



ValvTechnologies' Aftermarket Service

Global Capabilities

At Your Service.



ValvTechnologies is committed to helping our global network of customers maintain peak valve performance. With certified service centers located around the world, we are prepared to address your valve and actuator repairs, 24 hours a day, seven days a week.

While the ValvTechnologies' Service department is headquartered locally in Houston, TX, its capabilities extend globally. With more than 25 authorized service centers strategically located around the world, we can address virtually any service and repair challenge that may arise.

ValvTechnologies' experienced, factory-trained field service engineers and technicians can troubleshoot, diagnose and repair valve and actuator-related problems not only in ValvTechnologies' products, but most other manufacturers' products as well. In addition, we provide other field services such as actuator maintenance and leak detection via our ValvPerformance Testing™ program.

With nearly 30 years experience, ValvTechnologies has not only designed the world's best high-performance valves, they also developed a system of service that maintains the performance and value of your investment, reducing total cost-of-ownership. Our range of services includes complete factory repairs in-house or on-site as well as extensive stock of all maintenance and repair parts. Our proprietary in-house ball and seat coating repairs, as well as our large inventory, allows the ValvTechnologies' Service team to respond quickly to our customer's needs and ensure the performance and value of their severe service valve investment.

The OEM Advantage



OEM In-house

ValvTechnologies' service engineers and technicians are factory trained to handle all of your valve and actuator repair needs. Whether it is a planned repair or an unexpected emergency, our team is prepared to evaluate the challenge and determine the best course of action to get your business back in service in a timely manner.

ValvTechnologies is equipped with a 6,500 square foot repair facility with 10 ton, five-ton bridge cranes plus two-ton area jib cranes. Service is supported by CNC ball grinders, HVOF RiTech® coating, weld shop, CNC lathes, VTLs, mills, etc.

Our core in-house services include:

- Factory trained, certified technicians
- Extensive component parts inventory to support the wide-range of products to ensure quick turn-around
- Valve and component repairs and complete reconditioning
- Actuation repairs and complete reconditioning.
- Plant shutdown planning and implementation.
- Full preventative maintenance
- Valve asset management
- OEM evaluation with root cause investigation
- Fugitive emissions upgrades
- Bi-directional modifications

On-site Field

For customers planning an extensive start-up, turnaround or shutdown or just need additional personnel during critical projects, ValvTechnologies' service organization can arrange a team of OEM certified service technicians to assist with any field repair or maintenance or commissioning or repair, anywhere in the world.

Our highly-skilled team can make most valve and actuator repairs and modifications on site, even when extensive overhauls are necessary.

Our core on-site services include:

- Valve and component repairs and complete reconditioning
- New valve installation oversight and commissioning
- ValvPerformance Testing™ and diagnostics
- Field service repair with certified factory trained technicians using OEM parts
- Field walk-down to help users with outage / turn around planning
- Field-installed retrofits and modifications
- Troubleshooting
- Preventative maintenance training
- On-site product training

Remote Support

VirtualValv Support™ on-demand, augmented reality remote assistance and support for all service and troubleshooting needs.

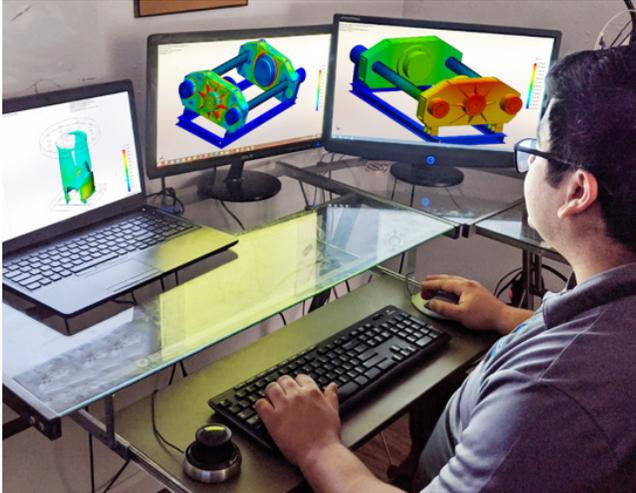
ValvTechnologies' VirtualValv Support™ delivers a wide range of remote support to customer site personnel during the normal plant operation including valve repair and installation, immediate troubleshooting, assistance performing site tests and inspections and any other planned or unplanned maintenance event.

Conducted by a ValvTechnologies' certified technician, ValvTechnologies can also provide a dedicated augmented reality remote assistance technician to provide continual support to optimize production and facilitate direct access to our full breadth of service support.

VirtualValv Support™ benefits:

- 24/7 site support from anywhere in the world
- Remote-assistance and testing
- Flexibility of scheduling
- Eliminates time and expense of traveling on-site
- Intrinsically-safe
- Light-weight
- WiFi, cell phone hotspot, or 4G
- Easy-to-use (training completed in 30 minutes or less)
- Service work can be recorded
- Operates on Microsoft Teams
- Work procedures in local language

Customer Satisfaction.



