WJTA Jet News

WaterJet Technology Association

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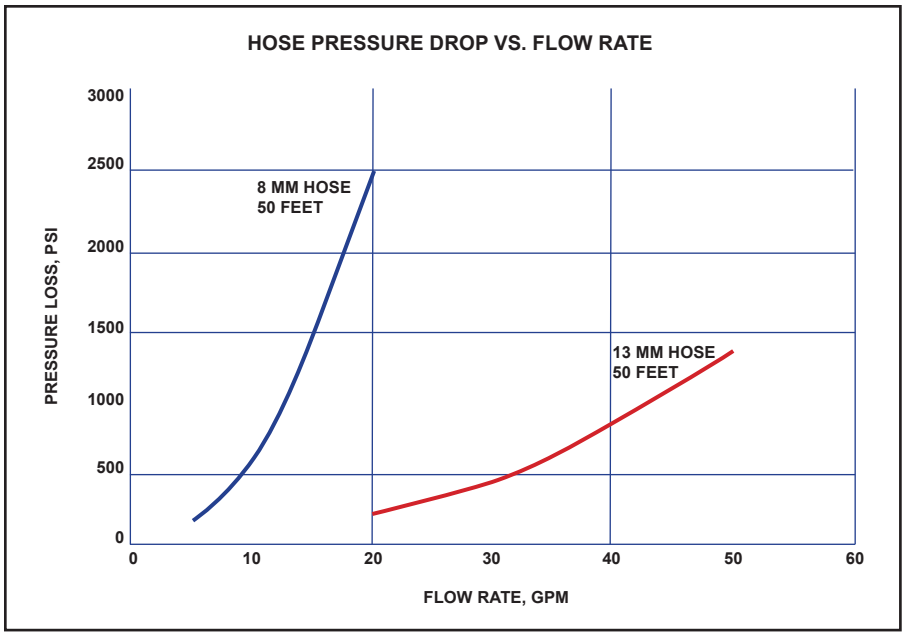
Hoses



This figure illustrates how increasing flow rate increases pressure loss in 50-foot lengths of 8 mm and 13 mm hose. See Paul Webster's article (page 2) on the use of high pressure hose and Bill Shire's article (page 4) on reducing pressure losses.

On the inside

Learn how to get the most out of your industrial vacuum equipment by maximizing safety and enhancing production.

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Use Of High-Pressure Hose

By: Paul Webster, Engineering Manager, Parker Hannifin Corp., Polyflex® Business Unit, Stafford, Texas

Ultrahigh-pressure (UHP) hoses are a key component in today's waterjetting systems. We will discuss field practices to assist users in maximizing hose life and determining when a hose should be replaced.

Many factors can decrease the life expectancy of a hose assembly. We will also discuss the advancements in hose and fitting development along with the descriptions and use of hose accessories and how each can enhance connection technology, service life and safety.

Following are some factors that reduce service life.

Hose fitting stress

The fitting is the weakest point of a hose assembly. Stiffeners reduce the bending movement directly behind the fitting, reducing stress at the hose and fitting interface and prolonging assembly service life.

Stiffeners keep the hose straight behind the fitting, and safety shields act as semi-stiff bend restrictors to let the hose gradually bend. A general rule of thumb is to keep the hose supported and straight directly behind the fitting for a minimum length of three times the hose outside diameter.

Axial loading creates stress when the hose assembly is stretched or compressed at the fitting. A hose hung from scaffolding stretches or tensile loads the hose at the topside fitting.

Abrasion

Abrasion damages the outer cover and underlying reinforcement. When the outer cover becomes abraded to the extent that the reinforcement is visible, the reinforcement now becomes the acting wear member.

All reinforcing layers, whether steel or fiber, contribute to the strength of the hose. If the reinforcement becomes degraded, hose life will be reduced dramatically. Visually examine the hose prior to use for signs of abrasion.

Kinks and crushes

Kinks and crushes are due to mishandling and improper installation. Dragging or pulling the hose when it is in a coiled state and not letting the hose naturally untwist may cause the hose to kink.

Crushes occur if heavy equipment is dropped on the hose assembly or clamping accessories are improperly attached to the assembly. Crushes are visibly detected as oval, flattened areas along the length of the hose. Both kinks and crushes will significantly reduce service life or may lead to immediate failure when pressurized.

Impulse and flex fatigue

The main component that causes hose fatigue is pressure cycling and, to some extent, hose flexing.

The steel wire reinforcement is cold worked every time it is pressurized (stressed) and depressurized (unstressed). Pumps where pulsation dampeners are not used cause the hose to expand and relax at very high frequencies.

The greater the pressure change the greater the effect of reinforcement fatigue. Constant pressure offers very little cyclical pulsation, and hose service life will increase.

High frequency flexing of UHP hose should be avoided. Therefore, pulsation dampers should be used.

Flex lance damage

Flex lance applications demand extraordinary caution due to operator proximity to the waterjet. By far the most common failure is caused by damage at the fitting and hose interface. Inspect this area closely for outer cover damage, kinks and reinforcement damage.

A wrinkled outer cover at the fitting is a clear sign the hose assembly has been "kinked" behind the fitting.

Any time the outer cover is missing, the hose is kinked, crushed, twisted or the fitting is squashed into an oval, the assembly must immediately be taken out of service.

Chemical attack

UHP hoses use very tough materials that resist fatigue and abrasion, but they can suffer chemical attack. In waterjetting applications, chlorine and fluorine are the two main chemicals of concern and are present in all city municipalities' water systems.

