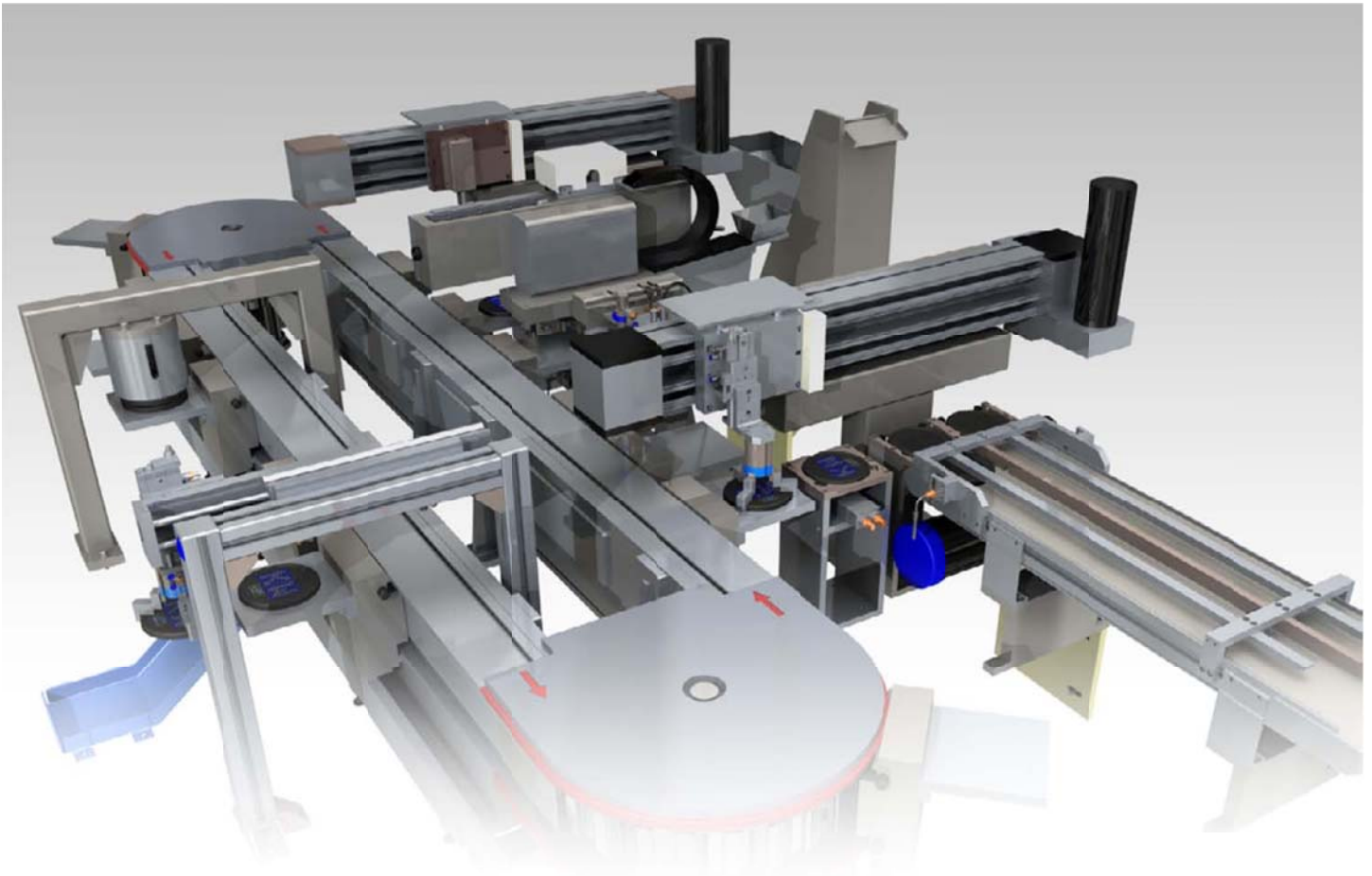# SOLIDWORKS & SOLIDWORKS ENTERPRISE PDM
QUALITY ASSURANCE/RELEASE PROCESSES

Overview

SolidWorks is committed to providing its customers with the highest quality design and data management software. The Quality Assurance (QA) department at SolidWorks is responsible for verification and validation of all SolidWorks and SolidWorks Enterprise PDM (EPDM) product releases on all supported platforms and configurations. The following document describes in more detail our QA processes.

