



RELEASE SUMMARY

PLANTMANAGER

PlantManager is E²G's central framework for holding information about plant equipment, and integrates E²G's software products including SagePlus, API RBI, SnapIMS, and CMLWise. PlantManager offers equipment and data management in one application and database, on a universal standard platform that encompasses all modules with a single IT installation procedure. It provides an extensible framework that standardizes the basic look-and-feel and functionality within the integrated components.

The 2.4.0 release of PlantManager is targeted to new Capabilities and Enhancements to existing capabilities:

New SagePlus Capabilities :

- Updated all Level 1, 2, and 3 API 579-1/ASME FFS-1 (API 579) Fitness-For-Service analysis methods to the 2015 edition
- Analysis of crack-like flaws subject to ductile tearing (CLFLAWTA)
- Generation of API 579 Level 1 crack-like flaw screening curves using the Level 2 criteria (CLFLAWL1)
- Automated API 579 Level 3 brittle fracture screening
- Enhanced cycle dependent and time dependent crack growth
- Enhanced ASME Section VIII, Division 2 fatigue capability

SnapIMS Capabilities :

- Added a Briefcase feature which allows inspection tasks to be packaged for individual inspectors. The Briefcase can be exported to work on a portable device in the field so that inspections can be recorded conveniently. Completed Briefcases can then be imported to the main database to quickly see inspection results. More information on the Briefcase feature can be found at <https://www.youtube.com/watch?v=1122CR5Ty8A>
- Integrated inspection recommendations generated by CMLWise with support for thickness measurement import in Olympus specific format

API RBI Enhancements :

- Full damage factors per API 581 for both thinning and external damage are applied when both mechanisms are selected. In previous versions, a "double dip rule" was implemented to avoid overly debiting a vessel for existing damage for thinning and for external damage. This had been created because the logic in API RP 581 2nd Edition does not specify how to distribute



the existing damage between thinning and external. The software now enables separate start dates for internal thinning and external damage. This should resolve some of the issues that the double dip rule attempted to avoid.

- Implemented extended generic materials in the materials database
- Risk matrix now available directly in Plant Manager at the Unit level including drill down capability to component level.
- Added Plant and Unit output summaries to the respective output screens

PlantManager Framework Enhancements :

- Added the ability to specify field-level access for user roles
- Added the ability to time-stamp report databases
- Eliminated the need to provide Admin users with the Root password
- Improved the speed of the drag drop functionality

SAGEPLUS PRODUCT

API 579 VESSEL, PIPING AND TANK FITNESS-FOR-SERVICE

FITNESS-FOR-SERVICE (APIFFS) AND API 579 FITNESS-FOR SERVICE FOR NOZZLES AND FLANGES (APIFFSB)

API/ASME 579 Updates: SagePlus has been updated to comply with the latest edition (2015) of API 579. The following are a list of significant changes with respect to Version 2.3.

- Part 4 General Metal Loss
 - FCA within and outside the region of metal loss is now handled separately
 - The remaining thickness ratio and length for thickness averaging has been modified
 - The acceptance criteria tables for pressure or required thickness have been modified
- Part 5 Local Metal Loss
 - FCA within and outside the region of metal loss is now handled separately
 - The Level 1 screening for the circumferential extent of an LTA in a cylinder has been changed
- Part 6 Pitting
 - The definition of pit couples has been modified
 - The remaining thickness ratio has been modified to account for internal and external pitting
 - The longitudinal stress acceptance criteria for cylinders and cones has been changed
- Part 8 Shell Distortion
 - Some weld misalignment Rb factor solutions have been changed



- Part 9 Crack-like Flaws
 - o The plasticity correction factor has been changed
 - o The fracture toughness estimation options have been changed
 - o Partial safety factors have been removed for Level 2 assessments
 - o The weld residual stress solution have been changed
 - o Some crack tip stress intensity solutions have been modified or extended

ADVANCED FRACTURE MECHANICS

STATIC CRACK-LIKE FLAW EVALUATION (CLFLAW)

- Added the nozzle junction and sleeve reinforced cylinder component geometries
- Updated the material dependent FAD definition options
- Added automated brittle fracture screening based on load variation for all crack and component morphologies
- Added complete component brittle fracture screening for all combinations of crack orientation and welding for cylinders, spheres, and nozzle junctions (API 579, Part 3, Level 3 evaluation)

CRACK LEVEL 1 SCREENING (CLFLAWL1)

- New module to generate Level 1 screening curves for crack-like flaws using the Level 2 acceptance criteria option
- Up to 20 curves with associated plots can be generated based on material, component geometry, weld geometry, and flaw size

CRACK-LIKE FLAW DUCTILE TEARING ANALYSIS (CLFLAWTA)

- New module to evaluate the behavior of crack-like flaws at upper shelf toughness based on J-integral tearing criteria
- J curve can be estimated for carbon and low alloy steels based on API 579 or specified for high alloy steel or other materials
- Automated initial crack size sensitivity and critical flaw size capability can be evaluated based on the tearing criteria

CRACK GROWTH ANALYSIS (CLFLAWCG)



- Updated the plotting and output capability
- Added time dependent crack growth based on the MPC Omega law
- Added the ability to calculate remaining life based on a single load condition or repeating block of load conditions
- The operating history load definition has been changed. Individual load state definition is now required. The loading history can now be formulated by defining the interaction between specified load states
- Note: The new version of CLFLAWCG is not backwards compatible with previous versions. It will be backwards compatible with subsequent versions.