If these chemicals are concentrated, the core tube may experience crazing. Crazing is when the core tube has longitudinal cracks in the core tube. Not enough data has been collected to know what concentration levels will chemically attack the tube or what circumstances allow chlorine and fluorine to be present in these concentrations. Further testing is needed to better understand this problem.

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This article is part one of three articles. In the April 2008 issue of *Jet News*, Paul Webster, engineering manager at Parker Hannifin Corp., Polyflex® Business Unit, will address improving service life.

For more information on Parker Polyflex, call (281)530-5300.

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The ***WJTA****ListServ* enables you to take advantage of prompt e-mail interaction with your colleagues. ***WJTA****ListServ* is a **FREE** e-mail broadcast system developed by WJTA to help you communicate and network with other waterjet professionals.

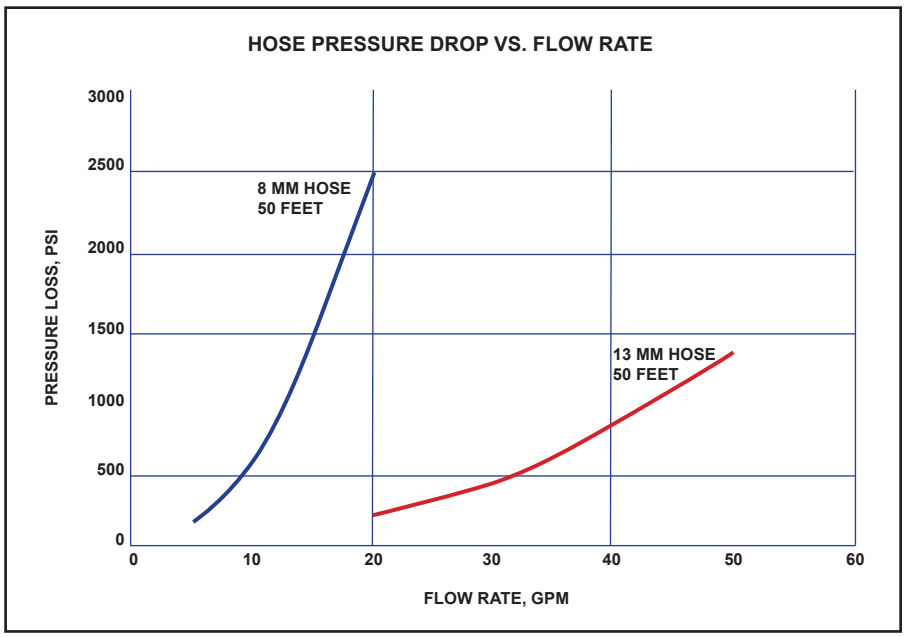
Participation is limited to WJTA members in good standing. You must sign up in order to participate. To sign up for the ***WJTA****ListServ*, contact Beth at the WJTA office by email: wjta@wjta.org, phone: 314-241-1445, or fax: 314-241-1449.

Reducing Pressure Loss for More Effective Cleaning

By: Bill Shires, Director of Sales and Marketing, StoneAge, Inc., Durango, Colorado

The goal of a waterjetting system is to deliver as much of the pump's power as possible to the surface being cleaned. While it is important to use a tool well designed for the application, factors outside the realm of tool design are equally significant. Use of improperly sized hoses, poor quality nozzles, and flow rates resulting in excess pressure loss can forfeit as much as 80 percent of the jetting pump's power. In order to maximize the application of high pressure waterjet power, calculated pressure loss and the effects of nozzle stand-off distances must be understood.

Pump capacity and the size of hose being used are the two most important factors when calculating and managing hose pressure loss. It's easy to demonstrate how much pressure drop exists by throttling up the pump to its operating speed using an open-ended hose that is securely tied down to prevent whipping. The pump's pressure gauge will display the pressure loss in the hose. The higher the pressure, the more pressure loss you are experiencing. Many waterblast equipment manufacturers have pressure loss charts available as well. See Figure 1 above for an example.



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Offloading Technology Enables Reclaiming, Reusing, And Recycling A Variety Of Materials

By: Tony Fuller, Director of Sales, Guzzler Manufacturing, Inc., Streator, Illinois

For decades, industrial vacuum technology has provided solutions for cleaning up a variety of waste products, bulk commodities and process materials. But all too often, vacuum trucks provided no offloading options other than dumping their contents at disposal sites. As a result, manufacturers, mills and material processors lost countless opportunities to reclaim, reuse or recycle products. Instead of reaping higher productivity and profits, producers had no choice but to bury these potentially valuable materials.

Faced with the dual need to improve efficiency and protect the environment, more and more companies are using various offloading options now available for industrial vacuum loader trucks, including batch and continuous offloading solutions.

Reclaim, reuse, recycle

The Guzzler NX air mover is available with the advanced Dense Phase Offloading system. This vacuum loader tackles the toughest applications from solids and dry bulk powders, like fly ash — to liquids, slurries and thick heavy sludge.

Dense phase offloading systems – such as the Guzzler NX air mover from Guzzler Manufacturing – offer environmental solutions for reclaiming, reusing and recycling a wide variety of valuable materials, ranging from solids and dry bulk powders, such as fly ash, to liquids, slurries and thick sludge.

Guzzler's dense phase batch offloading system combines pressure offloading in conjunction with the NX's vacuum recovery and provides a closed-loop system that eliminates waste. The system makes possible the conveyance of dry material up to 125 vertical feet, which is ideal for cement or dry bulk powder applications.

