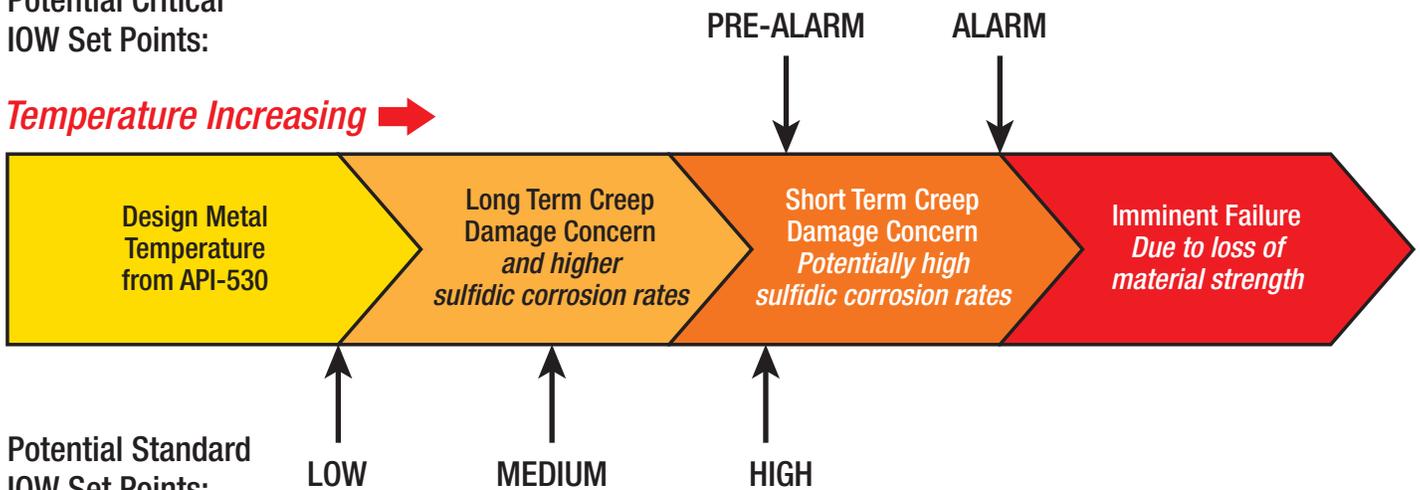


Integrity Operating Windows

Operational Sustainability, LLC offers insight into operating conditions along with a fundamental understanding of damage mechanisms required to maintain your inspection program via our **Integrity Operating Window (IOW) Module**. Companies need to establish process variables to control their process (i.e. product within specification, safe operation, reliability, etc.) including a subset of operating limits (in this case called operating windows) that address the controls necessary on any and all process variables that might affect the integrity or reliability of the process unit. Integrity Operating Windows (IOWs) are those preset limits on process variables that need to be established and implemented in order to prevent potential breaches of containment that might occur as a result of not controlling the process sufficiently to avoid unexpected or unplanned deterioration or damage to pressure equipment. Operation outside the IOW limits could result in accelerated damage from any one or more of the numerous damage mechanisms covered in API RP 571 including general or localized corrosion, mechanical or metallurgical damage, high temperature corrosion and environmentally assisted cracking.

Potential Critical IOW Set Points:

Temperature Increasing →



Potential Standard IOW Set Points:

