailed information for all design areas.

There are no limits to the size or complexity of projects which PDMS can handle. PDMS allows users to configure the types of information stored in the database to meet particular company and project specifications.

The effective use of catalogues ensures consistency of data, however many individual designers are assigned to the project. The PDMS database contains information on all plant items and enables designers to carry out 3D interference checks between and within disciplines. The complete model is checked for design consistency before any design information or drawings are released for fabrication and construction. Once installation is complete, PDMS helps plan maintenance procedures, design alterations and safety routines, acting as a powerful plant management resource throughout the life of the installation.

Standard output such as engineering data reports, bills of materials, general arrangement, detail and isometric drawings are all derived from PDMS which means fast, accurate and comprehensive deliverables. Engineering drawings are quickly produced on any aspect of the design, including sections and perspective drawings for use during construction and operation, maintenance and stress analysis studies.
General Information

PDMS provides total drawing integrity as the design changes, so drawings can be kept up to date automatically. These intelligent documents revolutionize information management by ensuring that data is accurate and up to date.
Information Sharing

- Share catalogue information across multiple projects, for consistency and standards compliance

- Share information between AVEVA Plant™ applications for Integrated Engineering & Design

Use with AVEVA Global™ for seamless multi-site collaboration on a single, common project model
Schematic Model can store P&IDs from any intelligent P&ID application, combining freedom of choice of P&ID design software with access to the powerful functions of the PDMS environment. P&ID data can be imported from any ISO15926-compliant application. All P&IDs, from whatever source, can be used to create, compare and modify the 3D plant model. Invaluable when integrating multiple P&IDs from different contractors on a project, this open approach saves manhours and makes elimination of errors quick, easy and thorough.

P&ID design can now benefit from PDMS functions, such as multi-user working, revision control and global project execution. Complete and consistent schematic information enables quicker commissioning and easier plant maintenance.
An extensive set of catalogues covers industry, national, and international standards, and includes piping, structural steel, ducting, hangers, supports and cable trays. Each catalogue provides parametric definition of all components in the required size ranges, ratings and types. For piping components, for example, data is stored related to connection types, physical and nominal size, material codes and bolt requirements.

Engineering specifications control the way in which catalogue components may be used in the design. Standard catalogues can be defined once and shared across multiple projects. Controlled changes to components and specifications are quick and easy to make and apply across the design.
PDMS's highly interactive piping design functions allow rapid modelling of all piping systems, based on component catalogues and engineering specifications. From this model, Piping General Arrangement drawings, isometric drawings and bills of quantity are produced. A full range of piping isometrics can be automatically generated, from the complete system, through to fabrication, erection and individual spool isometrics. PDMS manages and integrates all stages of the piping workflow, from initial routing, through basic and detailed design to individual pipe spooling at the fabricator. In Integrated Mode, PDMS references engineering and schematic data for design input. PDMS can be augmented with Multi-Discipline Supports for the detail design of pipe supports, and interfaced with specialist applications for pipe stress analysis, flow calculation, wall thickness calculation or other tasks. Automated Pipe Routing includes automatic selection of items such as gaskets and flanges, allowing a preliminary route and Materials
Piping

Take Off to be created very quickly. The Quick Pipe Routing function enables interactive pipe routing by using the mouse pointer to specify changes in direction. Components can be quickly positioned using feature snapping and intelligent prediction can complete a pipe route automatically. Sophisticated pipe manufacturability checks help designers ensure that pipes can be fabricated at least cost. Flange rotation checks ensure that bolt holes are correctly aligned. Integrity and clash checking functions highlight errors during modelling, for high quality design. Sophisticated modification capabilities enable the piping design to be progressively refined. These include functions to apply specification and bore changes across the line, and to define and modify sloping pipes. Piping Assemblies such as vents, drains or control sets can be added to the design as entities. Existing configurations can be saved for re-use elsewhere. All drawings have associative dimensions and 'intelligent' annotations, and can be updated automatically with design changes.