A contractor working for a major plastics manufacturer uses dense phase offloading to return low-grade acetate flakes in metered amounts back into its manufacturing process. Previously, the low-grade acetate flakes that were removed from the plant process were transported to a holding site or landfilled, because there was no practical, economical way to re-introduce them into the production mix.

Similarly, producers of lime, aggregates and cement are finding dense phase offloading to be an efficient method of reusing spilled material that previously was vacuumed up and disposed of as waste. Transportation spills involving trucks or railcars provide another advantageous use of dense phase offloading. In the past, these types of spilled materials were simply bulldozed or loaded into disposal vehicles. Now, dense phase offloading allows these materials to be saved and re-loaded into their transport containers.

The Guzzler NX Dense Phase Offloading system allows the operator to quickly and easily reclaim, recycle and redistribute valuable material. The innovative system combines pressure offloading with vacuum recovery providing a closed-loop system that eliminates spills.

Dense phase offloading maintains a constant vacuum pressure that prevents the dilution of off-loaded material with excessive amounts of air, increasing productivity and eliminating the need for air filtration that previous "dilute phase" systems required.

Because the dense phase system uses continuous pressure, it can also be used as a productive means of offloading liquids. Unlike typical vane pump offloading, the dense phase compressor can push some of the thickest materials much faster, making the system much more efficient and productive.

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2011 American Waterjet Conference And Expo

The WJTA Board of Directors is presently deliberating the question of the site for the 2011 American Waterjet Conference and Expo. The last three Conferences have been held in Houston as will the 2009 Conference.

The WJTA Board hereby solicits suggestions from the membership concerning the advisability of holding the 2011 Conference somewhere other than Houston and, if so, what city should be considered.

Please contact the WJTA office with your suggestions by email: wjta@wjta.org, phone: 314-241-1445, fax: 314-241-1449, or mail: WJTA, 906 Olive Street, Suite 1200, St. Louis, MO 63101-1448.

D.S. Miller's View Of The AWJ Industry

D.S. Miller's latest article (*) addressed various aspects of the abrasive waterjet (AWJ) industry. Here are highlights of his viewpoints.

Market and Research

The potential market for machining systems based on the current AWJ technology is more than 10 times of existing systems (about ten thousands). On the contrary to this potential, abrasive waterjet research activity in the US and Europe is virtually collapsing.

Incremental Improvements

Among the cost components of an AWJ machining system, the cost of the abrasive waterjet part may be less than 20% of the capital cost but can account for over 80% of the operating costs. A few percent points improvement in the cutting performance, reliability and usability become very significant.

AWJs Do Not Operate Like Jet Pumps

The mixing chamber length vs. orifice diameter (l/d) is between 40 and 60 for an AWJ nozzle and is under 4 for a jet pump. The focus tube length vs. its diameter (L/D) is greater than 60 for an AWJ nozzle but is

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Reducing Pressure Loss for More Effective Cleaning, from page 4

Pressure loss is directly related to flow, the length of the hose, and the diameter of the hose. The diameter of the hose has the most effect on pressure loss. The reason why is that there is friction between the moving water and the inside diameter of the hose. This friction consumes energy and reduces the pressure delivered to the hose exit. Smaller diameter hoses create more friction, which leads to greater pressure loss. For high pressure waterjetting, it's common to lose 20-30% of the power. The most effective way to reduce pressure loss is to use the largest diameter hose possible, but due to cost constraints and handling issues, this is not always possible.

If you are limited to using a smaller diameter hose, another realistic option to reduce pressure loss is to decrease the flow at the hose exit. Let's explore this option with the use of rigid lances cleaning small diameter heat exchanger tubes. In this type of work the lance size is limited by the diameter of the tubes being cleaned. You will first need to determine what pressure loss you are willing to accept. In this example we have a 20,000 psi, 17 gpm pump. The tubes being cleaned are 25 feet long and require the use of 3/8-inch Medium Pressure Tubing with an inside diameter of .203 inch. Your experience with this application has shown you that 18,000 psi is an effective pressure for cleaning the tubes. If you were to use your pumps full capacity of 17 gpm you would lose over 5000 psi, which would leave you with less than 15,000 psi at the tips. If you reduced the flow to 10.5 gpm by purchasing tips with smaller jets, your pressure loss would only be 1940 psi, which meets your 18,000 psi effective number. To figure out pressure loss you can use the equation below or use pressure loss charts provided by waterblast equipment manufacturers. Once you have the appropriate pressure loss and flow, ask your nozzle supplier for a nozzle that meets your requirements.

$$\text{Pressure Loss through Hose} = ((\text{flow} \times \text{length}^{.5})/(53 \times \text{I.D.}^{2.5}))^2$$

Once you have the calculated pressure loss you can then take steps to manage the numbers better. Again, assuming the size of the hose is fixed, another option is to run hoses in parallel to the cleaning surface. This reduces the flow in each hose and therefore the pressure loss. The number of fittings, design of manifolds, and the type of swivel