Sustainable Engineering

Sustaining is an integral part of our aftermarket service capabilities. It allows for customer-focused solutions unique to their process and conditions. Sustaining engineering enables us to respond rapidly to complex problems often experienced in operations.

Benefits:

- Rapid response
- Improve reliability
- Troubleshooting and root cause analysis
- Design and modeling
- Finite elemental analysis



ValvPerformance Testing™

Innovative Cycle Isolation Measurement

The ValvTechnologies' ValvPerformance Testing™ program utilizes next generation acoustic monitoring instruments to help customers monitor valve performance. These tools allow predictive and preventative maintenance programs to be fine tuned for very large or very small valve populations. Providing cycle isolation services can be as simple as performing a valve survey, or as comprehensive as the management of all valve work during your next outage — from erecting scaffolds to repairing, installing, welding and stress relieving.

Program Highlights:

- 1-4% in plant system efficiency increase
- Best-in-class valve leakage diagnostics
- Predictive maintenance savings vs. scheduled maintenance activities
- Overall reduction in maintenance costs
- Target only high-value, fast-payback repairs and replacements
- Ease of execution
- Fast results with minimum effort
- Analyzed reports of our findings
- Non-intrusive to plant operations

ValvTechnologies

Cycle Isolation Test Results

Introduction
The following report details the testing methods employed and results obtained during cycle isolation testing on December 2016.

Overall, the valve(s) or valve(s) tested met or exceeded the performance goals set for the project. The program was a success and the results are being used to improve the plant's overall performance.

Leak Rates or Passing Rates
ValvTechnologies' extensive test bench software, an extensive database of laboratory test results and our experienced engineers who together with our customers' Energy Engineers based on energy measurements to accurately identify and quantify valve leaks and/or passing rates. The process is fully automated and repeatable.

- All fluid through a construction from high pressure to low pressure, it produces turbulence. The degree of turbulence is related to the rate of fluid flow through the construction.
- In the field, the degree of turbulence is recorded indirectly via an associated signal (for ultrasonic sensors). Knowledge-based software is used to correlate the recording for an extensive database containing all relevant properties for an array of valve types and conditions of service with laboratory test results. The program returns a leakage rate for the subject.

Testing services are 100% reliable and non-invasive to normal plant operations.

Energy/Water Losses and Associated Costs
ValvTechnologies' energy loss analysis tool provides the product of the workhorse fluid analysis and mass flow rate of all passing the valve working surface. The cost of energy losses is developed by applying the Cost of Cycle Isolation and the product of the flow rate.

The results are always in the attached spreadsheet with all data values recording the values with the highest losses are recorded in red text. The results are always in red text and values which are assigned to be corrected for their repair or replace. The results are always in red text and values which are assigned to be corrected for their repair or replace.

A Cost of Cycle Isolation (CCI) was calculated for the test and was found to be a significant cost of \$100,000.

Nearly 20% of the total losses were attributed to the 10 valves listed below. These contribute nearly 500 kg of test results to the total and \$100,000 per year. We would recommend doing an economic analysis to determine the best way of managing a valve in a plant system.

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Cycle Isolation Test Results

Leak rate to Economic Impact Pareto

Top 10 contributors to Leak Rate

Valv No.	Valve Tag	Manufacturer	Valve Type	Plant Area	Process	Pressure (PSIG)	Temp. (F)	Leak Rate (kg/hr)	Energy Loss (\$/hr)	Leak Rate (\$/hr)
41	MS00000001	Control Valve	40	Steam	100	200	200	0.010	0.010	20.000
42	MS00000002	Control Valve	40	Steam	100	200	200	0.010	0.010	20.000
43	MS00000003	Control Valve	40	Steam	100	200	200	0.010	0.010	20.000
44	MS00000004	Control Valve	40	Steam	100	200	200	0.010	0.010	20.000
45	MS00000005	Control Valve	40	Steam	100	200	200	0.010	0.010	20.000
46	MS00000006	Control Valve	40	Steam	100	200	200	0.010	0.010	20.000
47	MS00000007	Control Valve	40	Steam	100	200	200	0.010	0.010	20.000
48	MS00000008	Control Valve	40	Steam	100	200	200	0.010	0.010	20.000
49	MS00000009	Control Valve	40	Steam	100	200	200	0.010	0.010	20.000
50	MS00000010	Control Valve	40	Steam	100	200	200	0.010	0.010	20.000

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ValvTechnologies' Planned Preventative Maintenance (VPPM)



VPPM can improve the reliability of your plant, extend the life of your assets, reduce operating expenses and eliminate the need for unnecessary capital expenditures.

While zero-leakage is 100% guaranteed when the valve is supplied, a level of inspection and maintenance is required to ensure longevity and seal effectiveness for many years to come.

ValvTechnologies' valves around the world continue to deliver zero-leakage in severe service applications up to 20 years or more after installation. This is achieved through ongoing VPPM which prevents catastrophic valve failure.