STRESS ANALYSIS TOOLS

FATIGUE LIFE ASSESSMENT (FATLIFE)

- Updated to be fully compliant with the equivalent stress and structural stress fatigue assessment methods provided in ASME Section VIII, Division 2
- Added fatigue plot output and fatigue damage calculation
- The fatigue cycle loading options have been enhanced. The alternating stress range may be specified directly or calculated between to stress states to define the cyclic loading history.

MISCELLANEOUS CHANGES:

- FITNESS-FOR-SERVICE (SHELL) – Added the ability to specify the unsupported length regardless of internal vs. external pressure
- FITNESS-FOR-SERVICE (APIPE) – Size on Size branch evaluation is now allowed
- FITNESS-FOR-SERVICE (TANK) – Removed the restriction on the maximum number of tank courses
- SPECIALTY HIGH TEMPERATURE PACKAGE(RP530) – Low carbon steel materials were not being recognized
- ASME B31 PIPING (TOWER) – Corrected the shell and stiffener unsupported length calculation with respect to cone transitions
- ASME B31 PIPING (BHEAD) – Fixed an issue with the calculated dished head location for Type D heads



API-RBI PRODUCT

- Filtering is now supported when using Batch Apply
- Calculator now provides results and issues a warning instead of an error when Caustic Cracking is enabled for materials other than Carbon Steel.
- On the Thinning Form, the base metal corrosion rate now defaults to “Estimated” with a required input of the estimated thinning rate
- Optionally allows the user to enter measured or estimated thinning rates when another method is chosen
- For Carbon Steel, Low Alloys and Austenitic Stainless Steel base materials, the External Corrosion/CUI mechanism now defaults to Active
- Adjusted the RBI inspection date calculation for Pressure-Relieving Devices (PRDs) to give proper credit for inspections and overhauls
- Corrected a defect that allowed weld joint efficiencies outside the range of 0 to 1 to be entered.
- Corrected a defect where interval-based inspections were not properly called when the risk is below the target risk.
- Corrected a defect where a component that was removed from the list of protected components on the PRD list improperly persisted on the details tab
- The life extension factor for rotating bundles was corrected
- Improved the fireball consequence calculation to include non-continuous gas leaks
- Corrected reporting of inlet and outlet control valve failure frequencies
- Added columns for Post Weld Heat Treat and for multiple Cracking Mechanisms to the Inspection Plan Summary
- Corrected the Fluid Summary report to work correctly with the fluid modeler and tanks
- Added tube bundles and PRDs to Bulk Edit Inspections tool
- Corrected a defect that disabled copy and paste in Inspection History records
- Numerous minor improvements to Bulk Edit Inspections tool

CMLWISE PRODUCT

- Minor improvements and corrections to the generic import and export functions
- Added the ability to make folders within Circuits
- Added expandable framework for import of manufacturer specific thickness data logger files



PLANTMANAGER FRAMEWORK

- When creating a new component using default values, the default values now become the component's set values and do not reset when the default values are changed
- Several minor improvements to Batch Edit Plus
- Made minor changes to standard user role permissions
- Corrected several minor problems with international currency
- When a batch calculation is performed, calculation flags now update on a component by component basis, rather than when the entire batch is completed.
- Many improvements to table functionality throughout including improvements to copy and paste

CONTACTING THE EQUITY ENGINEERING GROUP SOFTWARE TEAM

SOFTWARE SUPPORT HELP DESK

The E²G Software Support Services Help Desk is your dedicated resource for all software support related needs. Our Helpdesk has the tools available to log each customer support need, address your needs and track them to root cause resolution. **Please call our help desk at 216-658-4777 or e-mail HelpDesk@equityeng.com for a quick resolution to your software support related needs.**

SOFTWARE SALES

Learn more about E²G's Software Products and the PlantManager Software Suite by scheduling a DEMO
Please contact SOFTWARE SALES.

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E²G PlantManager Software Suite Product Summary

PlantManager is a platform for E2G's software tools, API RBI, SagePlus and CMLWise, which gives you the power to accomplish total life-cycle management for fixed equipment.



API RBI was originally developed from an API-sponsored joint-industry project and is the only fully API 581-compliant tool that provides metrics and probability of failure calculations due to ongoing damage.

SnapIMS A full lifecycle Inspection Management Software solution that provides a common sense approach to managing your RBI inspection recommendations from scheduling, planning, reporting, and ever greening inspections results

SagePlus incorporates a large collection of analysis products applying the most recent updates to the API 579 codes and offers numerous features including data sharing, intuitive user interface, ability to store documentation files and pictures, easy collaboration between users, and much more.

CMLWise is an integrated thickness management system that runs in E2G's PlantManager platform. It can be used as a stand-alone management tool or linked with E2G's risk-based inspection software, API RBI allowing geometry, material data and T-Min from components to be pulled down into data for linked circuits. In turn, CMLWise can push the calculated corrosion rate back to the component for use in risk calculations. CMLWise offers the WISE method for rate calculation as a reliable means of blending of expert opinion with actual field data.

DamagePlus is a stand-alone product based in API RP 571 and WRC 489, DamagePlus™ software is a quick reference guide for identifying and understanding the potential damage mechanisms that can cause costly fixed equipment failure. Many improvements have been made to the software which includes the new version of API 579.

Intellijoint is a stand-alone total solution to bolted joint leakage. The only way to reliably solve bolted joint leakage is to attack the joint as a whole by examining and optimizing all of the factors that contribute to leakage.