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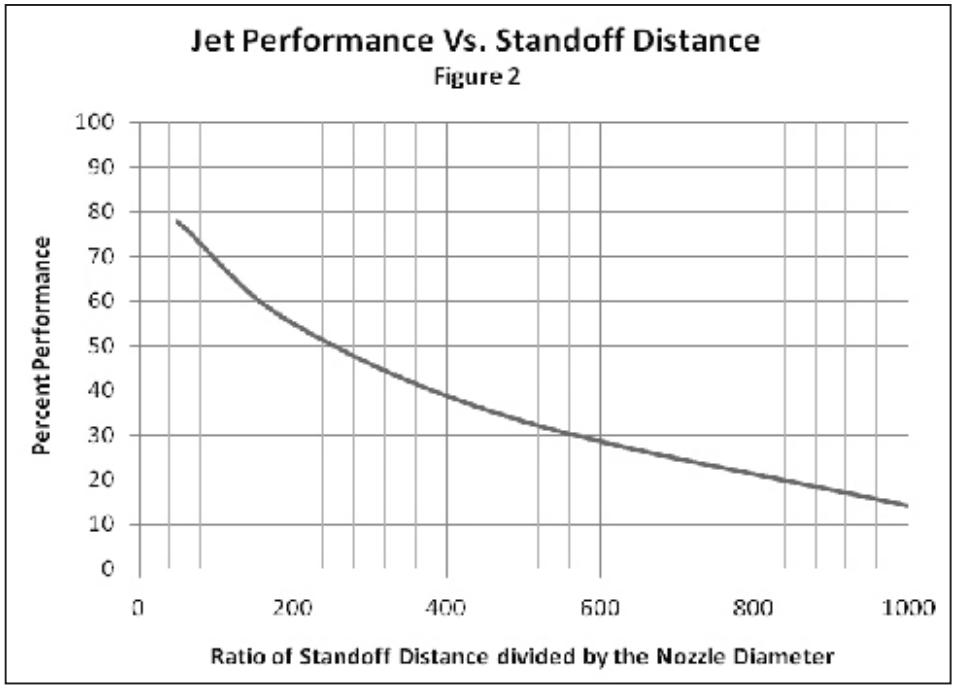
being used also will have an effect on pressure loss, so it is equally as important to have the correct tools and accessories for the application.

When applying jet power it is also important to understand power losses due to the distance of the jet to the surface being cleaned, referred to as standoff distance. To achieve cleaning at farther distances, additional power in the form of greater flow or pressure is needed to get the water to the surface. But as the jet moves through the air, it breaks up into droplets, reducing its impact on the surface. Ideally, the standoff distance should be kept as small as possible. The rate at which a jet loses power is dependent on the size of the nozzle. Therefore, at a given standoff distance, a larger jet will deteriorate less than a smaller jet. Using extensions can help minimize standoff distances and improve cleaning capabilities; however, in many waterblast operations, extensions are not appropriate and large standoff distances cannot be efficiently avoided. The loss due to the standoff distance can be obtained from the Figure 2 (top right). In this chart, the standoff is expressed in terms of nozzle diameter. Divide the distance by the diameter to get this ratio, then find the percentage from the chart at this standoff distance. This is the percentage of power that will reach the surface being cleaned. This curve is dependent on the nozzle quality and upstream conditions, which will be discussed in a later article.

Calculating pressure loss and the effects of nozzle stand-off distances can help maximize the application of high pressure waterjet power. Be sure to read future articles in *Jet News* covering nozzle design, upstream jetting conditions, rotating tools, material jet-ability, and substrate damage will help explain the many variables involved with high pressure waterblasting.



Flow Receives Aerospace Contract With Mitsubishi

Mitsubishi purchases second round of Flow waterjets to cut wing structures for major commercial aircraft composite airframe manufacturer

Flow International Corporation, a leading developer and manufacturer of industrial waterjet machines used for cutting and cleaning applications around the world, today announced that Mitsubishi Heavy Industries (MHI) has awarded the company a second round multi-million dollar contract – to supply MHI with Flow's Composite Waterjet machine tool to cut the carbon fiber wing components for a major commercial jet aircraft program.

Flow's Composite Waterjet machining system for the precision machining of carbon fiber composite stringers will measure 80 ft. long. It will be utilized for cutting the composite stringers, which are part of the composite wing structure. As a result of breakthrough development work, it will be equipped with multiple patent-pending "side-fire" nozzles. The system will be built and tested in Jeffersonville, Ind., one of Flow's six worldwide manufacturing plants. The UHP pumps that provide the ultrahigh-pressure water will be made at the Kent, Wash. headquarters.

"The second round award of Flow's commercial wing structure machining system proves the effectiveness of Flow's waterjet technology and its ability to create 'state of the art' aircraft parts in a cost-effective manner," said Charley Brown, Flow's President and Chief Executive Officer.

Traditionally, conventional cutting tools – handheld diamond or carbide-tipped routers, bandsaws, cutoff saws and abrasive wheels – were used to cut composites. However, due to the composition and fiber orientation of advanced composites, these traditional cutting tools can damage the composites either by over heating, or by leaving frayed or delaminated edges. Frequent delamination and fraying requires costly rework.

Waterjets eliminate cutting problems associated with advanced aerospace composites because abrasive waterjets cut by erosive action rather than friction and shearing. To cut carbon composite aircraft parts, a thin

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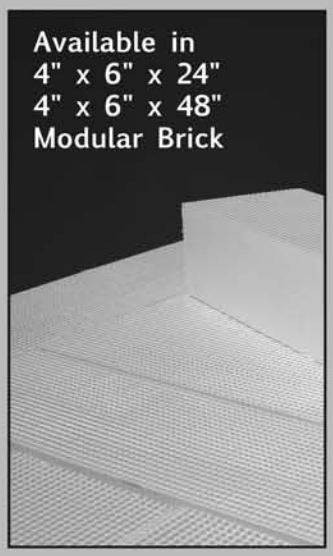

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Flow Receives Aerospace Contract With Mitsubishi, from page 10

stream of water moving at three times the speed of sound is emitted from a tiny, jeweled orifice in the tool head of Flow's machine. The one gallon-per-minute water flow draws in a separate stream of fine garnet particles that slice into the surface being cut. They produce exceptional edge quality, free of frayed or delaminated areas, which minimizes costly secondary finishing. Waterjets' low operating temperature doesn't affect the material being cut. Furthermore, because waterjets exert far less lateral force on the material than conventional machines, tooling and fixturing requirements are simpler and less expensive.

