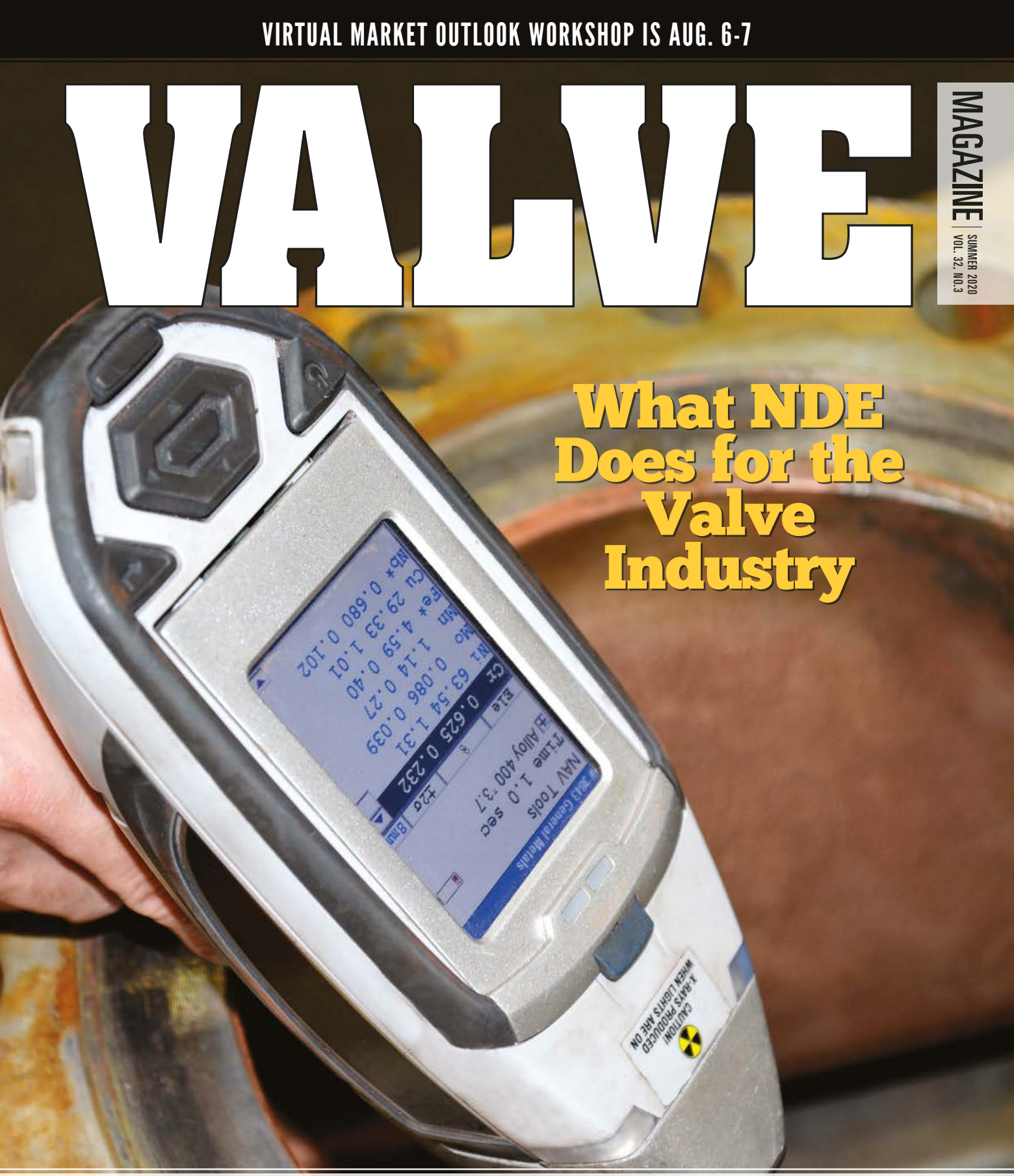
VIRTUAL MARKET OUTLOOK WORKSHOP IS AUG. 6-7

VALVE

MAGAZINE | SUMMER 2020 | VOL. 32, NO.3



What NDE Does for the Valve Industry

- HELPING OUT DURING THE PANDEMIC
- PNEUMATICS IN THE DIGITAL AGE
- CONTROL VALVE PACKING
- METALS USED IN VALVES

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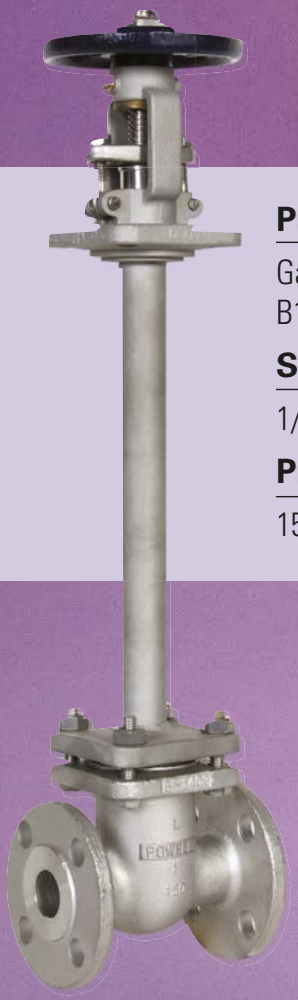

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Pressure Class

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VALVE MAGAZINE
SUMMER 2020 | VOL. 32, NO. 3

VALVE MAGAZINE

www.VALVEmagazine.com

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VMA VALVE MANUFACTURERS ASSOCIATION OF AMERICA
The voice of the flow control industry

www.vma.org

Our Changing World

Since the beginning of this year, we've been reminded time and time again of the words of the ancient Greek philosopher Heraclitus, who said, "the only constant in life is change." Just a few months ago, most of us believed this pandemic was a significant-enough event to be considered the game-changer of the year—if not the decade. Yet we're now facing additional issues from prolonged economic downturn as well as social and political unrest. These issues are all important and are challenging our industry, our companies and all of us as individuals. How we respond individually and collectively will also be game-changers.

One constant, however, is that the essential valve industry perseveres just as we have for several hundred years. Those working in the industry will continue to innovate, manage through crises and overcome hurdles—all while producing products that are essential to countless end-user industries that are indispensable to today's society. This issue highlights some examples of how the industry is continuing to move forward.

Read about how companies have reacted to the COVID-19 crisis by reaching out to help communities and businesses in need (see page 18). We also take a look at how to evaluate and test valves and equipment to ensure that products continue to perform well. We've included information on how new technology and advances in manufacturing and materials science are being applied to our industry, topics we address further in our online content.

The valve industry remains steadfast in its determination to produce and deliver quality products that serve customers. VMA will do the same as the industry's association, whether that means providing knowledge and education through this magazine, virtual events or in-person events; representation for the industry within the government; or connecting the industry together through networking and business opportunities.

Change may be a constant factor in today's reality, but VMA, the industry and our member companies are up to the task. VM

Heather

Heather Rhoderick, CAE
President

Air leaks in my pneumatic system are wasting energy, and affecting the performance of my machine. I need continuous monitoring that can identify them quickly.

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NEW CONTRACTS

ProMation, FloTech Providing Actuators to NASA

ProMation Engineering will supply electric actuators to the high-pressure industrial water facility at Stennis Space Center (SSC). The facility provides cooling water to the largest test stands at SSC during static single or multi-engine testing.

ProMation sales engineers worked closely with NASA personnel to determine the correct configuration of the actuators to be installed. Once the correct configuration was determined, ProMation worked with key partner FloTech Inc. to identify the correct valve and coupler to complete the specification.

Baker Hughes Supplying LNG Project

Baker Hughes has been awarded the contract to supply turbine bypass valves and condenser back-pressure dump tubes to Exxon Mobil's Golden Pass LNG site for the new expanded combined cycle power plant procured through Chiyoda Corporation of Japan.

The LNG project is adding liquefaction and export capabilities to its existing facility in Sabine

PEOPLE IN THE NEWS

MRC GLOBAL... President & CEO **Andrew Lane** announced he will retire and resign from the board effective Dec. 31, 2021. Lane has served as a director of MRC Global and president and CEO since September 2008 and was the MRC Global chairman of the board from December 2009 until April 2016, when the positions of chairman of the board and CEO were separated.

CRANE... chairman **R.S. Evans** has retired in accordance with the company's director retirement policy. **James L. L. Tullis**, a Crane Co. director since 1998, became chairman upon Evans' retirement. Evans was with Crane for 47 years, including 36 years as chairman and 17 years as CEO.

According to Crane Co. president and CEO **Max Mitchell**, Evans drove substantial change to the company's portfolio, operations, strategy and culture and has been a singular focus on building shareholder value while adhering to the tenets of the R.T. Crane resolution.

CONVAL... announced that **Kris Stevens** has been appointed inside sales manager. Stevens replaces **Austin Wilkie**, who retired after many years with the company.

Stevens served in the U.S. Navy Nuclear Program as a nuclear steam power plant mechanic aboard the USS George H.W. Bush and transitioned to the private sector in 2013, becoming nuclear contracts administrator at Conval. In this role, he dealt with Conval nuclear valve design codes, specifications, contracts and general sales activity.

CURTISS-WRIGHT... vice president and CFO **Glenn E. Tynan** announced plans to retire after 20 years with the company, the past 18 as CFO. Tynan will continue to serve as a vice president to assist the executive team with the transition until his retirement this fall.

K. Christopher Farkas has been promoted to vice president and CFO. Farkas has served as vice president of finance and corporate controller since 2017. Before joining Curtiss-Wright, Farkas spent more than 17 years in financial, technical and operational roles of increasing responsibility within Fortune 50/250 industrial companies.

OPTIMATION TECHNOLOGY... announced it has a new COO: **Wendy Smith**. She has over 30 years' experience in plant operations and design and engineering services management.

Wendy Smith

In 2003 Smith joined the company as the mechanical and process engineering/design supervisor as well as the COO of Klug Systems (a company that Optimation had recently acquired). Over the next 15 years, Smith took on additional management and leadership roles. Besides serving as COO, Smith is a member of the sales team and the executive team, and sits on the board of directors.

VICTAULIC... has appointed **Rick Bucher** to the position of president and COO. Bucher will continue reporting to **John F. Malloy** who has served as chairman, president & CEO for the past 16 years. Malloy will remain chairman and CEO.

Bucher began his career with Victaulic in 2009 as vice president, product development, and rose to the position of executive vice president, technology and product development. In June 2019, he was named COO.

BADGER ALLOYS... has named **Richard Flahive** operations manager. Flahive brings 33 years' experience to Badger Alloys managing both ferrous and nonferrous foundries and serving most recently as vice president of manufacturing for an iron castings company.

WOLSELEY INDUSTRIAL GROUP... vice president **Rob Braig** is the newest member of the PVF Roundtable Board of Directors. The roundtable is an organization of industry professionals involved in the pipe, valve and fitting (PVF) industry committed to providing an open dialogue to exchange relevant information, creating awareness of current industry affairs that affect the entire PVF community.

RICHARDS INDUSTRIALS... named **Jordan Bas** its new president and CEO. Bast succeeds **Bruce Boxterman**, who is retiring after 15 years as president/CEO, but will remain a member of the board of directors. Bast brings vast experience in business development and management across different process industries and discrete manufacturing.

Jordan Bas

ADMIRAL VALVE... has appointed **Robert Maza** inside technical sales manager. Maza has more than 25 years of experience in the technical and industrial sales fields. He most recently served as the director of sales and business development for Neutronics Inc. in Exton, PA.

VALVTECHNOLOGIES... has appointed **David Birks** as regional sales director for the Middle East and Africa. He will be based in Dubai, United Arab Emirates.

With more than 20 years' experience in the valve manufacturing industry, Birks brings extensive international sales and business management experience to ValvTechnologies. Most recently, he served as vice president of sales project pursuit for Emerson Valves.

Baker Hughes is supplying to Golden Pass, which is increasing export capacity by about 16 million tons.

Pass and will increase overall export capacity to about 16 million tons of LNG per year. The current Golden Pass LNG terminal campus includes five, 155,000-cubic-meter LNG storage tanks, two marine berths capable of offloading ocean-going LNG carriers and process facilities capable of re-gasifying LNG to produce 2 billion standard cubic feet of natural gas per day.

Wolseley and Union Tech Announce Distribution Agreement

Union Tech and Wolseley Industrial Group, a division of Ferguson Enterprises, LLC, have signed an agreement for the exclusive distribution of Union Tech's severe-service metal-seated and rising-stem ball valves throughout the Western U.S.