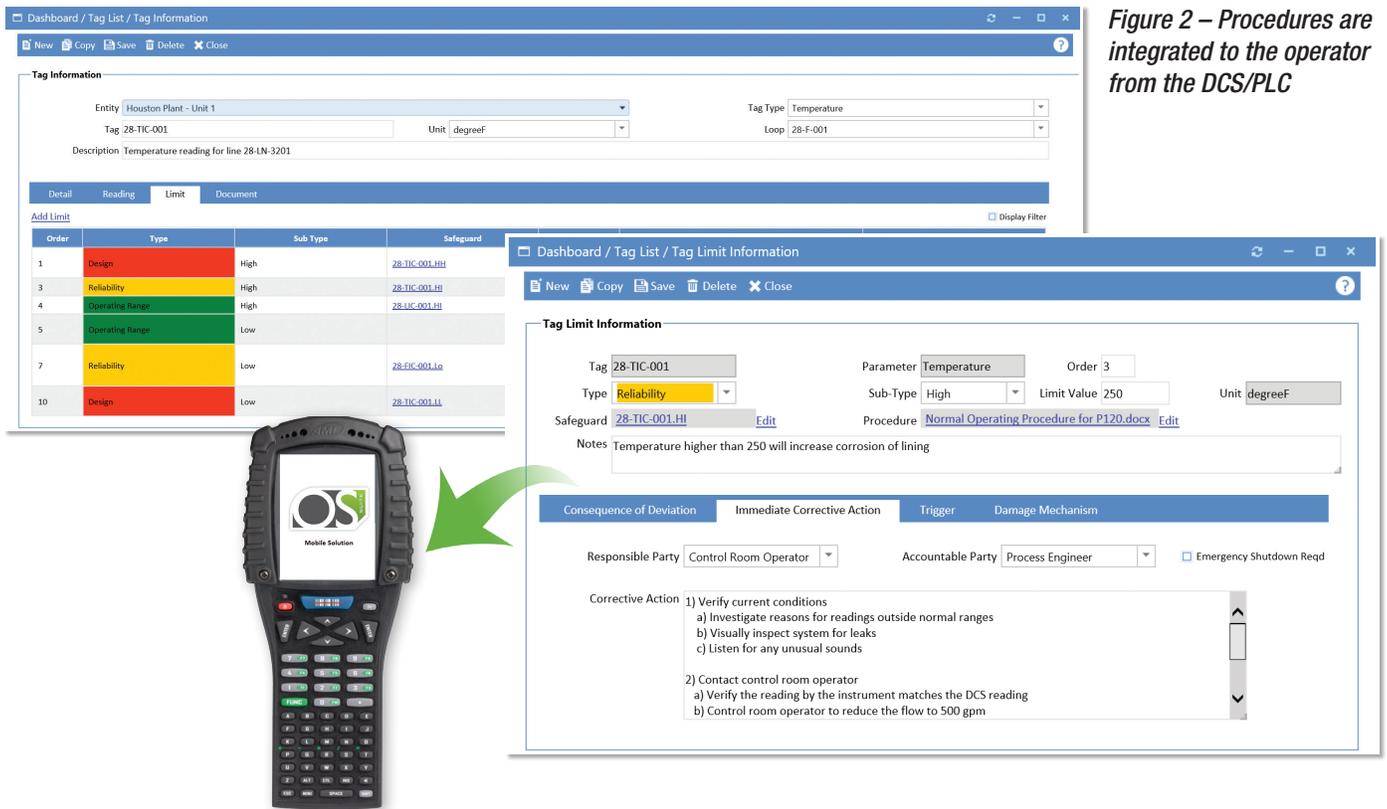
LOW MEDIUM HIGH

Figure 1 – Example of Critical and Standard IOW Limits

A healthy, properly structured inspection program (standard condition based or more advanced risk based inspection program) depends on IOW's being established and implemented to avoid exceedances having an unanticipated impact on pressure equipment integrity. Inspection programs are not generally designed to look for unanticipated impacts of processes that are not adequately controlled. Inspection programs generally assume that the next inspection interval (calculated based on prior damage rates from past operating experience) should be scheduled on the basis of what is already known and predictable about equipment degradation from previous inspections. Without effective process control, based on a robust and complete list of IOW's, inspections might need to be scheduled on a frequent time-based interval just to look for anything that might potentially occur from lack of process control.

By extending beyond traditional risk-based inspection programs, operators are able to extend inspection intervals while pushing operating envelopes. OS offers a robust Integrity Operating Window solution as part of the OSSuite™ platform that integrates with your distributed control system (DCS), data historian or supervisory control and data acquisition (SCADA) system. Our solution empowers staff to tie to the DCS/PLC to develop operating envelopes and limits to track changes to your equipment condition in real-time.

In addition, our system allows you to trigger email notifications, action items, incidents and work requests based upon exceedances of envelopes and incidents. Users can take immediate action to avoid shutdown or equipment damage or incidents. Procedures can be automatically tied to integrity operating windows (i.e. Normal, Emergency, Shutdown) to empower the field operator with the asset condition to ensure they act upon the appropriate information as conditions change. As consequences of deviation occur, operators are empowered to take corrective action. Normally, operators lack the ability to access information on asset conditions along with the proper procedural steps without this level of integration. Typically, operators take action based upon what they remember as they rarely have access to procedures in the field leading to potential risk. OSSuite™ enables real-time information dashboards for risk-informed decision making on the fly while optimizing their rounds.



As integrity deviations occur, OS gives you the opportunity to determine the effects of sustained exceedances to operating pressures and temperatures. Our IOW module is integrated with our Risk-Based Inspection module to take advantage of our robust library of damage mechanisms. In the event of changes to the physical hardware or the process being introduced, our solution automatically documents MOCs. MOC is critical in the prevention of process safety incidents related to pressure equipment failures and leaks as well as other process safety issues.

Our IOW solution leverages API RP 584 to ensure that feedstock variability and process upsets are factored in. The systemic effect of prolonged integrity deviations can be analyzed using our powerful reporting engine. In addition, our automatic email notifications give operators the opportunity to correct consequences of deviation before they cause permanent damage to your equipment.

For more information email us at info@os-orm.com or call (713) 355-2900.