Flow waterjets have been used to increase productivity at leading aerospace companies such as Boeing, Airbus, Rockwell, Teledyne Ryan, General Dynamics, Lockheed, Raytheon, Bell Helicopter, Northrop and other firms that provide composite machining services.

Offloading Technology Enables Reclaiming, Reusing, And Recycling A Variety Of Materials, from page 6

Batch offloading solutions offer flexibility

Vertical augering, designed to tackle such tough materials as heavy dry solids and sludges, is a recently developed offloading technology. Ideally suited to solid materials such as grains and pellets, Guzzler's vertical auger system features an integral cone mechanism mounted on the rear door, which funnels material through the auger when the body is tipped, conveying material into receptacles up to five feet tall. Variable auger speeds enable flexible offloading of various materials. Exclusive to Guzzler's auger is an isolation valve located between the tank and the auger which prevents material from entering the auger when it's not in use, prolonging auger life and reducing cleaning downtime.

Guzzler's vertical auger system.

The Sludge Guzzler is another batch system that has long been an option to move captured waste back into the process. Drilling mud is a great example of a material that can be recycled. Once vacuumed, the mud can be pumped back using the Sludge Guzzler into a collection system for recycling.

The Sludge Guzzler.

Continuous offloading

Guzzler introduced its original, patented, continuous production offloading system – the XCR – in 1986. This solution saves time and money by allowing users to offload material into a variety of collection vessels without interrupting the vacuuming process.

Guzzler's swing-out cyclone option enables the discharge of material into collection vessels while vacuuming – a patented, continuous production system. Users can load roll-off boxes, flow bins, super sacks or drums with product. When vacuuming without the need for packing the material, the cyclone can swing in and vacuum conventionally through the rear port.

For specific recovery applications, a trickle valve assembly can be mounted on the bottom of the cyclone. Using

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D.S. Miller's View Of The AWJ Industry, from page 7

under 8 for a jet pump. These differences distinguish them in terms of energy efficiency and momentum exchange.

AWJs Are Not Cold Cutting Tools

Abrasive waterjet cutting is a thermal cutting process. Temperature in the interaction between abrasive particle and material to be cut can exceed melting points of either the material or the abrasive particle. But the unique cooling effect of water virtually eliminates heat effects on cut surfaces. This also means that the focus tube material should have extremely good wear properties at high temperatures.

Operating Envelope for Abrasive Waterjets

AWJs are classified based on these three machining areas: general machining (AWJs), fine machining (FAWs), and micro machining (MAWs). The cutting jet has a diameter between 300 microns and 1.5 mm for general machine, between 50 and 300 microns for fine machining, and under 50 microns for micro machining. Because fine abrasive is not free flowing in air, MAWs are typically suspension jets, as opposed to entrainment jets.

Key Technologies for New AWJ Systems

a. Abrasive: When abrasive is not free flowing in air because of electrostatic or moisture issues, an alternative solution is to suspend fine abrasive in water. Abrasive quality control and packaging become critical.

b. Waterjet Nozzles: Replace waterjet orifices with waterjet nozzles to reduce focus tube wear and improve cutting performance.

c. Focus Tubes: Discover and develop materials capable of good wear performance at high temperatures.

d. Valve Seats: MAW valves operate on a suspension of abrasive particles and require valve seats to either be super-hard and not brittle or use a sliding valve action.

e. High Pressure Pumps: Suitable pumps to supply ultra high pressure at a few litres of water per hour for FAWs and pressure below 1000 bar and with flows less than 3 litres per hour for MAWs.

*Miller, D.S. (2007) From a single product (AWJ) to a multi product abrasive waterjet industry, Proceedings of the 2007 American WJTA Conference and Expo, August 19-21, Houston, Texas.

Reprinted by permission from Quality Waterjet Newsletter, December 18, 2007.

A Hydrodemolition Robot

Conjet AB's latest compact hydrodemolition Conjet Robot 322 is the smallest unit in the Swedish company's comprehensive range of high pressure waterjetting equipment, which selectively removes weakened and damaged reinforced concrete from numerous structures.

The compact Conjet Robot 322, here fitted with a rotor head, is ideal for working in small tunnels or similar structures with restricted access.

The compact, lightweight Conjet Robot 322 is exceptionally manoeuvrable and ideal for working in confined spaces and areas inaccessible to larger equipment. It is very narrow and can pass through an 0.8m to 1m wide opening, depending on attachment tool. This makes the Robot 322 ideal for operating in tunnels as small as 1.7m diameter with rotor attachment or single nozzle, culverts, inside concrete box girder bridge decks and under bridge and quay decks. The Robot 322 is also exceptionally efficient for use in numerous industrial cleaning applications and has been designed to operate with a reaction force from the water jet of 1,400N.

The Robot 322 consists of a self-contained, crawler-mounted undercarriage, electrically powered with an integral control system. This allows progress of the hydrodemolition process to be remotely and safely controlled and monitored away from the hazardous cutting area. The Robot 322 can adjust the width of its undercarriage to improve stability when operating and is equipped with a single oscillating nozzle.

The nozzle, set at a predetermined angle of attack, is mounted on a traversing cradle running back and forth along a 1.5m long feed beam. Safety is paramount and a protective shroud covers the entire nozzle assembly. The feed beam is attached to an arm mounted on a rotating turntable fixed to the Robot's crawler based undercarriage. The feed beam and oscillating nozzle can be replaced with an optional hydraulically driven rotor for cleaning and scarifying concrete surfaces.

