

Optimizing your Last Line of Defense



Lifecycle Management of Pressure Relief Valves

Get the most out of your investment and keep your plant operating safely, consistently and efficiently



You can't afford to halt operations due to unreliable equipment or safety concerns.

Pressure Relief Valves (PRVs) are mostly self-operated mechanical equipment designed to protect people, plant and assets. Although PRVs are critical assets, they may never be called upon to operate, but need proper maintenance and upkeep to help prevent catastrophic failures. They are the last line of defense in an over-pressure event and protect lives.

Accurately specified and appropriately maintained pressure relief valves (PRVs) are critical to protect plant personnel and equipment against unexpected overpressure events. Effective lifecycle management of PRVs can significantly improve operational efficiency, ensuring safety, reducing maintenance costs, and increasing plant reliability.

“Reactive work is routinely reported to cost two to five times more than planned work.”

– Ron Moore, The RM Group



“Nearly 70% of early equipment failures can be traced to installation, startup or design deficiencies”

– Efficient Plant Magazine



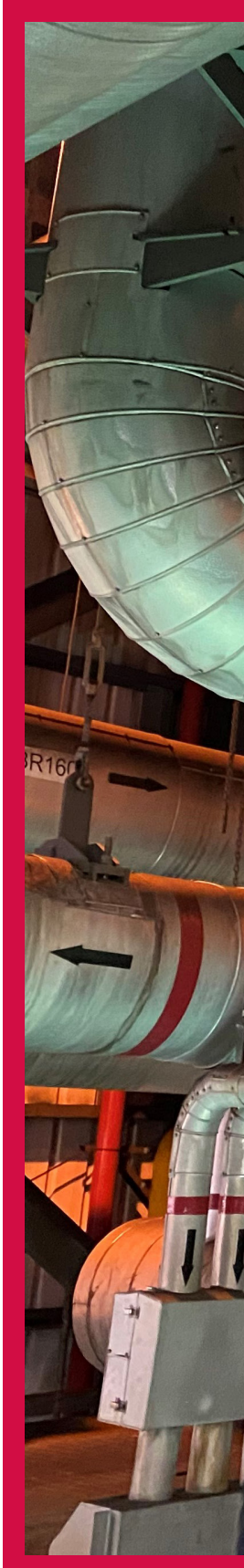
“Approximately 74% of all shutdown, turnaround, and outage (STO) projects fail to satisfy performance goals. Every day an STO run late, it can cost you \$1 million in lost revenue and increased cost”

– American Fuel and Petrochemical Manufacturers



“The most important appurtenances on any pressurized system are the pressure relief devices provided for overpressure protection of that system.”

– National Board Inspection Code, Part 2, 2.5.1





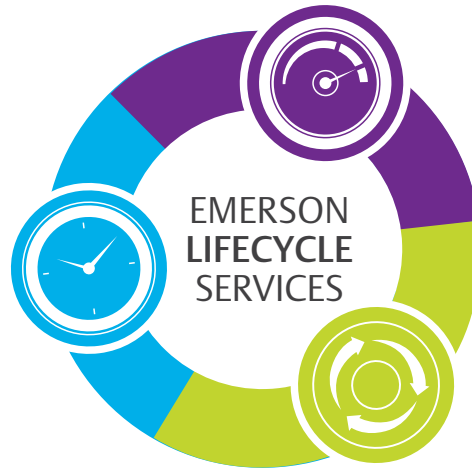
Why address a situation only after it negatively impacts the bottom-line and not give a chance for an earlier insight to help make the right decision at the right time? Approach your lifecycle planning differently and build a long-term strategy.