Quality at SolidWorks

SolidWorks employs a continuous quality improvement program. All major releases, betas, pre-release versions and service packs undergo rigorous quality assurance and qualification cycles prior to customer release. These cycles are repeated several times during development of a major release or service pack.

Testing processes consist of manual product testing against documented web-based test plans, manual exploratory testing, and the daily execution of a large number of automated tests. These activities include installation testing, languages testing, performance/load testing, functional testing, regression testing, import/ export testing, and customer data conversion.

Quality Metrics

Specific quality metrics are used to measure software quality during the development cycle and to set release criteria for major releases and service packs.

Release Engineering

Final approval for a release is given by the Release Engineering (RE) team. After a proposed release or release candidate build has met the specified release criteria and has final QA approval, the RE team runs through an extensive checklist to insure the release candidate is ready. Part of this checklist is a final sign-off on quality and the release candidate will only be approved when these quality benchmarks have been met:

- No critical issues from automated tests
- No critical issues from manual tests
- No critical issues from checklist tests

The Release Engineering team performs a post analysis of every release to determine root causes of any defects discovered after code freeze. Corrective actions are agreed with development and QA management.

The QA Department

SolidWorks maintains a dedicated full-time QA department with a clearly documented Quality Management System (QMS) and documented training courses, which require all members of the QA department to reach internally certified standards.

In addition to an experienced team of CAD/PDM domain experts, the QA department also includes a software team specializing in automated testing, tools, and infrastructure.

The entire Quality Management System/Process at SolidWorks is subject to continual review, and all QMS documentation is regularly maintained. In addition to this, internal audits are carried out on an annual basis, and any required corrective actions identified during these audits are followed up in a timely and scheduled manner. Continuous efforts are made to develop new testing techniques and obtain new tools to validate products more rigorously.

The QMS includes a Quality Plan which defines:

- Planning and progress monitoring
- Maintaining/archiving quality records
- Roles and responsibilities
- Development lifecycle
- Management procedures
- Quality activities to be carried out
- Development tools and methodology
- Standards for user and technical documentation

Testing Overview

Testing is broken up into the following categories

- Manual regression testing
- Implementation/modeling projects
- Project testing
- Installation and language testing
- Release testing
- Alpha/beta/Pre-release testing
- Automated testing

These categories are described in more detail below:

Manual Regression Testing

A comprehensive regression test plan is executed prior to each release. SolidWorks and EPDM are sub-divided into over 150 functional areas. Each area has a documented Test Plan that details all the functionality that must be tested.

Each of these areas is assigned to a QA Engineer who is responsible for the quality. All Test Plans are executed before any release (Service Pack, Beta, New version).

These Test Plans are continually updated as features from major releases are added and internal testing/code coverage analysis and customer reported issues identify additional testing requirements.

Implementation/Modeling Projects

Prior to shipping a product, the entire QA team uses the release candidate in user scenarios. The team performs several implementation/modeling projects, building parts, assemblies, and drawings of real-world products in a multi-site environment to test drive the software in an end-user environment.

Installation and Language Testing

All products are continually installed and tested on all supported configurations/ languages within a matrix of automated tests to insure adequate coverage. Installation and language are also tested using a well-defined checklist of tasks performed by Release Engineering as part of final sign-off for release.

Operating System Testing

Automated and manual testing is continually carried out on all supported (and future supported) operating systems. For a complete list of supported operating systems, please refer to the system requirements page on the SolidWorks website at: http://www.solidworks.com/sw/support/hardware.html

Language Testing

Automated and manual testing is continually carried out on all supported languages:

Database Testing (SolidWorks Enterprise PDM only)

Automated and manual testing is carried out with all supported versions of Microsoft SQL Server. For a complete list of supported versions, please refer to the Data Management system requirements page on the SolidWorks website at: http://www.solidworks.com/sw/support/PDMSystemRequirements.html

Project Testing

The development lifecycle, which includes both development and test activities, is defined precisely, and is managed by internal project management, test tracking, and bug tracking tools.