AUMA Wins Major Tank Farm Order

AUMA has won the largest order in the company's history, which is to supply 2,756 explosion-proof electric actuators for the HES Hartel Tank Terminal in the Port of Rotterdam, the Netherlands. AUMA is the sole actuator supplier for the project.

When operational, HES Hartel Tank Terminal will have storage capacity for 1.3 million cubic meters of clean petroleum products and biofuels in 54 tanks. The 27-hectare site also has moorings for six vessels up to VLCC size and nine barges.

HES International is one of Europe's largest independent terminal operators in dry and liquid bulk products. The company has a long relationship with AUMA, which has previously supplied actuators for HES Botlek Tank Terminal in Rotterdam.

EGC Enterprises Becomes ITAR Registered Manufacturer

EGC Enterprises has achieved certification from the Directorate of Defense Trade Controls (DDTC) as an International Traffic in Arms Regulations (ITAR) registered manufacturer. ITAR certification is the export control regulation overseen by the U.S. State Department. It is used to control items on the U.S. Munitions List and the Missile Technology Control Regime Annex and applies to defense-related applications for military end use.

Emerson Enters into 7-Year Saudi Alliance

Emerson has signed a strategic agreement to serve as a preferred automation services and technologies provider with Saudi Basic Industries Corporation (SABIC) to help the petrochemical manufacturer successfully adopt digital transformation programs and optimize operations.

Valtorc Providing Valves for NASA

Valtorc International, USA manufacturing operations has been tapped to fabricate V ball control valves for an upcoming NASA project. Valtorc has been working with many private space companies to provide USA fabricated V ball control valves to critical infrastructure projects.

AWARDS & MILESTONES

Teadit Honored with 2019 SEAL Award

Teadit North America was recently presented the SEAL (Sustainability, Environmental Achievement and Leadership) Award, which recognizes Environmental Initiatives. This is the first of several accolades for Teadit's Origin Technology that is based on the sustainability of its manufacturing process. The technology has received multiple awards in other areas. The award entries were evaluated based upon key criteria such as impact metrics, innovation, sharing of insights and investment levels.

Emerson Wins 2020 Edison Award

Emerson's Plantweb digital ecosystem has been named a 2020 Edison Awards winner in the Innovative Services category.

Emerson's Plantweb was chosen as a winner by a panel of more than 3,000 business executives from the fields of product development, design, engineering, science, marketing and education.

AUGUST

6-7
VMA Virtual Market Outlook Workshop
www.vma.org/MarketOutlook2020

SEPTEMBER

9-11
VMA/VRC Virtual Annual Meeting*
www.vma.org/AnnualMeeting

OCTOBER

3-7
WEFTEC 2020 (Virtual)
New Orleans
www.weftec.org

DECEMBER

1-3
Valve World Conference & Exhibition
Dusseldorf, Germany
www.valveworldexpo.com

8-10
POWERGEN International
Orlando, FL
www.powergen.com

ALSO COMING THIS FALL ...

VMA Virtual Valve Basics Seminar
www.vma.org/ValveBasics

VMA Virtual Valve Forum
www.VMA.org/ValveForum

* Open to VMA/VRC members only. Visit www.VMA.org to learn if your company qualifies for membership.

VALVE MAGAZINE

STAFF

PUBLISHER
Heather Rhoderick

ASSOCIATE PUBLISHER/
EDITOR-IN-CHIEF
Judy Tibbs

MANAGING EDITOR
Genilee Parente

WEB EDITOR
Barbara Donohue

ASSISTANT EDITOR
Chris Guy

CONTRIBUTING EDITOR
Greg Johnson

ART DIRECTOR/
PRODUCTION MANAGER
Michelle Wandres

ADVERTISING DIRECTOR
Sue Partyke

How to Contact VALVE Magazine

EDITORIAL OFFICES
phone: 571.274.0402
email: jtibbs@vma.org
www.ValveMagazine.com

ADVERTISING SALES
Sue Partyke
145 Harrell Road
Suite 119
Fredericksburg, VA 22405
phone: 540.374.9100
fax: 540.374.9265
email: spartyke@vma.org

CIRCULATION/SUBSCRIPTIONS
phone: 570.567.1193
fax: 570.320.2079
email:
valve@psaemail.com

NEW PRODUCTS, MEDIA AND INDUSTRY NEWS
Chris Guy
phone: 571.274.5224
email: cguy@vma.org

ARTICLE SUBMISSIONS
VALVE Magazine welcomes articles, proposals, manuscripts, photographs and ideas from our readers. For a copy of the magazine's Author's Guidelines, contact Genilee Parente, managing editor, at gparente@vma.org.

Emerson's expansion also includes an innovation center.

NEW FACILITIES

Emerson Plans $100 Million Expansion in Boulder, CO

Emerson will invest more than $100 million in Boulder, CO to significantly expand its manufacturing space and launch a new innovation center focused on research, new product development and industry training for its advanced flow measurement products.

The nearly 180,000-square-foot expansion includes a new, 85,000-square-foot laboratory and manufacturing facility to design and develop products, technologies and software that measure and control the flow of material in a manufacturing process.

REXA Opening New Sales/Service Office

REXA is opening a new sales/service office in Marietta, GA. The building was formally the home of REXA representative Process Measurement and Control Corporation (PMCC).

Owned by Trey Vaughan, PMCC represented the REXA product line for over 25 years. To streamline sales and service for a large and growing installed base in the southeastern U.S., Vaughan has agreed to dissolve PMCC and join REXA directly as the southeastern United States territory manager.

Powell Valves Moving to New Facility in Cincinnati

After 174 years in the same Cincinnati location, Powell Valves moved so that its neighbor, KAO USA, can expand its facility.

Powell agreed to sell its headquarters to The Port of Greater Cincinnati Development Authority and use the proceeds to build a new facility on four acres of land that The Port owns just north of the former Sara Lee/Kahn's manufacturing site on Spring Grove.

Flotech Moves Valve & Automation Shops to New Facility

Flotech, Inc. recently moved to a 175,000-square-foot building in Jacksonville, FL to accommodate its growing service, automation and sales activities. The company has locations in Florida, Alabama and South Carolina.

The new facility consolidates Flotech's machine shops, automation center, training facility, industrial and municipal valve distribution, sales and service teams under one roof. Valve services include testing, certifying, repairing, automating, and modifying manual valves, safety relief valves and process control valves. VM

Metso Becomes Neles USA Inc.

The company formerly known at Metso Flow Control is now Neles. In this country, the company is officially known as Neles USA Inc. Neles became an independent, focused flow control company July 1, 2020 after a partial demerger of Metso. Neles is a leading provider of mission-critical flow control solutions and services for process industries including chemicals, energy, gas and LNG, industrial gas, marine, mining, refining and more.

NELES

Flotech's new facility is 175,000 square feet.

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At United Valve, providing excellent valve repair turnaround work is a prime focus. We are adept at meeting tight turnaround schedules while providing the highest quality workmanship and engineering expertise.

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Our repair equipment includes lapping machinery for balls up to 36".

Our repair equipment includes lapping machinery for balls up to 36". The welding department, headed by our in-house welding engineer, can handle casting repair and upgrade on virtually any alloy, especially Cr/Mo materials

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Virtual Valve Forum and Valve Basics Coming this Fall

Like the rest of the world, VMA's plans for providing members top-notch educational and networking opportunities have had to change to adapt to a crisis of extraordinary proportions. Yet communicating with members and their customers, providing the industry and members with business intelligence, networking opportunities and education is part of the organization's backbone, and it will continue to be so in the future. The association has found innovative new channels for accomplishing this mission.

While the exhibition is moving to computer screens, suppliers and sponsors will be very much present during Valve Week. Each exhibitor and sponsor will have a virtual room so attendees can see each company's offerings, view demos, ask questions or even set up appointments for future discussions.

A GATHERING OF ALL THINGS VALVE

To provide a forum for bringing together people from across the industry, VMA is hosting its first-ever "Valve Week," to take place in late October or November. That will include the Virtual Valve Forum—VMA's most comprehensive gathering for all those who touch valves. It also will include the popular Valves Basics 101 course.

At the Valve Forum, thought leaders in the industry present information on manufacturing, technical, management, business and marketing, and valve repair topics, as well as showcase products and services for the valve, actuator and automation industry.

Roundtable discussions focusing on specific areas of interest will be part of the Valve Forum along will numerous opportunities to network with other participants, meet one-on-one, and visit sponsors to learn and ask questions about their products and services.

NEWCOMERS WILL BENEFIT FROM THE BASICS

The Valves 101 course teaches attendees the fundamentals of the valve industry including what types of valves are used in what applications, what the various types of equipment do, and what standards and regulations apply in the industry. In addition, up-close videos of various products will be shown as part of the curriculum to provide a better understanding of how this vital equipment works. The course is led by VMA's experienced team of volunteer presenters who will be available to answer the many questions asked by newcomers to the industry, who typically make up a large percentage of the Basics course participants.

The association is in the process of finalizing the schedule. Stay tuned to the VMA.org website and other VMA channels of communication for details.

The curriculum for VMA's Valve Basics course—designed to be product neutral—will be presented by our experienced team of member volunteers. In addition, videos will be included to show products "up close and personal," enhancing the educational experience. Shown here, Greg Johnson of United Valve.

New Careers Center to Open in September

VMA is launching a new Careers Center.

The center will be a place for companies to post jobs to the VMA Valve Network or to a larger network of STEM [science, technology, engineering and mathematics]-related organizations representing thousands of job seekers in those fields.

Companies will be able to search posted resumes for good candidates. Job seekers can use the center to find valve industry jobs as well as jobs for hundreds of companies in other STEM-related industries. For a fee, job seekers also will be able to get professional help in areas such as resume writing, interview tips and coaching, and other job-related areas.

VMA members will receive reduced pricing on the job networking site. Candidates and others seeking information on what valve careers will do for them can visit Valve Careers.com.

Questions? Email info@vma.org.

NEW MEMBERS

ProMation Engineering (www.promationei.com) has joined VMA as a full member. Based in Brooksville, FL, the company was founded in 2006.

ProMation manufactures, assembles, and designs electric actuators and flow control devices used on valves and dampers in water and wastewater, large heating and cooling facilities, oil and gas production, and industrial processing.

VMA also welcomed **Groth Corporation** (www.grothcorp.com) as a full member. Established in 1960, Groth Corporation manufactures pressure/vacuum relief valves, deflagration and detonation flame arresters, blanket gas regulators and other low-pressure relief products. The company's products are used in refineries, chemical processing plants and facilities with atmospheric storage tanks.

VMA Requests Action from Congress on Key Legislative Proposals

The Valve Manufacturers Association and other trade groups representing companies that employ millions of men and women have several key proposals on the front burner. To help members and other manufacturers move forward in renewing their businesses and expanding the economy, VMA has been in contact with congressional leaders to urge the passage of several of these critical legislative proposals.

Among the issues on which VMA has focused its efforts are tax credits, infrastructure and liability limitations. Legislative measures of importance include:

- Aiding the economic recovery by adopting an additional tax measure that would **accelerate the use of general business tax credits**. This policy would provide much-needed liquidity to companies to help with reopening and rehiring.
- VMA and other organizations feel that now is the time for Congress to make a bold and historic investment and **move forward with surface transportation reauthorization action** ahead of a Sept. 30, 2020 deadline (the date when the current infrastructure bill is due to expire). Passage of a long-term infrastructure bill will address the nation's longstanding infrastructure needs and provide stability and certainty for the manufacturing sector during this critical time.
- Essential industries such as the valve industry have remained operational during times of remarkable legal uncertainty, but in doing so, they risk becoming the targets of coronavirus-related lawsuits. Congress must act to **ensure that misguided litigation does not derail the nation's recovery**. Temporarily suspending lawsuits that threaten to shut down vital industries (including health care providers) is a sensible step to ensure every American has access to basic life essentials without creating new shortages and exacerbating the crisis.

Members: Make an Impact, Become a VMA Volunteer

Volunteers provide the foundation for all of VMA's activities. The association is driven by the people who are on the board of directors and various special committees or those who lend their expertise through presentations or teaching at one of the association's educational programs or events.

The VMA Board of Directors guides the overall direction of the association, along with providing financial oversight. Currently, the board is working on developing a Strategic Plan to map out the association's future path.

VMA committees include market outlook/statistics, technical, manufacturers, education & training, communications, and the VALVE Magazine Editorial Review Board.

The benefits of being a volunteer are many, including the opportunity to meet and learn from others in the industry, gain insights into trends, provide solutions to issues facing the entire industry, and demonstrate leadership that will help advance your company and the industry.