VPPM Benefits:

- Improved reliability
- Safe operations
- Reduce operational and maintenance costs
- Extends the life of the valve
- Detailed inspection reports
- Commitment to customer satisfaction

How often?

ValvTechnologies recommends the following VPPM cycles:



WALK-DOWN



INSPECTION



OVERHAUL

VALVE	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 6	YEAR 8	YEAR 10	YEAR 12
V Series up to 4"	Person	Person	Person	Inspection	Person	Overhaul	Person	Inspection
V Series/ERV over 4"	Person	Person	Person	Overhaul	Person	Overhaul	Person	Overhaul
IsoTech®	Person	Person	Person	Overhaul	Person	Overhaul	Person	Overhaul
NexTech®	Person	Inspection	Person	Overhaul	Person	Overhaul	Person	Overhaul
TrunTech®	Person	Inspection	Person	Overhaul	Person	Overhaul	Person	Overhaul
Xactrol®	Inspection	Overhaul	Inspection	Overhaul	Overhaul	Overhaul	Overhaul	Overhaul
AbrasoCheck®	Inspection	Overhaul	Inspection	Overhaul	Overhaul	Overhaul	Overhaul	Overhaul

These are general guidelines. An optimal VPPM plan for your process can be developed to ensure the best fit preventative maintenance plan.



Testing

Valves repaired in our facility are fully tested per OEM requirements. Testing capabilities range from 3/8" to 36".

Benefits:

- Accurately validate the quality of the repair
- Comprehensive test report
- Reduced downtime with on-site high-pressure testing equipment
- Testing capabilities for all valve components, actuator and instruments

Full Overhaul/Outage Support

Our dedicated staff of experienced service professionals can ensure that all aspects of your valve overhaul during outages are done safely and efficiently.

We offer a widerange of support:

- Parts planning
- Disassembly
- Full repair
- Assembly and testing
- Start-up and commissioning and more

Spare Parts

The service team supports maintenance / repair parts sales for both current and out of production designs of the product offering. Many current production parts can ship in a matter of a few days as a result of the extensive inventory for various valve types that is maintained at our Houston headquarters. The team of service coordinators and service engineers will assist you with getting the parts identified and supplied to meet your maintenance / repair needs.

Benefits:

- Shorter or reduced outage schedules
- Allows for service of older model valves
- OEM certified parts to OEM specifications



OEM Service Subsidiaries



Portersville PRD

Portersville PRD is a certified valve service and repair facility and leading provider of highly engineered, safety critical valves and related products and solutions for the power, oil and gas industries. With numerous facilities, Portersville PRD is recognized for its engineering and technical expertise and focus on solving the most difficult industry challenges.

Portersville PRD equipment includes:

- 50,000 sq. ft. for service facility fully equipped to support your repair needs
- Shop areas boast impressive overhead crane coverage
- Full machine shop with lathes, mills, vertical and horizontal boring mills
- Valve test facilities (hydrostatic, air, shell)
- In-line and shop weld repair
- In-line machining
- VR certification
- Steam boiler to test safety valves per code requirements. Certifications include R, NB, VR, UV, V.
- Safety valve shop - testing capabilities include:
 - Air - up to 10" and 6100 psi
 - Steam - up to 10" and 1400 psi
 - Liquid - up to 17,400 psi

MCE Group plc

MCE Group plc, UK-based valve repair and shutdown services facility, commenced trading in 1990 offering mechanical, electrical and instrumentation services to the power generation and process industries. Over the years, MCE has streamlined its activities, in order to concentrate our core business on the provision of valve shutdown and repair services. MCE provides factory-authorized valve modifications and repairs to customers throughout the UK. MCE is a distributor of ValvTechnologies' severe service products.



Celtex Industries

Celtex Industries is an industrial distributor for valves and valve automation located in White Oak, Texas. Products include manual and automated valves, electric and pneumatic actuators and accessories from the leading manufacturers in their industries.

All valve automation, including mounting hardware fabrication, assembly and testing, is done in house by experienced technicians. The knowledgeable sales staff works directly with customers to understand their needs and is dedicated to offering the best customer service available.



Authorized Repair Centers

ValvTechnologies global network of certified service centers ensures our customers have access to the factory-trained technicians around the world who can quickly provide the services you need. Technicians have been trained by ValvTechnologies in Houston and are committed to being there when you need it.

ValvTechnologies Limited India

ValvTechnologies India assembles and repairs ValvTechnologies products as well as supports the company's global sourcing initiatives, including on-site vendor selection and product inspection.

Zero-leakage Valve Solutions



Global Authorized Repair Centers

Find a local ARC, visit: www.valv.com/authorized-repair-centers

Emergency Service Hotline

Available 24 hours a day, anywhere around the world, call +1 832.652.3607

Worldwide Office Locations

Australia

Brazil

Canada

Chile

China

Colombia

India

Japan

Kazakhstan

Malaysia

Poland

Saudi Arabia

Singapore

South Korea

Spain

Thailand

Turkey

United Arab Emirates

United Kingdom

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