SolidWorks follows a very rigorous process for testing new features in every new release, and new features are always implemented as projects, QA is involved in projects from the conception stage to ensure that quality is built into the software from the specification stage. Project testing has the following stages:

- Engineering finished sign-off
- Unit test
- System test
- Final performance verification

These stages are described in more detail below:

Engineering Finished Sign-off

Before testing begins the project specification and project test plan need to be approved by QA, Engineering (Development), and Product Definition. The implementation also needs to be signed–off as code complete and ready for testing.

Unit Testing

The goal of unit testing is to isolate each part of the program and show that the individual parts are correct. Unit testing focuses on the project functionality and includes testing for correctness, completeness and compliance to specification, reliability, usability, GUI, discoverability, error handling and recovery testing, performance, limit/load testing, user case scenario testing, exploratory testing, boundary value testing, regression testing, and database consistency testing.

System Testing

System testing is testing conducted on the complete, integrated system to evaluate the system's compliance with the specified requirements. This involves testing new functionality in conjunction with other new and existing features on all supported operating systems/configurations.

Final Performance Verification

Performance testing is carried out during both the unit and system testing stages. final performance verification is carried out when projects are finished to ensure that the new functionality or enhancement has acceptable performance and does not have an adverse effect on the performance of existing functionality.

Once a project has passed final performance verification, models developed to verify and validate new functionalities and enhancements are added to automated testing suites and manual test plan databases.

Automated Testing

There are a number of automated test suites used at DS SolidWorks Corp. These tests automatically check for regressions from previous builds and run continuously. As part of our release criteria, all the automated tests must be running successfully with no known critical issues.

New datasets are continually added as test cases to the large array of existing test cases in both the manual and automated test suites. The test cases include all tutorial datasets, verification datasets, customer datasets, and in-house developed datasets. Current automated tests for SolidWorks and EPDM amount to several terabytes of data.

Smoke Tests

Smoke tests are used to qualify the initial quality of SolidWorks development builds. Builds must pass smoke tests before being released for further manual and automated testing.

SolidWorks/SolidWorks Enterprise PDM Integration Testing

The interaction of EPDM and SolidWorks CAD software is continually tested with thousands of data-driven and functionally driven automated tests.

SolidWorks Enterprise PDM/Database Testing

Regression testing is conducted covering all critical functionalities of the software and validated against pre-verified baselines. EPDM/database testing/validation includes, among other items, the validation of stored procedures, indexes, data validation, constraint validation, return values on functions, database consistency, and error checking.

Alpha/Beta Testing

Prior to final release, the software goes through two stages of extended testing known as alpha and beta testing. The first stage, alpha testing, is performed by internal users and a selected set of customers. The alpha version is a very early version of the software that may not contain all of the features that are planned for the final version. The second Beta testing stage uses external users to test new and existing functionality using their data, design workflow and hardware configuration. This testing helps improve quality by identifying any customer specific problems that often can only be reproduced at the customer site.

Project Retesting

In the case of an alpha/beta release, all the projects (new features) of the release are retested using the project test plan as a sanity check prior to going live.

Bug Reporting Process for Customers

If a customer finds a bug or wants to request an enhancement in the software, they can report it to their VAR. Enhancement requests can also be reported directly to SolidWorks. A SolidWorks Technical Support engineer then verifies the issue and enters it in the SolidWorks issue tracking database. When the bug/enhancement is fixed and the fix has been verified by a QA engineer, SolidWorks sends an email notification to the customer informing that the bug has been fixed, along with the release/service pack in which it is fixed.

Evaluation of Critical Issues

All issues in the SPR database are evaluated by designated QA engineers when they are entered into the SolidWorks issue tracking database.

Critical issues are additionally evaluated by the release manager, QA managers and Technical Support manager. Critical issues are targeted to be fixed in a specific release or service pack. The selection of which release or service pack is based on:

- Customer impact/scope of the problem
- Risk
- Ownership (i.e. SolidWorks software code or 3rd party code)

Evaluation of Customer Feedback Data

Users can opt to participate in the customer feedback program. This enables SolidWorks to gather key information related to usage of the system. This information is for SolidWorks internal use only. Customer feedback data from the currently released service pack is analyzed and used to pinpoint any dominant issues or trends.

You will find more ideas and help on the SolidWorks website at **www.solidworks.com**.

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