While the time required to volunteer is minimal, the impact is great. If you are a member of the association who would like to make an impact, contact VMA President Heather Rhoderick (hrhoderick@vma.org).

If you have been thinking about joining and would like more information on how to get involved, go to: www.VMA.org/AboutVMA.

Market Outlook: Gaining Invaluable Insight into the Future

One of the most challenging tasks people in the flow control industry face is determining what will happen in the future so they can make wise business decisions. Current economic pressures and complications from COVID-19 make those glimpses into the future more critical than ever, which is why 2020's VMA Market Outlook Workshop event should not be missed.

The virtual event is Aug. 6-7 and is put on by both VMA and the Hydraulic Institute (HI). It is packed with the same vital information as in past years—information that helps decision makers get up to speed on where valve end-user markets are today and where they are headed. In addition to the regular program, there is time built into the event for attendees to share experiences in virtual rooms on topics of mutual interest, ask speakers questions about their areas of expertise, chat with other attendees one-on-one and visit with sponsors and vendors to the industry.

The conference features economic experts in all of the valve markets including oil and gas, water/wastewater, power generation, commercial construction, chemicals, food and beverage, pulp and paper, as well as acclaimed economists in general areas such as the global and domestic outlooks, global trade and Wall Street.

The workshop welcomes back some well-known speakers such as Tom Decker, Thomas E. Decker Consulting (water/wastewater); Michael Halloran, Robert W. Baird & Co. (Wall Street); Johns Spears, Spears and Associates (oil and gas); and Sara Johnson, IHS Markit (Global Outlook), as well as new experts and economists.

In addition to sessions by 11 presenters, attendees can:

- Get answers from speakers on questions in their specific area of expertise.
- Save the cost of travel while getting the same valuable information presented in past years.
- Engage in industry roundtables with peers to hear about best practices and common challenges.

VMA and HI have created substantial discounts so that companies can enroll more than one staff member.

For more information and to register, go to www.VMA.org/MarketOutlook2020. VM

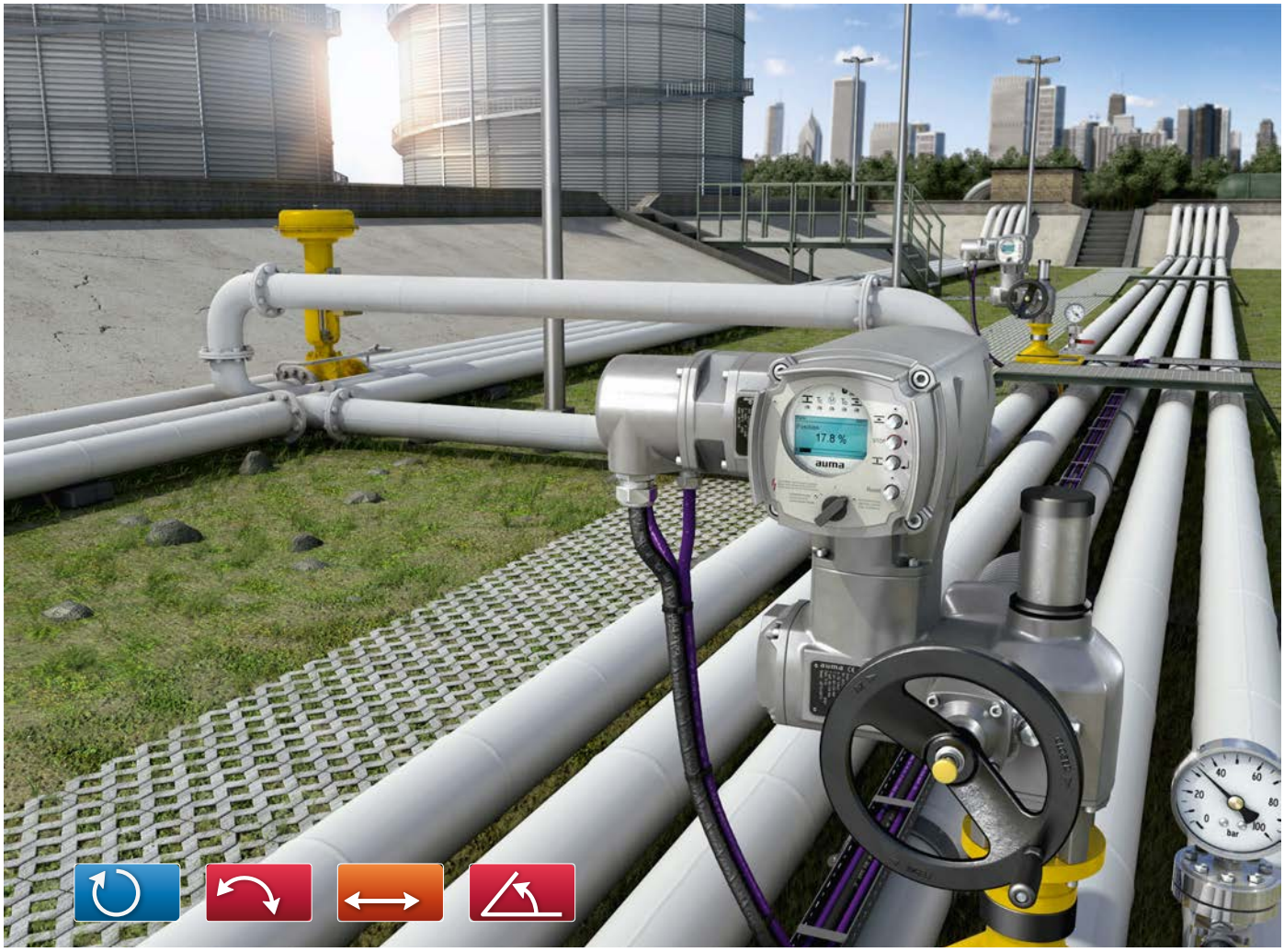
WEFTEC 2020 Goes Fully Virtual

WEFTEC 2020, which is scheduled for Oct. 5-7, has gone virtual through a new program WEFTEC Connect, which provides attendees interactive education, an exhibitor showcase and networking experiences.

The 93rd Annual Technical Exhibition & Conference for the Water Environment Federation (WEF) offers workshops, technical sessions and a comprehensive exhibition showing the latest and best water quality equipment, solutions and services. The event covers three focus areas: the circular economy, resilience and the water/food/energy nexus.

WEFTEC Connect will include live streams of the opening general session; technical sessions; on-demand, prerecorded technical presentations; and more. It also will include a virtual exhibitor showcase and the ability to schedule virtual chats for networking opportunities.

Registration is now open. For information, go to www.weftec.org.



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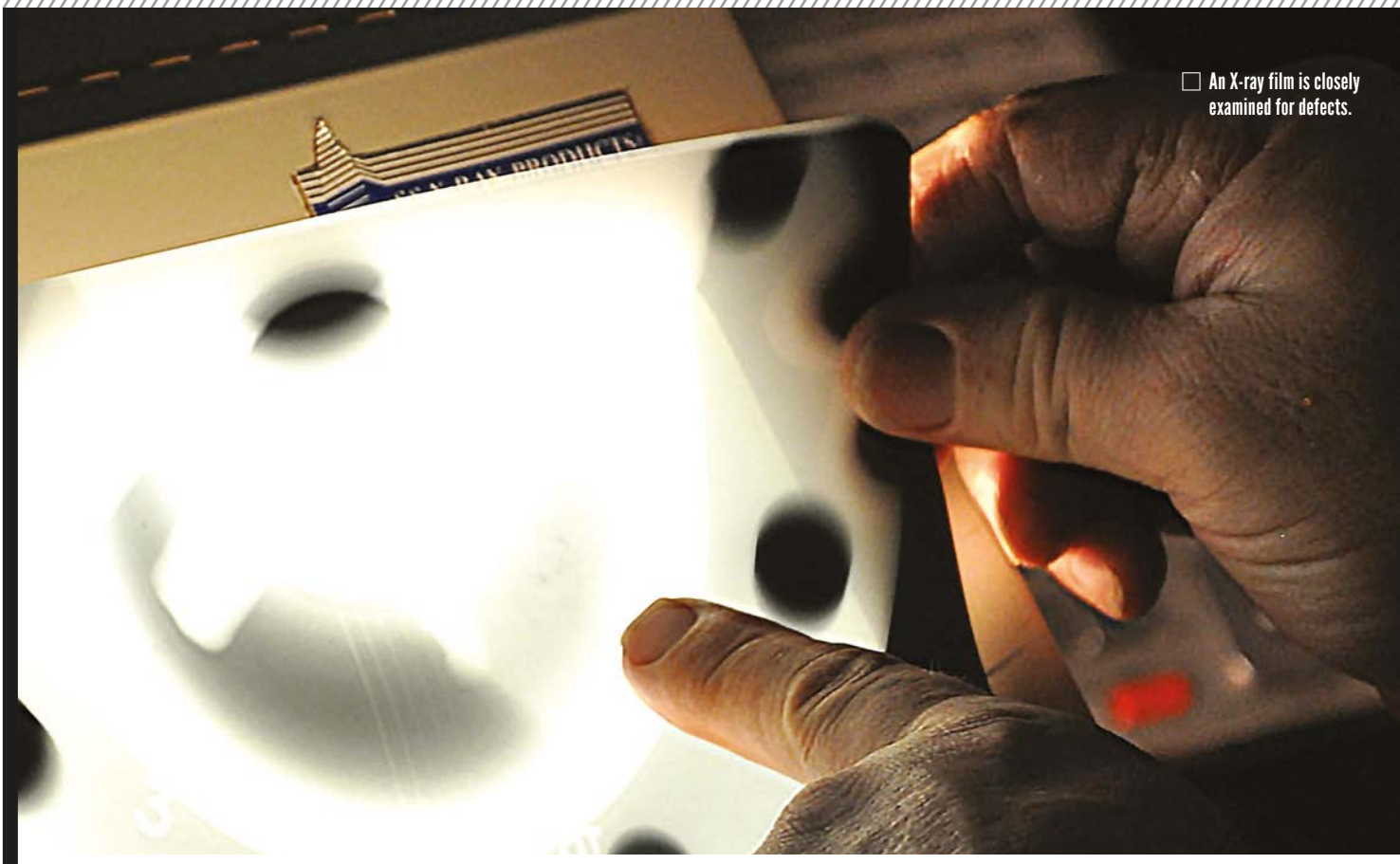


An X-ray film is closely examined for defects.

Beauty or a Beast?

Using NDE on Valve Components

BY GREG JOHNSON

When it comes to valves, "beauty is only skin-deep" is often a true statement. Since Superman and his X-ray eyes don't really exist, there is no way to verify the quality of a valve or valve component by just looking at it. To discover defects we can't see with the naked eye, we have to use principles of physics and chemistry to delve deeper into component quality. To do that, we often call upon the techniques of nondestructive examination (NDE).

The American Society of Nondestructive Testing defines NDT as:

> *"The determination of the physical condition of an object without affecting that object's ability to fulfill its intended function."*

This makes the use of NDE methods ideal for valve manufacturers that want to evaluate components and still use them in production without damaging them when it is determined that they meet the desired acceptance criteria.

NDE has been used on valve components since the late 1930s. However, the second world war and the infant nuclear industry propelled NDE into acceptability within the valve industry.

The stringent quality requirements, developed and implement-

Executive Summary

SUBJECT: Those who make valves and related components and those who buy them need a way to tell what's below the surface of the materials and construction. Nondestructive Examination (NDE) methods help in that endeavor.

KEY ISSUES:

- Types of NDE
- What they can unearth
- Standards issued for examination

TAKE-AWAY:

NDE methods continue to be fine-tuned and results interpreted so that quality can be assured.

ed by Admiral Hyman Rickover in the construction of the Nautilus ("Nuclear Navy"), were used by several manufacturers selling valves for use in this critical, highly lethal service. During the mid-1950s, the Manufacturers Standardization Society (MSS) began work on a series of NDE standards for valves that had their genesis in the nuclear valve program of the time. The precepts of these standards are still in use today.

Most of the same MSS committee members were also involved in the creation of American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME) B16.34, Valves–Flanged, Threaded and Welding End published in 1973. This document contains (almost verbatim) the same wording of the MSS NDE standards. The B16.34 document still contains the most referenced NDE requirements in the industry, echoing some of the early quality requirements of the nuclear industry.