"PDMS has slashed field piping errors by a factor of 10."
Equipment

The Equipment functions build 3D models for all kinds of plant items, from pumps and exchangers through to complex items such as reactor vessels and compressors. Any level of detail can be modelled. 3D CAD models can be imported via translators, including AVEVA Mechanical Equipment Interface™. Laser scanned models of 'as-built' equipment can be referenced. (See AVEVA Laser Model Interface™ for more information.) Multiple graphical representations are available, and obstruction volumes may be added so that spaces required for maintenance access can be visualised and clash-checked during layout and design. Equipment templates allow complex parameterised design configurations to be defined so that they can be quickly and easily re-used, even across multiple projects. Equipment items include 'intelligent' connection points, with relevant attributes, for the connection of associated piping, ducting, instrument and electric-
PDMS provides close integration with the Electrical and Instrumentation disciplines. All E&I items, including cabinets, transformers and switchgear, can be located in the 3D plant layout for visualisation, clash checking and production of arrangement drawings. AVEVA Cable Design™ enables connectivity information from AVEVA Electrical™ and AVEVA Instrumentation™ to be fed into PDMS for automated cable routing in the 3D model. PDMS feeds routed cable lengths back for accurate calculation of quantities. Compare & Update capabilities allow cable catalogues to be kept consistent between 3D layout and E&I engineering as the overall design evolves. 3D models of electrical equipment and off-line instruments can be created from parameterised templates, or imported as STEP files using AVEVA Mechanical Equipment Interface™.
Electrical and Instrumentation

Valves and in-line instruments are selected from catalogues via engineering specifications. The workflow is fully integrated with 3D piping design, enabling such items to be detailed on piping isometrics, for example. The PDMS Cable Tray application selects components from a catalogue via an engineering specification and creates the complete cable tray layout. Cable Tray isometric drawings can be automatically generated for manufacturing purposes. For more extensive functionality, PDMS may be used with AVEVA Cable Design™. PDMS integrates with AVEVA Multi-Discipline Supports™ for the design of cable tray supports, and with AVEVA Instrumentation™, for the design
HVAC & Ducting

PDMS includes a specialist function for the design of all types of ducting. 3D ducting designers use an engineering specification to select parametric components from an extensive catalogue. A Fill function automatically fills the straight parts of the route with straight lengths of ducting. In-line equipment such as dampers, vanes, diffusers and hoods can all be included. The ducting model can be split into spool parts for manufacture and preassembly. Spool and isometric drawings can be produced automatically. AVEVA PDMS integrates with VEVA Multi-Discipline Supports™ for the design of ducting supports. Integrity checking ensures correct alignment and sizing of duct components.
PDMS includes parametric design of the steel and concrete structures found in process and power plant. A wide range of layout and component drawings can be produced, together with accurate weight and materials information. The Beams & Columns application defines a fully connected network of structural sections.

Simple regular structures can be created easily. Standard bracing configurations can be customised as required. Structural modelling uses parameterised, extendable catalogues for components such as section profiles, joints, and fittings.

Curved, tapered and built-up beams are all available. The Panels & Plates application enables designers to define flat panels of any shape, while the Walls & Floors application defines walls and floors of standard shapes. Fittings can be added to all types of beams, plates, walls, floors and so on, to apply items such as doors, windows, 'intelligent' piping penetrations, stiffeners, lifting lugs and fireproofing.
Structural

A specialised Access platforms, Stairs and Ladders (ASL) application is provided. Intelligent, parametric penetrations can be defined, with details such as kick-plates, and connected to both the structure and the penetrating item (for example, pipe or duct). Profile catalogues cover the leading international and national profile standards, including angles, channels and I-beams. Sample joint catalogues contain standard types of joints including cleats, endplates and sniped end preparations. Parameterised joint definitions automatically resize a joint if an associated section is resized. Fittings catalogues contain parameterised structural and industrial fit-including lifting lugs, stiffeners, windows and doors. Interfacing options are available to link to third-party analysis software and structural detailing systems.
Integration & Interfacing

PDMS is fully interoperable with AVEVA E3D™. Both share the same catalogues and specifications and may be used together on the same project. PDMS integrates seamlessly with all AVEVA Plant™ products, including: AVEVA Review™ for design visualisation and review AVEVA Schematic 3D Integrator™ for associating P&IDs with their 3D piping counterparts AVEVA Electrical™, AVEVA Instrumentation™ and AVEVA Cable Design™, for cable routing AVEVA Mechanical Equipment Interface™ for import/export of 3D equipment models AVEVA Bocad Steel™ for structural steel detailing PDMS integrates seamlessly with all AVEVA Enterprise™ products, including: AVEVA Enterprise Resource Management™ for materials management AVEVA NET™ for project information management In Integrated Mode, PDMS users have online access to P&ID data from AVEVA Diagrams™ and engineering data from AVEVA Engineering™, for consistency checks, inclusion in drawings and so on.