Your partner in proactive and predictive maintenance

Reliability

Improve your asset reliability and preserve your investment

- Shutdown, turnaround & outage planning and support
- Preventive and predictive maintenance repair
- Connected services for remote monitoring of asset condition



Performance

Optimise your plant performance and achieve your goal

- Total Asset management with long-term service agreements
- Resident Asset Managers or Engineers placed on site
- Turnaround and startup project management

Maintenance

Keep your plant operating safely, consistently and economically

- On-demand support and emergency response
- Focused walkdown and Asset Management Tag installation
- Parts and replacement supply

As your strategic partner, Emerson will help you uncover WHEN and HOW valves impact your overall operations and your ability to reach Top Quartile Performance.

Emerson leads the way with industry-defining end-to-end lifecycle service experiences, helping you achieve superior outcomes through our maintenance, reliability and performance offerings. The tools we've developed support the top quartile performance of the process industry, providing the confidence to extract the maximum value from your service and technology investments. Our team partners with you across the globe to help you maintain safe operation, improve reliability, and optimize plant performance.

Imagine how smoothly your operations would run if you could delegate all of your maintenance challenges to an expert you trust. Let us help you in planning and optimizing your maintenance effectively.

Lifecycle Services Capability Suite

ASPs	Parts & Order Fulfillment	Mobile Service Centers	In-Situ Testing	Structured Training for Technicians	Site Walk Down	Risk Based Inspection (RRA)	STO Planning
<ul style="list-style-type: none"> • 22 ASPs • 7 Countries • 2 Level 2 Assemblers 	<ul style="list-style-type: none"> • SG OF Hub • Valves and parts • O&G Specials 	<ul style="list-style-type: none"> • 8 MSCs • 5 Countries • Onshore / Offshore 	<ul style="list-style-type: none"> • 4 devices • 4 Countries • Start up and Service support 	<ul style="list-style-type: none"> • Certified technician school • 8 Modules 	<ul style="list-style-type: none"> • SWD dedicated APP • Expert report post survey 	<ul style="list-style-type: none"> • PRV Repair App • LBP Access • Emerson specialist RBI Module 	<ul style="list-style-type: none"> • 7 Step STO process • Plan ahead and avoid surprises during STO



Authorized Service Provider Network
Unmatched local technical support
at any time, anywhere ▶ p05



Parts & Valve Fulfillment Center
With easy access to spares & parts
▶ p06



Mobile Service Centers
Anytime, anywhere service
▶ p07



In-Situ Testing
Calibrate devices onsite
▶ p08



Site Walk Down
Expert audit of your assets
▶ p09



**Shutdown, Turnarounds
and Outages Planning**
Eliminate the unknowns
with prognostics and planning ▶ p10



Risk Based Inspection
Optimize maintenance frequency
based on deep asset investigation ▶ p11



Educational Services
Enhance your asset knowledge
with the help of Emerson experts ▶ p12

Authorized Service Provider Network

Unmatched local technical support at any time, anywhere

Global network of skilled technicians provide parts, expertise, and hands-on service to quickly diagnose and repair your equipment and devices.

Emerson's Authorized Service Center features :

- Audited and Certified workshops to stringent Emerson and local TS/VR standards and criteria
- Equipped with high pressure testing equipment to calibrate and fully service pressure relief valves and associated equipment
- Accredited UV assembler network provide local new valve assembly in county and provide fast valve delivery to reduce any downtime
- Dedicated specialized team of engineers and technicians trained by Emerson
- Provide Local Inventory, warehousing and pool valves and rotatable valve Support
- Provide Application, Sizing & Selection Support



Parts & Valve Fulfillment Center

With easy access to spares & parts

Our dedicated fulfillment centers support essential and critical spare parts & valve requirements for your plant and ensure fast delivery ensuring continued plant operation. Our ASME certified manufacturing facilities and order fulfillment centers :

- Have capability to engineer and produce wide range of products
- Utilize our extensive worldwide network to support with fast parts availability
- Provide Onsite and offsite inventory management (pool program) and parts planning provide peace of mind and ensure availability of critical components for planned and unplanned maintenance
- Specialize in on demand services including localized welding, special painting, NDEs and customized solutions for most challenging applications



Mobile Service Centers

Anytime Anywhere service

Minimize schedule delays and receive Emerson certified repair with onsite service capabilities.