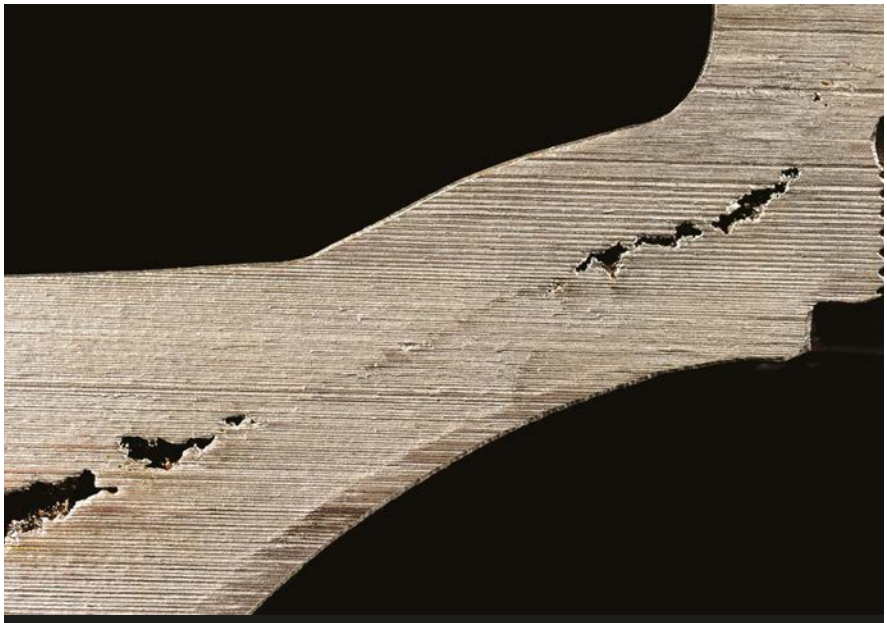
Although the purpose of the NDE requirements in B16.34 is to allow users to upgrade the pressure rating of valves based on the performance of required NDE, similar requirements and acceptance criteria are referenced in many other applications where added examination is desired.

NDE methods are typically divided into two categories: Volumetric and surface methods. Volumetric methods are capable of examining the entire, through-wall thickness of the part. Surface methods are capable of detecting discontinuities exposed to the surface of the part being examined. Some common NDE methods include:

RADIOGRAPHY

Radiography (RT) is a technique for volumetric examination of a component. Radiography is excellent for detecting defects in castings but is unsuitable for locating defects in forgings where ultrasonic examination is used instead.

RT results have been much debated over the last 20 years as the NDE method was applied to hundreds of castings from low-cost manufacturing companies. To the untrained eye, a radiograph with mild to moderate defects is hard to grade. Even well-trained radiographers sometimes have problems interpreting the film results, especially if they do not regularly "shoot" castings or evaluate casting radiographs.



This cut-away of a gate valve bonnet shows defects originally revealed as level 5 shrinkage during radiography.

Radiographic defects are segregated into defect types and levels of severity. These are shown on books of actual reference radiographs published by ASME. The severity levels run from level one–no defects to level five–numerous defects. All of these are in a prescribed geometric area. Additionally, B16.34 lists the locations on the valve components where they should be radiographed and graded; these are called critical areas. A problem with only grading these critical areas occurs when a defect just outside those areas is observed on the radiograph. Technically, that area can't be evaluated because it is outside the area of interest, even if the defect is horrendous.

To alleviate the potential acceptance of out-of-scope defects, many end users request RT of 100% of the pressure boundary (i.e., the body and bonnet). This eliminates the chance of ignoring or missing defects that are outside the area of interest.

For decades, when radiographic testing was required, the stringent B16.34 acceptance criteria were specified, even though that criteria was originally designed to provide a level of casting integrity allowing the pressure rating of a valve to be upgraded. The intent was never to use the criteria to qualify a standard valve. When RT is required to evaluate valves in standard service applications, the policy of many end users today is to lessen most defect B16.34 acceptance levels by a step. For example, instead of requiring no shrinkage defect be over level two, level three may be specified instead.

Some critical services such as hydrogen and hydrofluoric acid demand the highest quality castings. The radiographic film for these valve components is often interpreted to a higher acceptance criteria level.

RT is also a popular examination method for evaluating weldments. It is especially valuable for spotting inclusions or voids in the weldment, as well as the lack of penetration (incomplete fusion between the weldment and the base material) in the weld.

ULTRASONIC

Ultrasonic examination (UT) is the other main volumetric NDE technique. It is used primarily to examine forged and wrought components, as well as weldments. The industrial UT process is similar to medical UT examination, in that a probe in contact with the couplant-coated area to be examined is gently moved around while the inspector views the results in real-time on a screen (CRT).

In some instances, UT is not preferred for use in castings because the ultrasonic beam reflects off the grain boundaries (inherent in a casting), providing a screen full of false (non-relevant) images. When inspection of the interior of forged valve components is required, UT is the clear choice. However, caution must be taken that components with sharp machined corners are not examined because these can also give false readings. Dimensional UT-based units, often referred to as "D meters," are used to determine the thickness of various components.

MAGNETIC PARTICLE

Magnetic particle (MT) testing is a technique for inspecting the surface (or slightly sub-surface) of parts of a ferrous component, such as carbon steel or martensitic stainless steels. The operation begins with the application of ferrous powder (typically colored red) to the surface of the part to be checked. After that, a low-voltage, high-current charge is applied to the area via a portable yoke or by inducing a magnetizing current through the entire component.

The magnetized powder is attracted to discontinuities such as cracks on the surface or slightly below. The MT technique is also sometimes used in conjunction with radiography to confirm whether or not a sub-surface (volumetric) defect is very close to the surface.

DYE PENETRANT

Dye penetrant (PT) examination is also used to detect defects on the surface of a component. Unlike MT testing, PT testing can be performed on any metal surface regardless of chemistry. PT is excellent for discovering cracks or other discontinuities open to the surface, including overall poor surface finish.

PT examination begins by applying penetrant to a pre-cleaned surface of the component. The penetrant is allowed to penetrate into any discontinuities (dwell time) and then the excess surface penetrant is carefully removed. After all the penetrant appears to be removed, a developer is applied to the part. Any issue will

☐ Dye penetrant (PT) shows cracks on this hard-faced overlay.

show up as a reddish indication or blob of varying geometries, depending upon the shape and depth of the discontinuity. By observing the overall amount of bleed-out of penetrant, a general idea about the depth of a defect can be determined.

Unlike UT and RT, MT and PT testing techniques can be learned relatively quickly. Both of these surface defect indicator tests are useful as in-progress methods of quality assurance during manufacturing.

HARDNESS TESTING

Although not always technically a non-destructive method, hardness testing is a bit different from the examination techniques of RT, UT, MT and PT in that the results of the tests do not directly identify defects. Instead, they're used to confirm the mechanical properties of a component. For example, hardness testing can confirm whether or not a specific heat treatment has been performed correctly, such as annealing or stress relief.

Many types of hardness machines and devices exist as well as several hardness scales. The most popular hardness scales in the valve industry are the Rockwell C (RC) and Brinell (BHN) scales.

Hardness testing can also be used to estimate the strength of plain carbon steels. Published charts show a correlation between carbon steel material hardness and tensile strength. However, this correlation does not apply to any metallic materials other than plain carbon steels.

Hardness testing of valve components is often performed on components used in sour gas service (H_2S). Carbon steels in this service are usually limited to a hardness of RC22 maximum.

POSITIVE MATERIAL IDENTIFICATION (PMI)

PMI is a testing method using electronic devices often containing radioactive isotopes to determine the approximate chemistry of a component or to confirm the probable identity of the material. The most popular technique is X-ray fluorescence (XRF). XRF analyzers determine the chemistry of a test piece by measuring the fluorescent X-ray emitted from that piece when it is excited by an X-ray source.

XRF is a valuable tool for confirming or verifying the chemistry of a sample. Conflicts sometimes arise, however, when a PMI result is used to override a previous laboratory analysis. Portable XRF is not as accurate as modern laboratory methods in use today, but it's very close.

A new PMI technique that is more accurate and offers more analysis capabilities than XRF is laser-induced breakdown spectroscopy (LIBS). A portable LIBS analyzer can even detect carbon content and verify plain carbon steels, which XRF cannot do.

The third PMI technique is optical emission spectroscopy (OES). OES uses electricity to excite the sample for taking a reading. The technique is also a bit destructive because it slightly melts the surface of the sample. Like KIBS, OES can sense carbon, but unlike LIBS and XRF, an easy-to-use handheld instrument version is not available. OES is usually housed in a sizable system that can be carried in a large backpack or cart, but it is best suited for indoor applications.

INSPECTION OF CASTINGS/WELDMENTS

Two testing areas have garnered the most attention when it comes to NDE of valve components—casting quality and welding quality. Since both are common in valve manufacture and installation, additional focus is required.

For the last 25 years, products from low-cost countries that have proliferated throughout the industry and supply chain have caused casting quality to be under hyper-focus. The most troublesome casting issues have been volumetric, and these can be

divided into two areas—those related to workmanship and those related to performance. While workmanship defects can be indicators of the culture of quality at a foundry, the defects themselves are generally not threatening to the component. Performance defects are a different case, and they should be given much more scrutiny.

Workmanship defects could include lower levels of shrinkage (1-3) or sand inclusions (1-3). While these may be troublesome in a valve used in nuclear or hydrogen service, they are usually not an issue in general applications. Unfortunately, many good valves in the past were discarded because of workmanship defects, even though there was no scientific basis for the rejection.

Many of the misconceptions over casting quality have stemmed from the history of B16.34, its critical areas and its acceptance criteria. An important note here is to remember the genesis of this document—the nuclear valve program. Because the document sprung from that program, the industry assumed for decades that volumetric quality had to be (and was in fact) as high in cast steel valve components. Still, some defects are not okay for any service. Among those are massive level five, and higher shrinkage and hot tears (shrinkage open to the surface).

WELDING DEFECTS

Welding is often used in manufacturing valves—from weld overlays of sealing surfaces to the attachment of pressure-containing components. NDE is often specified to confirm the quality of those weldments.

One of the most important characteristics of a good weld is how the filler material blends into the component to which it is attached. In welding parlance, this is called fusion and penetration. Both ultrasonic and radiographic techniques are used to confirm that these criteria have been met. Of the two techniques, radiography is somewhat easier to confirm results.

Surface irregularities, including a lack of penetration, are verified using both PT and MT test methods. However, the MT testing protocol can only be used on ferrous materials. (Materials that can be magnetized). Crack detection in weldments is performed by both methods, but PT provides a relative indication of how deep the crack could be.

NDE standards commonly applied to valve components

Radiography

- MSS SP-54 Quality Standard for Steel Castings for Valves, Flanges and Fittings and Other Piping Components–Radiographic Examination Method
- ASME B&PVC Section V, Article 2 Radiographic Examination
- ANSI/ASME B16.34 Valves-Flanged, Threaded, and Welding End
- ASME B&PVC Section VIII, Appendix 4 & Appendix 7

Magnetic Particle

- MSS SP-53 Quality Standard for Steel Castings for Valves, Flanges and Fittings and Other Piping Components–Magnetic Particle Examination Method
- ASME B&PVC Section V, Article 7 Magnetic Particle Examination
- ANSI/ASME Bl6.34 Valves-Flanged, Threaded, and Welding End
- ASME B&PVC Section VIII, Appendix 6

Dye Penetrant

- MSS SP-93 Quality Standard for Steel Castings and for Forgings for Valves, Flanges and Fittings and Other Piping Components–Dye Penetrant Examination Method
- ASME B&PVC Section V, Article 6 Dye Penetrant Examination
- ANSI/ASME B16.34 Valves–Flanged, Threaded, and Welding End
- ASME B&PVC Section VIII, Appendix 8

Ultrasonic

- MSS SP-94 Quality Standard for Steel Castings and for Forgings for Valves, Flanges and Fittings and Other Piping Components–Ultrasonic Examination Method
- ASME B&PVC Section V, Article 4, Ultrasonic Examination
- ANSI/ASME Bl6.34 Valves–Flanged, Threaded, and Welding End
- ASME B&PVC Section VIII, Appendix 12

PMI

- MSS SP-137 Quality Standard for Positive Material Identification of Metal Valves, Flanges, Fittings, and Other Piping Components
- API 578 Guidelines for a Material Verification Program (MVP) for New and Existing Assets

NDE SPECIFICATIONS

Numerous NDE standards and specifications exist. The document most often referenced in valve NDE work is the ANSI/ASME B16.34. This document lists requirements for "special class" valves, which are those that meet specific NDE criteria and as a result, can be re-rated to a higher pressure/temperature class. Over the years, these special class requirements have been specified by end users that require a higher-quality product. B16.34 lists RT, MT, PT and UT acceptance criteria.