The Robot 322 is very easy for the operator to use and optimise production. This ensures that only weak and damaged areas of concrete are selectively removed in a continuous, uniform and safe operation to a predetermined "quality depth" above or below any steel reinforcement, which, if exposed, is also cleaned of rust.

The robot can be controlled from a remote control box connected by a cable or by a wireless control unit. The wireless control unit, also available on other Conjet Robots, has the advantage of allowing the Robot operator to move freely without being obstructed by a normal control cable. The unit provides enough reach for all possible hydrodemolition applications. If the robot loses contact with the remote wireless control unit the equipment's emergency stop is automatically activated and the robot and the pump will shut down. The wireless control unit is available as a retro fit option for all Conjet Robot.

The robotized 322 tool carrier is easily adaptable to take a variety of hydrodemolition tools. It also enables hydrodemolition contractors to mechanise and replace the far less efficient and less productive hand lancing and jack hammering techniques. Hand held methods are known to be exceptionally tiring, stressful, noisy and dangerous for operators to use. Removal of concrete with a jackhammer or hand lance is also much slower and not as selective as a robot. In addition hand lances are very inefficient with their use of water and need far greater quantities than more effective and environmentally friendly robots to remove a specific amount of concrete.

Conjet hydrodemolition is used to remove concrete from sensitive structures, such as bridges, tunnels, quays and garages. When concrete has been removed with hydrodemolition no micro cracks are created in the surface left behind, which is the best foundation for a strong bond with the new concrete. This will result in stronger and longer lasting structures. The most common reason for removing concrete is that it is

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A Hydrodemolition Robot, from page 14

damaged and the structure must be repaired and strengthened. Conjet robots can be used for selective hydrodemolition, meaning that only damaged concrete is removed and the sound concrete is left behind.

Conjet hydrodemolition replaces jackhammers that create cracks and micro cracks in the concrete surface resulting in a bad bond with the new concrete overlay. Additionally using hydrodemolition robots eliminates the hand and arm injuries created by vibrating jackhammers.

Conjet's extensive product range includes hydrodemolition robots, jetframes, powerpacks and accessories as well as custom built equipment to cater for all possible hydrodemolition projects. The powerpacks consist of a high-pressure water pump supplying from 80-350 litres of water per minute and driven by a 160-750 kW engine. The water is fed through a high-pressure hose to a robot, which supports either a lance with a single nozzle or rotor head with several nozzles. The water passes through the lance or rotor and through the nozzles with a supersonic speed at pressures normally around 1000-1500 bar. The high-pressure water jet penetrates the porous concrete and builds up an internal pressure in the concrete. When the internal pressure exceeds the tensile strength of the concrete the concrete breaks away to leave a rough and uneven textured crack free surface, which is ideal for bonding new concrete.

For more information, visit www.conjet.com or contact Lars-Göran Nilsson, Conjet AB, email: conjet@conjet.se or Stephen Toms, National Hydro Inc., stevetoms@sbcglobal.net.

Offloading Technology Enables Reclaiming, Reusing, And Recycling A Variety Of Materials, from page 12

the discharge air from the silencer, the assembly helps pneumatically convey material from the cyclone back into a collection vessel, making the cyclone a dilute phase conveyor.

Guzzler's swing-out cyclone option (XCR) enables the discharge of material into collection vessels while vacuuming. The XCR is the only system that delivers simultaneous vacuuming and offloading capability.

For material handling versatility, Guzzler offers an offloading cyclone with a chassis-mounted crane option for loading and unloading of railcars, trucks, elevated bins and silos that combines a high-performance crane and a detachable receiving cyclone, enabling the safe and efficient movement, storage, transport, packaging or drumming of any material – even hazardous wastes.

Offloading cyclone with a chassis-mounted crane.

Guzzler Manufacturing is a leader in industrial vacuum loaders for use in cleaning up industrial waste and recovering and recycling valuable raw materials. With a wide range of offloading options available, Guzzler products are designed to vacuum a full spectrum of materials – from solids and dry bulk powders, to liquids, slurries, and thick sludge – in such industrial areas as cement plants, steel mills, railroads, oil refineries, chemical plants, foundries and power-generating stations. For more information, visit www.guzzler.com or call 1/800-627-3171.

Felipe Cortes Joins SPIR STAR

Felipe Cortes has joined the SPIR STAR Ltd. team as a sales representative. Cortes has over six years of sales experience, a bachelor's degree in communications, and he is fluent in Spanish with some Portuguese. His experience also includes work as a sales and marketing analyst in the marine hardware and equipment industry.

As sales representative, Cortes's primary responsibilities will be to generate business leads and facilitate the development of SPIR STAR's sales strategies. Contact Felipe Cortes at 1-800-890-7827 or visit www.spirstar.com.

Pavement Marking Removal System

NLB Corp. has introduced a redesigned STARJET™ pavement marking removal system with dual heads that provide twice as much surface coverage as other systems. It also includes in-cab video to help the driver focus on the road, an integrated vacuum recovery system, and other new features.

STARJET™ systems are widely used by highway and runway contractors to remove stripes, membranes, runway rubber and more from concrete and asphalt. Using NLB's patented rotating water jet assembly to maximize the force of ultra-high pressure water (up to 40,000 psi), they remove markings faster and more thoroughly than abrasive methods without damage to the pavement. The dual-head system has two rotating water jet assemblies for even greater productivity.