A variety of interfaces to third-party design systems are available for functions such as pipe stress analysis. PDMS supports a wide range of data exchange formats, including DXF, DGN, PDF, SDNF and CSV.
Management & Control

AVEVA PDMS is designed to support large teams of plant designers working together in a controlled and managed way. Access and change control can be readily configured for customers' work practices and specific project requirements. Work breakdown structures can be changed as project needs evolve; for example, when construction contracts are awarded. Using AVEVA Global™, AVEVA PDMS, together with AVEVA E3D™, AVEVA Engineering™ and AVEVA Diagrams™, can be used collaboratively by distributed project teams around the globe. Session management capabilities enable roll-back to any previous project situation. The full change history of any part of the model can be shown. Change highlighting facilities enable modelling and drawing changes from a previous version, or from a specific date and time in the past, to be highlighted on screen or in drawings. Reports of changes can also be created.
Quality Check

Automatic multi-discipline clash highlighting can be applied, either ‘online’ while modelling or in batch mode. Clash severity can be classified as hard-hard, hard-soft, or soft-soft, when access spaces or insulation volumes interfere. Detailed and complete clash reports can be created on demand. A separate product, AVEVA Clash Manager™, enables effective management actions in resolving clashes. Data consistency checks of the model are made for correct component alignment and connections. In Integrated Mode, unique Compare & Update capability enables interdiscipline consistency between engineering and design (eg P&ID, Line List, 3D) as the project progresses. Customer-defined engineering data checks enable design verification to project and company quality standards. PDMS created 10 piping isometrics in 10 seconds."
PDMS created 10 piping isometrics in 10 seconds.

- Rich, easy to use reporting functions enable sharing across many of the AVEVA Plant modules and products, and generate comprehensive and high-quality, project-ready reports and report templates. In Integrated Mode, these can include schematic, engineering, and 3D design data, such as surface area, weight and centre of gravity.

- A wide range of layout and detail engineering drawings are available for all disciplines. Many, such as piping isometrics, can be generated automatically.

- All drawings and reports are produced directly from the PDMS database in accordance with user-configurable rules, ensuring consistency between documents and design.

- Drawing updates automatically include the latest design changes. Change highlighting can be used.

- Export/import to AutoCAD and MicroStation drawing formats is available.

- All types of reports and schedules [such as valve or nozzle schedules] can be produced, in CSV or other formats.

- Accurate Material Take Off information is available across all disciplines, by item, unit, area etc.
PDMS is supplied with a predefined, extensible data model, enabling rapid deployment on projects. This may be extended with user-defined Element types and attribute definitions, for ongoing system enhancement. PDMS’s functions and graphical user interface may be extensively customised. Extensive international character sets enable localisation of the graphical user interface and data, catalogues, drawings and reports in Western, Asian, Middle-Eastern and European languages. An open programming environment enables customers to develop their own applications on top of PDMS. These can be written in any .NET language, such as C#, as well as in PML, a powerful object-oriented scripting language. PML enables customisation of functions to suit any particular project, industry or workflow, to add custom automation functions, or to create interfaces with in-house or third-party applications. Definitions and conversion factors are provided for a wide range of units, such as Distance, Bore, Area, Volume, Angle, Weight, Temperature, Density, Pressure, Force, Voltage, Current, Impedance and so on. Feet/inches and metric units are available throughout.
Advantages of Using PDMS

Operations & Maintenance

- Provides a complete integration of best practice processes for technical information, maintenance management, materials management and procurement.
- Creates a powerful environment for preventative maintenance plans, risk-based inspection, work order scheduling, resource allocation, materials tracking, spares and inspection
- Delivers a reliability-centric approach, to improve operational uptime and adhere to safety standards

In-Plant Engineering

- Focuses on safe working and regulatory compliance through repeatable and controlled Management of Change (MOC)
- Minimises project costs and production downtime, through dynamic management dashboards and rapid issue resolution
- Automatically validates data and rejects non-conformant information.
- Delivers data integrity throughout the engineering and commissioning process.

Operational Readiness

- Collects, aggregates, and validates handover and commissioning data from the supplier network
- Provides a proven process for Management of Change, ensuring data quality remains as high as possible throughout operational readiness
- Reduces time to initial production start up, and restart after revamp
- Provides intuitive and flexible dashboards for an instant overview of progress

HSE & Regulatory Compliance

- Adds control and management capabilities to asset data, enabling safe, secure, and compliant operations
- Demonstrates adherence to industry regulations by providing the ability to report, share and compare data against operational standards
- Provides rapid access to operational data for analysis, compliance audits, work permit handling and review, and
Take Aways from PDMS

- **Quality**: Reduce rework caused by inaccurate information.

- **Validation**: Resolve information inconsistencies & gaps.

- **Risk**: Mitigate operational & safety risks through improved decision Support.

- **Time**: Reduce time to production startup.

- **Cost**: Reduce the cost of ongoing operations, unplanned rework and Downtime.