To improve the procurement and quality of outsourced products and services, the American Petroleum Institute (API) created Standard 20D, Nondestructive Examination Services for Equipment Used in the Petroleum and Natural Gas Industry. This document has extensive details and requirements to assist purchasers that require NDE examination of their valve components.

As long as castings, forgings and welding are used in making valves, a need for straightforward NDE standards and specifications will exist. Also, until the beauty of all valve components is guaranteed to be more than just skin deep, standards development organizations will continue to create and update their arsenal of valve NDE standards and specifications. VM

Greg Johnson is president of United Valve (www.unitedvalve.com). He is a contributing editor to VALVE Magazine and a current Valve Repair Council board member. He also serves as chairman of the VMA Communications Committee, is a founding member of the VMA Education & Training Committee and is past president of the Manufacturers Standardization Society. Reach him at greg1950@unitedvalve.com.

RICHARDS INDUSTRIALS

Richards Industrials packaged and delivered valves used in ventilator testing machines for a Michigan car manufacturer within hours of the request.

Valve Manufacturers Step Up During the Pandemic

BY BARBARA DONOHUE

Around the nation, companies and businesses have found ways to help with the unique challenges of the COVID-19 pandemic. Manufacturers have supplied needed equipment to meet health care needs, reached out in various ways to support front-line workers and found ways to provide what people in their areas of the country need. For example, distillers are repurposing their production lines to make hand sanitizer. Apparel makers are sewing cloth masks and protective gowns. Automobile plants are making ventilators.

Valve manufacturers have been doing their part, not just by supplying critical valve products, but also by providing gear to protect people on the front line and offering vital resources to their communities.

RESPONDING TO URGENT VALVE SUPPLY NEEDS

Because valves are so critical to many industries, including the medical community, several valve makers have answered the call to help by supplying special orders of valves.

For example, global manufacturer ITT Engineered Valves provided 20 of its Bio-Tek hygienic diaphragm valves to a pharmaceutical company that was setting up pilot lines to run testing on potential COVID-19 drug treatments.

Product director Dave Loula explained that, "We've had various contacts from companies asking for expedited delivery on COVID-related products." An area of great need has been for the valves necessary for

Executive Summary

SUBJECT: Valve companies, like other manufacturers and businesses, are finding ways to help during the COVID-19 crisis.

KEY ISSUES:

- Supplying what's needed quickly
- Using existing equipment and technology
- Supporting community programs

TAKE-AWAY: Whether the efforts are providing funding for new programs, expediting projects for emergency aid or shoring up existing charitable efforts, valve companies are using their resources however they can.

producing three types of COVID-related bio-pharma products: test kits, therapeutics and vaccines, Loula said.

One of the customers of Cincinnati-based Richards Industrials contacted the company in great need of valves for ventilator testing machines.

"When our channel partner in Detroit called asking if we could ship ten of our high-pressure, low-flow pressure relief valves the same day in support of ventilator production testing, my on-the-spot response was, 'Yes, consider it done,'" said Charles Page, vice president of sales for Richards Industrials.

After a brief huddle with the key players, the company began machining bar stock into component parts, which occurred within half an hour after the call was received.

"We had completed valves on the road just five hours later," Page said.

The next hurdle was ensuring expedient delivery.

"One of our technical sales consultants headed north in his personal car, handing them off to our regional sales manager in Troy, OH, who drove them to the Ohio/Michigan border, handing them off to the end user," he explained.

VALVTECHNOLOGIES, INC.

Houston Fire Department staff received donated masks from ValvTechnologies, Inc.

A similar request came into manufacturer Emerson, which shifted priorities and resources at one its plants (Aiken, SC) to produce valves for 50,000 respirators an automobile plant in Michigan was making. Emerson also responded to a request from respirator mask plants in Arizona and Rhode Island that needed the electronic equipment Emerson manufactures in Virginia. The valve manufacturer re-prioritized orders to get the equipment shipped promptly.

In Boulder, CO, Emerson answered the call to help a distillery convert equipment to making hand sanitizer. The company provided a Coriolis flow meter that could automate and speed up the process. The bulk of the sanitizer has been donated to first responders, medical facilities and social aid organizations in the area.

Sue Ooi, vice president of marketing with Emerson's final control valves business, explained why the company felt it was important to take such actions.

"We understand and take seriously the key role we have in supporting so many essential critical infrastructure workers in life sciences, food and beverage, chemical, power, energy and other essential industries as they carry out their vital work."

3D PRINTING FOR THE FRONT LINE

Manufacturers that have new technologies already up and running have found ways to use it to benefit people facing the COVID-19 situation. For example, companies that have 3D printing capability have offered their printers, materials and labor to make items such as face shield frames that protect medical workers, first responders and other front-line personnel.

For example, when the manufacturer of Val-Matic's 3D printer contacted the valve company about an emergency project to supply vital disposable face shields for distribution to health care workers across the Midwest, the company responded. R&D staff members at Val-Matic started running the 3D printer around the clock producing the face shield frames.

President and CEO John Ballun of Val-Matic explains why.

"Val-Matic Valve continues to be hard at work building valve products for the waterworks infrastructure systems. But our job does not end there," he said. It extends to helping in the community.

PROVIDING PERSONAL PROTECTIVE EQUIPMENT

Another way that companies have found to help is by giving what they have on hand to their communities. Companies with access to face masks and other protective equipment, for example, have been generous in donating them to front-line workers.

ValvTechnologies, Inc. donated more than 800 masks to the Houston Fire Department in an effort to protect those responders.

SUPPORTING COMMUNITIES

Many valve and other companies are donating and supporting efforts in their local communities, sometimes looking at bolstering programs they already support in new ways.

For example, some valve companies have found ways to answer the call for food. In St. Louis, Emerson pledged $1 million to aid local food banks as well as agencies assisting the homeless and other nonprofits that are seeing increased need during the pandemic. Emerson CEO David Farr said that retired Emerson executives and their families also planned to donate an additional $1 million.

Victaulic, a manufacturer of valves and mechanical pipe joining devices, decided to give additional aid to a Pennsylvania-based program for which it has been a longtime supporter: Valley Youth House, a provider of services such as housing, mentoring and in-school programs.

"For decades, Victaulic has partnered with Valley Youth House to empower resiliency in young people, helping them establish promising futures," said Megan Longenderfer, manager of Corporate Communications at Victaulic.

The company chose to lend additional support during the crisis because of the challenges those young people faced because of isolation.

"During this increasingly difficult time, when we have all been called to maintain social distancing, youth without technology are particularly at a disadvantage," she said.

After learning many of these young people and families were cut off from the outside, living in apartments without any communication devices, Victaulic refurbished and donated 22 laptops to Valley Youth House, bringing the total the company has given to the organization to 138.

"Victaulic's donation of technology helps youths and families in need maintain their connections to schools supporting remote education, as well as social connections to family and friends, which is so vital during this time," Longenderfer said.

As with many valve companies, "Victaulic aims to be a good neighbor in every community where we live and work," Longenderfer explained. VM

Barbara Donohue is web editor at VALVE Magazine. Reach her at bdonohue@vma.org.

REACHING OUT LOCALLY IS GOOD BUSINESS

An MIT Sloan Management Review article early in the pandemic looked at how COVID-19 was affecting businesses and manufacturing in China and which companies were doing well once things started looking up. One of the main conclusions was that it was the organizations that were finding ways to be community players that were coming out ahead.

"Companies that recognize the stress on social systems during medical emergencies are more likely to do better afterward than companies that do not," the article says.

Charlotta Sirén, associate professor, University of Queensland Business School and co-author of the article, adds that "Doing good in your local community is more important than ever in natural disasters such as COVID-19. Contributing to the local community will lay out the foundations for post-COVID-19 business."

In addition to simply being a good practice for ethical reasons, "there are empirically established correlations between charitable activities and future financial performance, improved relations with government authorities and reputational legitimacy," the article concludes.

Effective approaches, according to MIT Sloan Management Review, include:

- Targeting local nonprofits and community outreach organizations. "Corporate generosity has a much larger impact when it is provided directly to a local community."
- Encouraging employees to volunteer. "Employees who have the option to participate in corporate volunteer programs are more likely to participate repeatedly."
- Putting the word out. Without boasting, companies can send a concise external announcement after they've donated, giving only the basics: the amount donated, the organization supported and what the business hopes the donation can accomplish.

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FOR MEMBERS ONLY:

VMA's Annual Meeting, the association's premier event, takes place virtually Sept. 9-11. For more information, visit VMA.org/AnnualMeeting.

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Contact Abby Brown at abrown@vma.org or 240.328.3866.

VMA VALVE MANUFACTURERS ASSOCIATION OF AMERICA

Leakage in a pneumatic system for a food and beverage filling application could cause huge energy loss and is often difficult to identify. Combining a valve system and air preparation with a flow and pressure transmitter as well as cylinders equipped with position sensors allows monitoring of compressed air energy consumption, air leakage detection and cylinder cycle times.

Pneumatic Valves:

New Technology for a Digital Transformation

BY MARCHELLE FORISH

Principles built around the Industrial Internet of Things (IIoT) have guided the automation industry's rapid adoption and mainstreaming of many production systems. These systems are aligned with the concepts for digital transformation—including intelligent, networked production systems and components that leverage smarter information and communications technology.

As this evolutionary process builds momentum, some people may think proven manufacturing technologies such as pneumatics could be considered "outdated" or even "old-fashioned." However, pneumatic technologies, including those that drive control valves, continue to evolve and incorporate sensors, industrial network interfaces, wireless technology and complex digital control features that make them well-suited for use in the emerging IIoT-driven production systems.

EVOLUTION OF TECHNOLOGY

Control of pneumatic valves and monitoring of cylinder position sensors originally was achieved through discrete wiring: Each programmable logic controller (PLC) output was individually wired to a solenoid valve coil and triggered separately. Position sensors on cylinders were wired back to the PLC's input card. Such systems were expensive and time-consuming to install.

With the creation of plug-in valves and manifolds, these systems evolved into a more practical solution in which all the solenoid valve connections to the PLC input/output (I/O) cards could be achieved with a single cable and terminated by a multi-pin connector. This meant that, with one cable run, dozens of individual

Executive Summary

SUBJECT: Pneumatic valve systems have kept pace with digital technologies that allow data collection and monitoring capabilities.

KEY ISSUES:

- Technology development
- Pressure regulation integration
- Smart pneumatic valves

TAKE-AWAY: Pneumatic valves as part of a complete platform can provide a low-cost, versatile option.

wires could be replaced easily, which reduced wiring costs for pneumatic valve control purposes significantly.

Although these plug-in valves reduced parts and labor costs for individually wiring each solenoid coil, they did not incorporate diagnostic feedback and other operational information that can be useful. Capturing that additional information would require separate sensors wired back to the PLC I/O cards to measure and verify correct functionality. This functionality data could include cylinder position, spool position, pressure, flow and other useful information.

As automation systems gained sophistication, fieldbus (industrial network) communications connectivity became more prevalent. This connectivity was implemented using a variety of industrial network protocols such as Profibus, Sercos and Ethernet-based fieldbus technologies. The solution offered additional cost savings and the opportunity for the PLC to both control valves and monitor sensors and devices exchanging I/O data via one, low-cost communication cable (without needing local I/O cards). Pneumatic valve manifolds began incorporating both fieldbus interfaces and I/O capability to provide complete pneumatic valve packages that were more versatile and engineered to be integrated easily with smarter, more sophisticated automation platforms.

The integration of these communications components on the valve manifolds, along with newer, lightweight polymer materials for construction and ingress protection from water and dust, also made it possible to locate the valve manifold closer to the system or actuators being controlled without the need for an enclosure. Machine builders now could more easily install valves on end effectors, robot arms and other working components, thereby locating the valve closer to pneumatically controlled devices. This configuration has several advantages: Besides decreasing the amount of tubing needed to connect the valves and cylinders driving the equipment, the pneumatic system can be optimized, leading to quicker response times and increased throughput for motion sequences.

INTEGRATING PRESSURE REGULATION

Advances in valve technology, performance and versatility took a major step forward when electropneumatic control capabilities were integrated into the valve manifold. A basic pneumatic valve is just a simple, directional control valve: An electric signal is sent to shift the valve spool, and the air is directed out of one port or the other. Conversely, electropneumatic (E/P) pressure-regulating valves, also called E/P converters, do not simply provide directional control; they also can provide a range of pressures proportional to the analog voltage or current of the signals the device receives from the PLC's analog output card.