Each self-contained STARJET™ system includes a truck with a UHP (ultra-high pressure) water jet pump unit, water tank, rotating nozzle assembly(ies), and cabin-mounted controls. The water jets rotate as the truck drives along the road, removing markings at rates of up to 13,000 linear feet per hour. Vacuum recovery is available to simplify clean-up and disposal. NLB can custom-engineer systems to meet specific customer requirements.

NLB Corp., a leader in high-pressure and ultra-high pressure water jet technology, manufactures a full line of quality water jetting systems and accessories for contractor and industrial uses. These include stripe removal, surface preparation, tank and tube cleaning, concrete hydrodemolition, concrete and pipe cutting, and more.

For more information, visit www.nlbcorp.com or call 248-624-5555.

Federal Signal To Open Fifth FS Solutions Center

Federal Signal Environmental Solutions Group opened its fifth FS Solutions center in Long Beach, California on January 2, 2008, as the company continues to increase product, service and training offerings to industrial cleaning contractors and other industry professionals. The new center, located at 1510 Hayes Avenue, will stock high performance parts and accessories for Federal Signal's Guzzler, Vactor and Jetstream brands – as well as other makes and models of waterblasters and vacuum loaders. The FS Solutions center will also offer used equipment sales and service and refurbishing and major component rebuilding services. Exclusive services at the new location will include rentals of Jetstream waterblasters, parts and accessories.

"For customers who have already invested in industrial cleaning equipment, FS Solutions centers – like the new Long Beach location – are the ultimate, one-stop shops," said Tony Fuller, director of sales for FS Solutions. "These locations provide the repairs, rentals, used equipment, parts and accessories and training our customers need to run their equipment more profitably." Additional FS Solutions centers are located in Birmingham, Alabama; Houston, Texas; Toledo, Ohio; and Streator, Illinois.

To help customers in Southern California with their waterblast rental needs, the Long Beach center is staffed by knowledgeable employees with significant waterblasting experience. A customer looking for an extra waterblaster for a short-term or seasonal contract can choose from a full line of Jetstream units at the new Long Beach center – and FS Solutions will deliver the unit directly to the jobsite.

Because the businesses represented by the Guzzler, Jetstream and Vactor brands are highly specialized in nature, all FS Solutions locations provide access to factory-trained, certified technicians and genuine OEM parts. "FS Solutions customers look to our sales staff and service training technicians for recommendations and solutions to the unique challenges of their particular applications," Fuller said. "Whether it's a contractor looking for faster, more cost-effective ways to perform cleaning operations or a business that can benefit from application expertise, equipment evaluations or training, we're providing solutions."

According to Fuller, FS Solutions technicians are also factory-authorized to repair Fruitland, Hibon, F.E. Myers, Dana, and Omsi equipment and are also factory-trained on Roots Dresser and Holmes blowers. "As an industrial-strength partner, FS Solutions is committed to the continued success of our customers," Fuller said. "From a new paint job to a complete rebuild, we can fix any blower, vacuum truck, water blaster or water pump."

With nearly 100 years of collective experience in industrial vacuum loading, sewer and catch basin cleaning, vacuum excavation and industrial high-pressure waterblasting, FS Solutions offers unsurpassed expertise and a unique breadth of product lines and trusted brands to meet the needs of industrial cleaning contractors and other industry professionals. For more information about products and services available from the FS Solutions centers or to find the nearest location, call 800/627-3171 ext. 298, or visit www.fssolutionsgroup.com.

Compulsory Redemption Of Outstanding Shares In KMT Group AB

Nordstjernan Ventures Investment AB (NVI) held approximately 93.8 percent of the shares in KMT Group AB (KMT) as of December 28, 2007. On January 2, 2008, NVI submitted a written request to the Board of Directors of KMT for the redemption of remaining shares in accordance with Chapter 22, Section 6 of the Swedish Companies Act (2005:551). As a result thereof, the Board of KMT will immediately inform the shareholders of KMT that redemption has been requested through announcements in Post-och Inrikes Tidningar (The Swedish Gazette), in Dagens Industri and by letter.

On January 9, 2008, KMT reported that NVI held about 94 percent of the shares in KMT as of December 28, 2007. At the request of NVI, the Board of Directors has decided to apply for delisting of the shares in KMT.

On January 11, KMT announced that the last trading day in KMT Group AB is February 1, 2008. OMX Nordiska Börs Stockholm has, after having received the application for delisting from the Board of Directors in KMT, decided that the last day for trading of the KMT share will be February 1, 2008.

For further information, contact: Carl-Erik Ridderstråle, Board Member, KMT Group AB, tel: +46(0)8-594 211 50.

Ring Power Named Exclusive Dealer for KMT-Aqua Dyne UHP Waterjetting Rentals

Ring Power Corporation has acquired exclusive rights to act as the rental agent for KMT Aqua-Dyne, a leading manufacturer of ultrahigh-pressure waterjetting systems, pumps and accessories. KMT Aqua-Dyne has been supplying high-pressure waterjetting equipment from 1,000 psi to 40,000 psi for surface preparation, industrial cleaning, hydrostatic testing and hydro-demolition for over 35 years.

The initial additions to the Ring Power rental inventory will include the 20,000 psi and 40,000 psi waterjetting systems. These systems will be marketed to customers using UHP waterjetting for surface preparation purposes. Ring Power is also a dealer of Sullair® air compressors and believes additional opportunities will be made available through this existing customer base. As with Sullair air compressors, Ring Power will be the first Cat® dealer to market UHP water-jetting products.