Emerson's Mobile Service Centers bring quality repair and support to your location for small or large maintenance activities. Our mobile service centers feature :

- Easy setup, only requires a power connection
- Fully equipped with high-pressure and low-pressure test benches, compressors, lapping machines and crane lifting facilities
- Access to all the valve onsite and no involvement of any third parties
- Fully qualified and certified technicians to maintain and overhaul PRVs
- Software controlled test benches for valves pop and tightness testing - gas and liquid.
- Complete overhauling capacity, including fully equipped workshop and lapping machine, to resurface valve internals back to OEM specifications.



In-Situ Testing

Calibrate devices onsite

In-Situ Testing

Testing of a pressure relief device installed on and protecting a pressurised system, using an external pressure source to determine some or all of its operating characteristics.

Hot Floating

Testing of a pressure relief device installed on and protecting a system using system pressure

In-Place Testing

Testing of a pressure relief device installed on but not protecting a system, using an external pressure source, without an auxiliary lift device to determine some or all of its operating characteristics.



Site Walk Down

Expert audit of your assets

Utilizing our Walkdown App, our experts will audit your plant and identify your assets and their current condition and provide expert recommendation for uninterrupted plant operation and asset utilization.

Our walkdown process helps

- Document all serial numbers and valve data.
- Identify the health of your asset and categorize them into red, yellow and green depending on criticality and condition of the asset.
- Troubleshoot problematic applications and assets and recommend best technologies to prolong asset life and prevent premature failure and reduce costs
- Determine spare parts for each assembly, new, old or obsolete equipment and check against inventory pool

When the audit is complete, we will provide a customized report allowing you to properly plan and execute your next maintenance and optimal asset utilization.



Shutdown, Turnarounds and Outages Planning

Eliminate the unknowns with prognostics and planning

Plant turnarounds constitute the single largest identifiable maintenance expense - and controlling turnaround costs and duration represent a definite challenge. The most critical objectives are to execute turnaround with the highest possible safety first, to complete in the shortest possible time at the lowest possible cost, and to achieve the best quality of workmanship.

To meet these objectives, Emerson has developed a proven process that ensures your turnaround is done right, on schedule and within budget.

- Develop initial scope
- Initiate planning
- Refine scope
- Finalise planning
- Turnaround execution
- Turnaround review



Risk Based Inspection

Optimize maintenance frequency based on deep asset investigation

Risk-based Inspection (RBI) is a risk assessment and management process that reduces risk by focusing inspection on the components that need more attention based on probability of failure and consequence of failure.

Failure modes and probability of failures are calculated based on past performance and condition. Consequence of failures are calculated based on potential serious injury to employees, equipment damage, loss of production and repair costs caused by the failure.

An asset management program can enable RBI by properly maintaining historic records and generating inspection reports with recommendations for adjustments in a PRV maintenance cycle. Some PRVs may require an increase on their maintenance frequency. However, RBI can reduce cost by extending the average inspection frequency for the entire plant while reducing risk.



Educational Services

Enhance your asset knowledge with the help of Emerson experts

Consider Emerson training as the effective short- and long-term solution to maximize the return on your most significant investment: your employees.

Through Emerson course work, employees obtain the knowledge they need to not only perform their jobs, but seek efficient solutions to daily issues.

Whether you choose individual classes or a complete education program designed specifically for your organization, Emerson can be your single expert training source and offer flexibility to work within your schedules and shifts.

Your facility will benefit from these options:

- Accelerated boot camp developed for your new recruits.
- Assessments for skill gap analysis specific to your facility.
- Efficiently delivered blended learning approach.



With lifecycle support tailored to fit your specific needs, we can help you reach Top Quartile performance.



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