As seen with valve manifolds, strides also were made with proportional regulators. New technologies allowed these devices to be controlled more accurately using digital signals and allowed the integration of fieldbus connectivity. This meant that the machine's PLC could easily and accurately send parameters to control valve and cylinder pressures dynamically, optimizing force and pressure requirements for the production system.

This advanced level of pneumatic control—intelligently combining both directional and pressure control—elevates the value and versatility of pneumatics for a wide range of automation applications. It allows greater, more precise and optimized control in the manufacturing process by ensuring good end-point accuracy and repeatability.

An example of how this works is electropneumatic control used in welding systems for automated manufacturing of engine starters. In this application, a pre-mounted armature is transported on workpiece pallets, aligned for position detection and brought into position for welding by pneumatically driven grippers. After welding, additional grippers return the armatures to workpiece pallets, which transport them to the next step in production.

Electropneumatic pressure regulators, combined with an advanced valve manifold with integrated fieldbus communication, optimize the diffusion welding processes with dynamically controlled pressure that can be precisely tailored to the application. At the same time, intelligence built into the manifold monitors and documents all the valve's functions, controlling the grippers for an enhanced level of quality control and process tracking. An added advantage of using digital E/Ps here is energy efficiency can be optimized by supplying only the required pressure "on-the-fly" to perform a specific task, rather than using the highest pressure for all tasks. For example, an application may require a cylinder to extend at 80 psi, but the return can be at 30 psi to save energy. Using digital E/Ps, the machine builder can program these parameters into the system.

ENHANCING MONITORING AND CONTROL

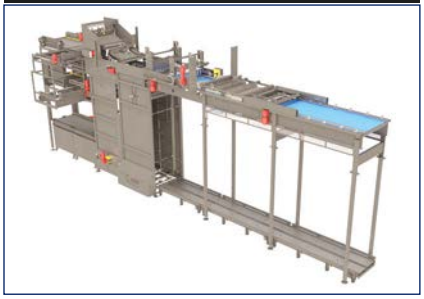
One of the key goals of digital transformation in manufacturing is to gather actionable information that allows for more sophisticated and optimized control of every single step in a production process. Companies building components for automobiles, for example, want to know exactly the force, pressure and position of a cylinder driving an actuator that's placing a bearing in a device. They also want that sequence documented so that 50,000 parts later, they know it was manufactured with the exact same precision as the first part.

Valves with IIoT integration (left), connected to the smart pneumatic monitoring "hubs" (right) aggregate and organize pneumatic performance data and deliver it through separate, parallel pathways to plant management systems.

If there is deviation in the data points the pneumatic devices generate as they operate, that data can indicate issues. Those issues can be with the actual device or include problems such as pressure loss in the air supply system, improper manufacturing of the bearings placed or actuators that are losing synchronization with the devices feeding the bearings. These issues can spring from component degradation and a need for maintenance.

The intelligence built into pneumatic valve systems provides new opportunities for monitoring and control. If a valve is rated to provide a proper operating life of 120 million cycles, when it reaches 100 million cycles, a well-designed predictive maintenance system can go into effect. That system can capture and use the data to either conduct an inspection and maintenance action or implement an automated purchasing request for a replacement device—before the unit actually fails.

This simple integrated IIoT solution on a packaging machine has a valve manifold, cylinders and sensors that make it possible to monitor machine health on legacy and new machines.



Enabling digital transformation within valve manifolds, a system can be engineered to easily and seamlessly supply different pressures for different tooling positions and sequences. This can include support for on-the-fly pressure changes and tooling positions for quick product variations for changeovers, to increase flexibility.

As pneumatics become more intelligent, they are generating additional data points across the production systems where they are used—diagnostics, usage statistics and lifetime data are a few examples. This data has the most value when used to manage production systems more efficiently, control energy consumption and maximize uptime.

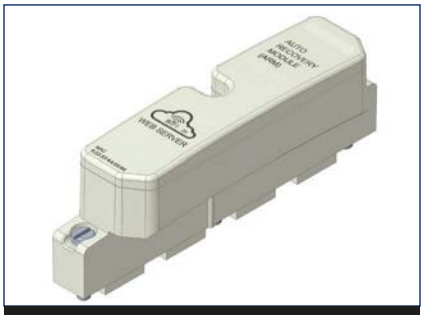
However, all this data from intelligent devices and subsystems has the potential to overwhelm the machine control network and affect control performance. Some pneumatics component manufacturers are offering smart pneumatic monitoring "gateways" or "hubs" that aggregate and organize pneumatic performance data and deliver it through separate, parallel pathways to plant management systems so the control network is not affected. These hubs can be independent of the process control architecture using OPC Unified Architecture, MQ Telemetry Transport, HyperText Transfer Protocol or email pathways to deliver alerts and data on both system-level and device-level performance.

With advancements in wireless communication, manufacturers also can offer device-level analytics to be captured and alarms transmitted via a Wi-Fi connection. The benefits of critical diagnostics information or key commissioning capabilities can

become difficult to realize when a pneumatic valve system is mounted high in the air or deep inside a machine. However, manufacturers have also created easy access to the robust diagnostics and commissioning features of certain fieldbus platforms via a mobile website that can be used on phones, tablets and laptops with Wi-Fi capability without the need to install an application.

Pneumatic valve systems designed for digital transformation now incorporate features and technology that provide a new level of precision control for pneumatic-driven actuators and applications. Because of more advanced electronics within valve system control modules, designers can now incorporate proportional–integral–derivative (PID) controllers for pneumatic positioning applications that automatically apply accurate and responsive correction to a control function.

With these high-tech pneumatic capabilities, not only is it possible to provide more precise system end-point motion accuracy but, in conjunction with the PLC, it's also possible to switch from position control to force control in real time and fine-tune motion sequences for very high levels of automation, product throughput, reliability and repeatability.



A wireless auto recovery module (ARM) protects the fieldbus platform's configuration information from a critical failure and provides easy access to diagnostic and commissioning data via an internal Wi-Fi access point and mobile website.

SMARTER PNEUMATIC VALVES

Pneumatic valves have been steadily evolving to help OEMs and end users make full use of pneumatic technology in their automation systems. In addition, many pneumatics technology providers have substantially upgraded their online configuration and ordering tools to make getting components that machine builders need efficient and easy even with short turnarounds.

These tools simplify what was once a time-consuming process of ordering multiple elements that make up the valve system—sub-bases, mountings and electronics, as well as the valves themselves. Now, these online configurators make it easy to order a valve assembly by selecting the fieldbus interfaces, integrated I/O modules and other features, complete with CAD drawings as part of the package without needing to know part numbers or system nuances. These tools enable both OEMs and end users to get a complete configuration in a condensed and more reliable purchasing process.

Leveraging the power of both electronics and modular, cutting-edge technology, pneumatic valves as part of a complete intelligent pneumatics motion and control platform provide a cost-effective, versatile technology option. That option can be used for a wide range of digital transformation initiatives for automation and manufacturing applications. VM

Marchelle Forish is a product marketing manager, Valves and Valve Systems for Fluid and Motion Control at Emerson. She has more than 25 years of experience working in fluid power. Reach her at Marchelle.Forish@Emerson.com.

Analyzing PTFE Valve Packing for Control Valve Performance

BY DAVID STEFFEN

During a power plant operating cycle, valve maintenance and reliability are key focus areas, often taking up the largest portion of an outage budget. Plant personnel responsible for maintaining the equipment must consider multiple variables present in the entire local valve "system" including: equipment such as the valve body, trim set, actuator and sub-assemblies; media parameters such as media type, temperature, pressure, piping design and environmental factors; and valve packing. Yet despite the fact packing can be a significant contributor to poor valve performance and can cause significant leakage, this part of the equipment picture is often an afterthought in the maintenance process.

The various properties of packing materials result in different performance characteristics. This article examines the features and benefits of different valve packing materials, with a specific focus on friction characteristics and their impact on control valve performance.

THE IMPORTANCE OF PACKING FRICTION

Some industries, such as nuclear power, frequently use sophisticated diagnostic tools that allow an end user to simulate operating conditions by cycling a valve open and closed during maintenance activities. These tools track many variables in the valve and actuator assembly during a stroke; if a control valve fails a diagnostic test or the results are abnormal, one of the first variables analyzed is the friction profile created by the resistance of stem movement generated by the stem sliding through the valve packing.

The key benefit of these diagnostic tools is the ability to generate a friction profile. Generally, the tools plot a graph showing the amount of friction generated in the valve system throughout the entire valve stroke.

Figure 1. Typical graphite configuration

The diagnostic software then calculates the friction during the open and closed stroke independently, as well as the average friction for the full open and full close stroke combined. This friction profile can be used to identify several potential issues the valve may have internally before it is put back into service.

When viewing the friction profile, it is relatively easy to identify issues such as whether the valve has too much or too little friction or whether the valve has a non-linear friction, which potentially indicates stem wear or necking. Though there are situations where too little friction can be an issue, this article focuses on reducing packing friction to increase valve margins and operability. Increasing friction can be achieved relatively simply by increasing sealing rings or packing stress; decreasing friction while maintaining leak-free service is much more complicated.

CHALLENGES TO DECREASING FRICTION

Valves with too much packing friction can suffer many negative effects, including hunting or actuator overcorrection; stem wear; actuator degradation; and reduced equipment reliability and operating life. All these factors may lead to downtime or equipment failure. Reducing packing friction while maintaining leak-free operation requires a delicate balance that is greatly dependent on valve packing materials.

The friction attributed to valve packing is generally represented as the product of two variables, f and y, in the packing friction equation:

*Packing Friction (L) = G_s*π*f*y*D_i*H*N, where G_s is gland stress, π is 3.14159, fy is the coefficient of packing friction, D_i is the inside diameter of valve packing (stem diameter), H is the packing ring height and N is the number of packing rings.*

The dimensionless fy value is a product of two individual values, the coefficient of friction of the packing material, represented by "f," and the transfer ratio of axial stress to average radial stress, represented by "y." These two values are multiplied together to form a single variable, fy, which represents the overall coefficient of friction of the packing on the stem.

Valve packing manufacturers have focused on reducing the fy values of their packing products for years, seeking to identify the ideal combination of materials to provide end users with packing that offers consistent sealing capabilities while maintaining low friction. Many packing types excel at one of these two aspects while lacking in the other. In other words, where one material might be effective at sealing but produce a high friction load, another material might produce low friction load but struggle to maintain sealing properties for multiple cycles.

This imbalance often forces the end user to select a packing type based on its strength in one capability, while compromising on its performance in the other.

VALVE PACKING MATERIALS

For many years, most valve packing was made from asbestos and installed with various forms of artificial lubricants. Eventually, the negative side effects of asbestos inhalation were recognized, and the industry searched for and found a replacement that was relatively inexpensive and abundant: graphite. Graphite is readily available and was used as a lubricant for many decades.

This widely accepted replacement material for most valves was a combination of braided graphite yarn and die-formed flexible graphite. The braided yarn rings and die-formed flexible graphite packing rings were used together to achieve stem sealing. The configuration would typically include three, die-formed flexible graphite rings in the middle and two braided yarn rings on the ends to keep the inner die-formed rings from extruding (Figure 1).

While this solution is inexpensive and provides effective sealing, diagnostic testing has shown that this packing set induces relatively high friction and has a relatively limited life in control valves. One of the characteristics of using the die-formed flexible graphite rings is that when these rings are manufactured, they are generally pre-formed to 90 pounds per cubic foot density. To achieve this density, the graphite has to be compressed in a die to roughly 2,000-2,200 psi of axial stress. This means a die-formed ring needs to overcome the forming pressure to seal. Therefore, typical recommended gland stresses for die-formed packing sets range from 3,000–5,000 psi. When considering the aforementioned packing friction equation, it is evident that as greater gland stresses are applied, greater packing friction is applied to the stem.

PROPERTIES AND BENEFITS OF PTFE PACKING

The introduction of packing containing polytetrafluoroethylene (PTFE) was revolutionary in the world of control valve packing. Many of the mechanical properties of PTFE are attractive for use as a stem sealant in control valves; it is non-porous, chemically inert and stable up to relatively high temperatures (generally having upper temperature limits ranging from 350°F or 177°C to 615°F or 324°C, depending on the properties of the PTFE used to manufacture the packing). During the last few decades, valve packing containing PTFE has been used to reduce the friction between the stem and packing, thus allowing the valve to operate more smoothly while decreasing wear and increasing equipment reliability.

PTFE-based packing is not without its limits and not all operating conditions are suitable for this material; temperature and radiation limits must be taken into consideration.

In an attempt to verify and quantify the benefits of PTFE-based packing using the information available, the author of this article and of the study it references compared the friction coefficients in control valves using various forms of valve packing. The study was not intended to be considered scientific—a proper statistical analysis has yet to be performed. But this article compares information to examine differences in packing types. The study uses data obtained from a web-based valve packing database software used in the domestic power industry.

COMPARATIVE STUDY

The packing database used in the study allows end users to input certain valve parameters to predict the friction induced by a packing set. Users input various pieces of data, such as stem and stuffing box diameter, packing gland stud diameter, the number of gland studs, and the desired packing (gland) stress; the software then uses a set of stored default fy values to predict the total friction induced by the valve packing. These predicted friction values become especially important for valves that are required to operate within a certain time domain. If the predicted friction is too high, the end user may choose to use alternative packing materials or reduce the number of rings to bring the predicted friction back within an acceptable range.

The default fy values associated with each packing type are based on packing manufacturer input, oftentimes coming from internal testing. Generally, this testing is performed in lab conditions and may represent an "ideal" situation, while the real-world coefficient of friction may vary widely based on several factors in the field. To more accurately predict the fy values, a feature was added to the software application to allow end users to input the actual measured friction obtained from diagnostic testing for each control valve. Based on this real-world data from the field, the program reverse-calculates the actual measured fy value of the valve packing for each individual valve.

Table 1. Comparisons by type

Packing Type	Total Records with Data	Avg. Real World fy Value
Braided Yarn/Die-formed Graphite	518	0.065
PTFE Yarn/Die-formed Graphite	286	0.053
PTFE Yarn Only	206	0.043

The goal was to gather enough data points so that the default values could be revised based on field data to more accurately predict real-world friction. This data presented the ability to compare packing data in aggregate. When charted to a spreadsheet, the data shows how certain packing types compare to one another with respect to their real-world fy values. One of the most significant comparisons was real-world fy values of standard yarn and graphite packing sets versus PTFE-based packing sets.

COMPARING REAL-WORLD VALUES

Roughly 1,000 records were compared, and the average real-world fy value was calculated for each packing type. As shown in Table 1, the average real world fy value for packing sets containing braided yarn rings and die-formed flexible graphite and no PTFE was 0.065; the average real-world fy value for PTFE braided rings with die-formed flexible sealing rings was 0.053; and the real-world fy value of those packing sets that contain PTFE braided rings and no die-formed flexible graphite rings was 0.043.

While the data set is relatively small because of the number of valves diagnostically tested since data tracking began, the results support a consistent ability of PTFE-based valve packing to reduce friction. The data demonstrates that using PTFE-based backing can reduce the coefficient of friction by roughly 34%, which equates to a significant increase in actuator margin and valve operability.

Based on this available data, PTFE valve packing offers improved performance over graphite and yarn packing in control valve applications. VM

David Steffen is a senior product manager at Curtiss-Wright's Nuclear Division (www.cwnuclear.com). Reach him at dsteffen@curtisswright.com.

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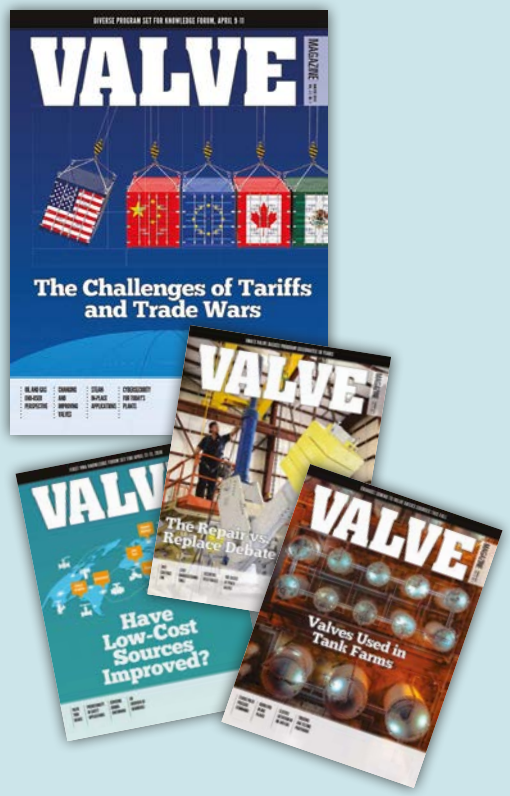

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The Materials That Make Up Valves

Editor's Note: Materials used in the manufacture of valves and how they perform in different applications is a topic of huge interest to everyone who works with valves. Bray recently held a seminar on Valve Materials. Below are some of the questions asked by the webinar viewers with answers provided by Stan Allen, global director of valve application engineering, Bray International, Inc., who was the featured speaker.

Q: DUPLEX AND SUPER DUPLEX STAINLESS STEELS HAVE BEEN USED EXTENSIVELY FOR VALVE COMPONENTS SINCE THE 1980S. WHY ARE THESE ALLOYS SO WIDELY USED AND HOW HAVE THEY IMPROVED? ARE THEY COVERED IN VARIOUS PIPING CODES?

A: Because of their unique combination of corrosion resistance and strength, duplex stainless steels continue to be widely used for valves in both pressure-containing and trim components. The oil and gas industry embraced duplex stainless steels during the 1980s, largely because of improved resistance to chloride stress cracking in temperatures above 140°F (60°C—where austenitic stainless steels are susceptible). Duplex stainless steels are widely used for ball, butterfly, check, gate and globe valves in a variety of applications and industries such as desalination, chemical processing, and pulp and paper. The initial grade, whether for bar, forging or casting, was UNS S31803, which has a nominal chemistry of 22% chromium (Cr), 3% molybdenum (Mo), and 5% nickel (Ni). ASTM International (ASTM) A182 Grade F51 forgings and ASTM A995 Grade 4A castings have been frequently specified and used for valve body and bonnet materials.

An improved duplex stainless steel often used in petrochemical and seawater services is alloy 2507 or UNS S32750 (cast ASTM A995 Grade CE3MN or 5A), which is often referred to as a super duplex. It has a nominal chemistry of 25% Cr, 4% Mo and 7% Ni. In addition to higher strength, which makes this material an excellent choice for stems, it has very high resistance to pitting and crevice corrosion. A similar version for castings is UNS S32760, ASTM A995 Grade CD3MWCuN, which is used for pressure-containing components such as valve bodies and bonnets and is included in the American Society of Mechanical Engineers (ASME) B16.34. The selection of the appropriate duplex or superduplex stainless steel requires evaluation of a variety of factors including the end user's needs for corrosion resistance, the valve manufacturer's required mechanical properties, and ASME standard and code compliance requirements.

Pitting and crevice corrosion resistance of super duplex stainless steels are almost as good as Hastelloy C276 and have been used as a lower-cost alternative in some services. One restriction in the use of duplex stainless steels in valves is high temperature—above 572°F (300°C) temperatures have the potential for embrittlement because of the chromium content.

Q: DURING YOUR WEBINAR, YOU MENTIONED NEW 9% CHROME ALLOYS THAT ARE BEING DEVELOPED FOR SUPERCRITICAL POWER PLANT APPLICATIONS. CAN YOU PLEASE ELABORATE ON THIS?

A: Creep Strength Enhanced Ferritic (CSEF) materials in both supercritical and combined cycle power plants have received much attention over the past few years. The Electric Power Research Institute (EPRI), ASME and ASTM have worked to standardize CSEF steels that meet both creep resistance and toughness for boiler superheaters and other applications that use high-temperature steam valves. New alloys are now listed within ASTM A182 for forgings. These include gate, globe and severe-service ball valves. ASTM 182 Grade F91, a 9Cr-1Mo-Vanadium (V) alloy, is now listed in two types: Type 1 and Type 2. Type 2 includes the control of Mo, V, niobium, tungsten, cobalt, boron, nitrogen and Ni to improve both creep resistance and toughness, and maintain high allowable stresses. The ASME B31 Committee issued a code case in May 2020 that specifically permits forgings of either Type 1 or Type 2 chemical compositions of 9Cr-1Mo-V for use in B31.1 construction. The material is limited to 1,200°F (649°C) and has a few other restrictions in processing and application.

Two other CSEF materials have been developed—ASTM A182 Grade F92 and Grade F93. Grade F92 is similar to Grade F91, but with higher Mo levels, which provides more strength, resistance to erosion and a slightly higher temperature rating. Grade P93 is the next-generation creep-resistant steel with substantially higher strength up to temperatures of 1200°F (649°C). A significant step in acceptance of these alloys is their inclusion within ASME B16.34, Valves–Flanged, Threaded, and Welded End. Grade F91 is included in Material Group No. 1.15; Grade F92 is included in Material Group 1.18; and Grade F93 is not yet included in the latest edition: ASME B16.34-2017.

Q: WHAT IS SUPERAUSTENITIC STAINLESS STEEL, AND WHERE AND HOW IS IT BEING USED IN VALVES?

A: Common superaustenitic stainless steels used in the valve industry are UNS S31254 (254SMO and AL6XN) and UNS S20910/S21800 (Nitronic 50/60). They are predominantly used to obtain both higher strength and improved resistance to crevice corrosion chloride pitting compared to 316 SS. This improved corrosion resistance comes from the higher Ni and Mo content, and nitrogen strengthens the material. It is an excellent choice for stem material in 316 SS valves because of its higher strength. Desalination, food processing, chemical processing and even seawater services use superaustenitic stainless steels as an economical selection in cases where high strength and good corrosion resistance are needed.

Another popular superaustenitic stainless steel is UNS N08904 (904L), which has a 5% Mo content. It is used for a variety of valve components for inorganic acid environments. It is also found in the pulp and paper manu-

facturing, pharmaceutical and power industries. The material is used mainly for trim components, but new specialized grades with higher strength are also being used for valve pressure-containing components.

Q: WHEN CHOOSING MATERIALS OF CONSTRUCTION OF VALVES, END USERS AND ENGINEERING COMPANIES FOCUS ON MATERIALS RESISTANT TO CORROSION OR EROSION, OR BOTH. FROM A VALVE MANUFACTURER'S PERSPECTIVE, WHAT ARE THE OTHER FACTORS THAT MUST BE CONSIDERED?

A: In applications using alloys, strength, toughness, resistance to galling and coefficient of thermal expansion are all factors a valve manufacturer must consider. End users may know what alloys work in their service conditions, but they must depend on valve manufacturers to evaluate these factors in the ultimate selection of the alloys for a valve. A common example is the use of 316 SS, which is compatible with a multitude of corrosive fluids, but may not have adequate strength for a stem, gate or disc material, may not serve as a good bearing material, or may result in lockup (because of thermal expansion rates) as a ball in a metal-seated ball valve applied in a temperature cyclic installation. End users often are concerned about proposed deviations to specifications for alloys in valves, and they should be. However, sometimes alternate materials must be proposed to ensure the valve functions as designed and is still compatible with the service fluid from a corrosion standpoint.

Q: WHAT MATERIALS ARE BEING USED IN THE ADDITIVE MANUFACTURING OF VALVES, AND FOR WHAT COMPONENTS ARE THEY USED?

A: The most common alloys used in additive manufacturing (AM) have been tool steels, aluminum and 316L stainless steel—and this statement applies to valves as well. Up until recently, AM in the valve industry has primarily focused on prototypes as part of research and development initiatives or specialty valves within the aerospace industry, serving those purposes well. Other alloys that are good candidates for use in valves are titanium (specifically Ti6Al4V), cobalt chromium Iconel 625 and various Ni alloys. The immediate future of AM in the valve industry involves replacement parts for urgent use (printing on demand with AM machines near remote operations) and reverse engineering of legacy parts where no drawings or models are available. There also are opportunities in the quick repair of valve parts using Directed Energy Deposition-based machines. Important opportunities to use AM for valves include machining of challenging and complex geometries, optimizing flow paths and reducing weight. The metal powders, manufacturing equipment and technology are all available, but economics is the primary reason AM has not been applied to standard production of parts. Bar stock 316L is eight to ten times less expensive than 316L metal powder developed for AM. As AM technology continues to develop and more suppliers come to market, its application in valve production will increase. Initial opportunities for application of 316L, titanium, and Ni alloys are improved design of contoured balls for ball control valves, block manifold valves and fully customized valves. Another barrier to widespread acceptance of metal additive manufacturing in the valve industry is the lack of quality standards surrounding the technology. ASTM committees are leading the way with new material standards, including ASTM F3122 (Guide for Evaluating Mechanical Properties of Metal Materials Made via AM Processes), F3049 (Guide for Characterizing Properties of Metal Powders Used for AM Processes) and F2924 (Standard Specification for Additive Manufacturing Titanium-6 Aluminum-4 Vanadium with Powder Bed Fusion). ASTM is also developing additional standards. ASME has been active over the past decade in the development of mechanical design-related standards, and its BPTCS/BNCS Special Committee on the use of Additive Manufacturing for Pressure Retaining Equipment has initiated work in this area. American Petroleum Institute committees also are beginning work on standards. All of this will take time, but the groundwork has been laid for a variety of alloys to be applied to this new manufacturing technology for the valve industry. VM

New Requirements for Actuator Sizing

BY JOHN BALLUN

After decades of confusion, the American Water Works Association (AWWA) has created new standards for actuator sizing that clear up some of the confusion and also provide guidance on where safety factors need to be applied.

BACKGROUND

AWWA published the first standard for quarter-turn valves in 1954: AWWA C504, Rubber Seated Butterfly Valves. In later editions, a prescribed methodology was developed for manufacturers to develop coefficients and calculate the torques required to operate valves under normal operating conditions. Several components of valve torque and their associated coefficients were defined including seating torque, bearing friction torque, hydrostatic torque, dynamic torque, etc. All of them varied greatly according to valve size, operating pressures and flow rate.

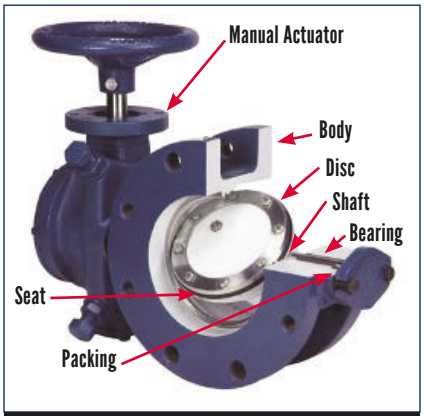
To complicate matters, experience showed that how the valve is installed and upstream flow conditions can have a significant influence on the valve torque as well. For example, if a butterfly valve is installed immediately downstream of an elbow pipe or a pump, the asymmetric velocity in the pipe can cause a significantly higher dynamic torque.

These types of experiences led to the development of an AWWA Manual of Practice M49 in 2001, which replaced the torque methodology historically provided in AWWA C504. The manual also added installation effects, head-loss and cavitation analysis. In the third edition, M49 was expanded to cover all types of quarter-turn valves and establish actuator sizing requirements.

VALVE TORQUE

To gain an understanding of quarter-turn valve torque, let's walk through an opening stroke of a butterfly valve such as the one shown in Figure 1. A butterfly valve consists of a body bolted to the piping system. A disc is supported by a shaft that rotates within radial bearings secured in the body. The valve has a seating system consisting of a resilient seat and a stainless-steel mating surface to provide zero leakage at full pressure.

In the closed position, the disc will typically see a high differential pressure, which creates forces on the disc that are transferred to the bearings. To open the butterfly valve, actuator torque is applied to the valve shaft equal to the friction forces around the resilient seat, packing and bearing



COURTESY VAL-MATIC VALVE & MFG. CORP

Figure 1. Typical butterfly valve

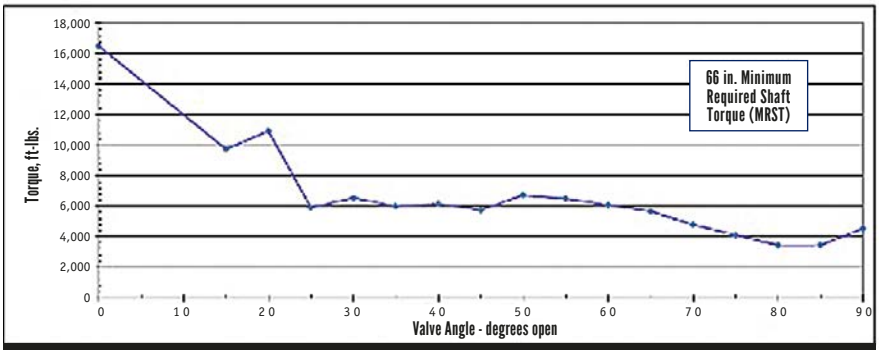


Figure 2. Required operating torque for a 66-inch butterfly valve

Figure 3. AWWA ball valve with pneumatic vane actuator

Figure 4. AWWA ball valve equipped with variable speed motor actuators.

surfaces. During mid travel (as seen in Figure 1), the friction forces on the bearings drop but the fluid flow induces a dynamic torque from unbalanced aerodynamic forces across the disc.

Using test-based flow and torque coefficients, manufacturers calculate and plot torques as shown in Figure 2. High torque at the 0 degrees or closed position exists because of seating, bearing and packing torque. As the valve travels from 0 degrees closed to 90 degrees open, the dynamic and bearing torques vary as shown. These data points represent the minimum required shaft torque (MRST) at each travel location.

MANUAL ACTUATOR SIZING

Sizing a manual handwheel or nut-operated actuator is a two-part process. First, the actuator must have a rating greater than the MRST at all positions of travel. Then, with consideration given for the efficiency and mechanical advantage of the actuator at each position, the required input torque for the actuator is computed so that the handwheel rim pull will be less than 80 pounds and the nut torque is less than 150 foot-pounds or similar criteria. In some cases, a larger handwheel or a spur gear may be required.

CYLINDER ACTUATOR SIZING

Cylinder or vane actuators provide remote operation of valves using hydraulic or pneumatic power (Figure 3). In general, cylinder actuator sizing is based on the mechanical advantage, efficiency and minimum supply pressure. A safety or application factor (AF) is needed to allow for supply pressure loss through controls and cylinder piping. The construction and operation of cylinder actuators and controls are described in detail in AWWA M66. Further, many cylinder actuators are equipped with springs to make the valve fail open or closed so the spring force must be added to the MRST. When controlling the position of the valve with a pneumatic power source, a higher AF is needed to maintain stability because of the compressibility of the pneumatic fluid.

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MOTOR ACTUATOR SIZING

The gear portion of a motor actuator is required to have a rating greater than the MRST. The combined gear and motor actuator is sized based on its mechanical advantage, efficiency, minimum supply voltage and required speed of operation. Motor actuators are equipped with limit and torque switches to protect the gear portion and the valve from excessive motor torque. An AF is needed to assure safe operation of the motor actuator as field conditions vary or valve component degradation occurs over time. Also, in modulating service, the necessary frequent starts and stops require greater safety in sizing the motor. The electric motor must also produce 1.5 times the MRST without stalling.

ACTUATOR SIZING TORQUE

According to AWWA C504, the actuator sizing torque (AST) should be calculated by the actuator manufacturer and based on the MRST times the AF. These requirements have been added to the 2015 versions of the AWWA butterfly and ball valve standards. AWWA standards committees are working on adding them to the applicable power actuator standards to provide consistent direction across the industry. VM

JOHN V. BALLUN, P.E. is the president and CEO of Val-Matic Valve & Mfg. Corp. (www.valmatic.com) and a regular contributor to VALVE Magazine. Reach him at jvb@valmatic.com.

Figure 5. Application factors for sizing actuators.

TYPE OF ACTUATOR AND SERVICE							
MANUAL	MOTOR			CYLINDER			
On-Off	On-Off	Modulating		On-Off	Modulating (water/oil)	Modulating (air)	Modulating (air-small cylinder < 80 in^3)
1.00	1.25	1.25 (seating)	2.00 (midstroke)	1.25	1.25	1.50	2.00

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Kennett Square, PA
www.cpvmfg.com

Allagash International Group, LLC
Portland, ME
www.allagashinternational.com
- **Nor'East Controls**
  www.noreastcontrols.com

American Valve, Inc.
Greensboro, NC
www.americanvalve.com

ASCO Valve, Inc. - Emerson Industrial Automation
Florham Park, NJ
www.ascovalve.com

A-T Controls
Cincinnati, OH
www.a-tcontrols.com

AUMA Actuators, Inc.
Canonsburg, PA
www.auma-usa.com

Automation Technology, Inc.
Houston
www.atiactuators.com

Babbitt Chainwheels
New Bedford, MA
www.babbitt.com

Harold Beck & Sons, Inc.
Newtown, PA
www.haroldbeck.com

Bernard Controls, Inc.
Houston
www.bernardcontrols.com

BHGE
Houston
www.valves.bhge.com
- **Consolidated Safety and Safety Relief Valves**
- **Masoneilan Control Valves**
- **Becker & Mooney Regulation & Control**
  Jacksonville, FL; Houston

Bray International, Inc.
Houston, TX
www.bray.com
- **Bray Controls**
  Houston, TX
  www.bray.com
- **Flow-Tek, Inc.**
  Houston, TX
  www.bray.com/Flow.Tek
- **Bray/Rite Corporation**
  Montreal, Quebec, Canada
  www.ritepro.com
- **Bray/VAAS**
  Houston, TX
  www.bray.com
- **Amresist**
  Houston, TX
  www.amresist.com
- **Ultraflo Corporation**
  Ste. Genevieve, MO
  www.ultraflo.com
- **Bray Commercial**
  Houston, TX
  www.braycommercial.com
- **Rite Pro Corporation**
  Montreal, Quebec, Canada
  www.ritepro.com

Champion Valves, Inc.
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www.wafercheck.com

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www.checkall.com

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  Cincinnati

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www.dft-valves.com

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www.drillmax.com

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www.emerson.com/FinalControl

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www.everlastingvalveusa.com

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Skippack, PA
www.fetterolfvalves.com

Flowserve Corporation HQ.
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www.flowserve.com
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For information on joining the Valve Manufacturers Association, contact Heather Rhoderick at 202.331.8105 (hrhoderick@vma.org).

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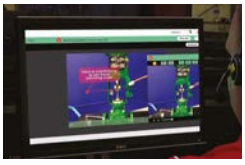
For more information on joining the Valve Repair Council, contact Marc Pasternak at 202.331.0104 (mpasternak@vma.org).

Cowan Dynamics released its next-generation AS Series, Spring-Return Pneumatic Valve Actuator. The Compact version was designed specifically for applications where space is a premium with up to 57% shorter and 42% lighter canisters compared to the standard model.

The spring is installed within a factory-sealed canister, allowing safe in-field service of piston packing, rod seals and bushings without handling the spring.

Emerson and its new Remote Assistance service capability can help plant operators quickly respond to industrial valve issues by using augmented reality technology. The technology uses a robust, secure channel certified as ISO 27001-compliant. Using a mobile device, plant personnel can securely share their field of view through the software as Emerson valve experts troubleshoot and solve valve problems.



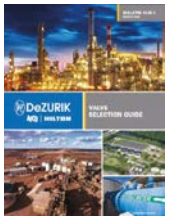
Baker Hughes Consolidated Pressure Relief Valves released the patented 2900 Series Generation II Pilot-Operated Pressure Relief Valve (PRV). This solution enables customers to replace existing oversized or misapplied API 526 Direct-Spring PRVs with the new series valves without requiring remote sense pipe tapping or piping modifications.

This product also features a full-nozzle main valve that easily threads in and out to save on maintenance costs as well as protect the main valve body from corrosive service.

ITT Engineered Valves introduced the Integrated Sensing Platform (ISP), a cutting-edge valve sensing platform developed to reliably monitor valve position. With advanced capabilities in calibrating, operating and communicating with diaphragm valves, the ISP provides customers a reduced piping footprint, shortened setup time and simplified operation.

The ISP sensing module is closely integrated with the patent-pending valve actuator to provide a compact assembly, up to 70% shorter than current assemblies on the market.

DeZURIK's new Valve Selection Guide highlights the broad portfolio of engineered valve solutions in the extensive DeZURIK, APCO, Hilton and Willamette product lines. The guide includes convenient selection charts and descriptions that help users quickly find the best performing and economical valve styles for a particular application.



A.W. Chesterton's Chesterton Connect is a simple-to-use data acquisition tool that enables users to safely and conveniently monitor their processes and equipments' operating conditions. Using Bluetooth technology and a robust design to withstand harsh environments, Chesterton Connect makes it easy to monitor equipment vibration, surface temperature, process temperature and process pressure.

Chesterton Connect connects to multiple sensors, providing a comprehensive view of a plant's equipment health. By setting thresholds, the mobile app and in-unit's LED display system alerts users of undesirable events.

ProMation Engineering's PL Series are linear electric actuators designed and engineered for precision operation of linear process control valves.

The series can be used to control solutes in pharmaceutical processing and to precisely control cooling water flow in globe valves as well as control quenching water in continuous steel production. The series has 3-phase separators in midstream oil and gas installations and large-diameter damper systems for scrubber systems. VM

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