Waterjetting units can be used by various industries, including automotive, marine, construction and mining and contractors who provide specialty cleaning services to those industries. The UHP waterjetting process cleans, strips, removes, demolishes and cuts material in an economical and environmentally friendly way.

"Ring Power looked for a well-known and respected UHP waterjetting manufacturer whose business goals and strategies matched our own; we found a partner in KMT Aqua-Dyne," said Roger Adkins, Ring Power AVP/ Air Compressor Sales Manager.

All rental calls received by the manufacturer will be forwarded to Ring Power, who will also be listed as a point of contact for rentals on www.kmtgroup.com.

Ring Power is the Central and Northeast Florida Caterpillar dealer, headquartered in St. Augustine. Ring Power is comprised of eight divisions and has more than 45 years of experience selling, servicing and supporting Caterpillar and allied equipment. Additional information about the Ring Power organization, its products, services and employment opportunities can be found on the Internet at www.ringpower.com.

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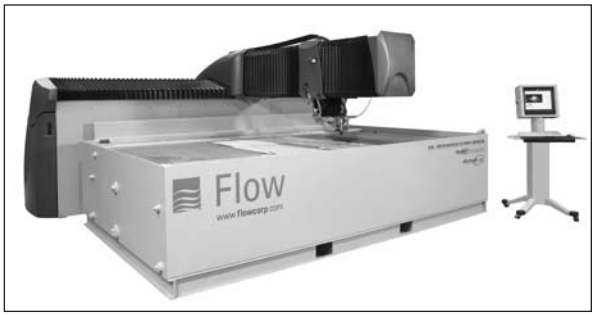
Flow's 87,000 psi Waterjet Cutting Technology At WESTEC 2008

Flow International Corporation, a leading developer and manufacturer of ultrahigh-pressure (UHP) waterjet technology, will showcase 87,000 psi waterjet cutting at WESTEC 2008, March 31 – April 3, 2008, at the Los Angeles Convention Center.

Flow's Integrated Flying Bridge (IFB) and WMC2 waterjet machines incorporate 87,000 psi waterjet cutting. Flow's HyperPressure technology enables faster, more cost-effective cutting; lower part cost and higher production, including cutting speeds that are 20-50% faster than 60,000 psi; 20-30% lower part cost than 60,000 psi; lower abrasive consumption, with 30-50% less abrasive used than 60,000 psi; simpler, faster maintenance; and many more benefits.



87k Cuts Faster, Reduces Part Cost, Increases Production Rates

Manufacturers are realizing significant benefits as the result of 87,000 psi waterjet cutting, as evidenced by Flow's customers who have implemented 87k psi.

"Flow's 87,000 psi HyperPressure with Dynamic Waterjet head is hands down the best, fastest, most accurate machine available – period," said Jack Bates, co-owner, Michigan Waterjet, Albion, Michigan. "In some cases we are cutting as much as 50% faster than 50k or 60k psi cutting."

TR Machine, Davis, Illinois, replaced its 50k psi machine with Flow's IFB waterjet and 87k psi and realizing faster cutting and a positive impact on their bottom line.

(continued on page 21)

2008 StoneAge Catalog, Manual Inserts Available On-Line

StoneAge, Inc. has updated its web site to include the new 2008 catalog on-line enabling visitors to view new tools, improved product information and images. Print copies of the 2008 catalog are available upon request by contacting sales@stoneagetools.com or by calling toll free 866-795-1586.

StoneAge recently improved its product support literature by converting operation manuals into manual inserts. The manual inserts have been condensed and simplified and are now available on the StoneAge website. The updated manual inserts are provided with each new tool and are packaged with service and overhaul kits.

Each insert includes detailed information about operation, troubleshooting, maintenance, disassembly, and re-assembly. There are also complete schematics with part numbers and part orientation for each tool.

Visit www.stoneagetools.com to view the 2008 catalog and to see the latest manual inserts for your equipment.

IMPORTANT NOTICE REGARDING SPAM

Email addresses and other member contact information published in the WJTA Membership Directory is meant to encourage helpful, informative communication between members. The information is not provided to circulate spam or junk mail.

The WJTA leadership requests that members respect the contact information of fellow members and not use that information for the dissemination of spam or junk email. Membership information is not meant to be circulated beyond the WJTA membership.

Flow's 87,000 psi Waterjet Cutting Technology At WESTEC 2008, from page 20

"With the 87,000 psi, we not only cut faster, but also control the straightness or taper of the edge quality using Dynamic Waterjet®," said Tom Olsen, Vice President of TR Machine. "The ability to control our cutting edge has given us a twofold advantage by eliminating secondary milling or profiling operations which in turn created added capacity in our CNC milling department.

"The speed at which 87,000 psi cuts has helped us realize significant time savings," continued Olsen. "A 3/8 aluminum plate part went from being a 6 minute part to a 3 minute part for a 50% time savings. As a result of 87,000 psi's faster cutting, we have cut our cycle time in half and can now produce twice as many parts in the same amount of time."

TR Machine has improved part production while maintaining quality, to help realize a positive impact on the bottom line. "Through faster cutting with 87,000 psi, we have significantly increased our production rates and in doing so, created capacity for other opportunities," said Olsen. "We have improved our overall operations but, more important, we have opened doors for other opportunities that would have remained closed without this technology. By keeping jobs in house we've improved our delivery, maintained quality, and increased our capacity as a company, resulting in a positive impact on our bottom line."

For more information, visit www.flowcorp.com.

The Jet News is published by the WaterJet Technology Association (WJTA) and is a benefit of membership in the Association.

WJTA Welcomes New Members

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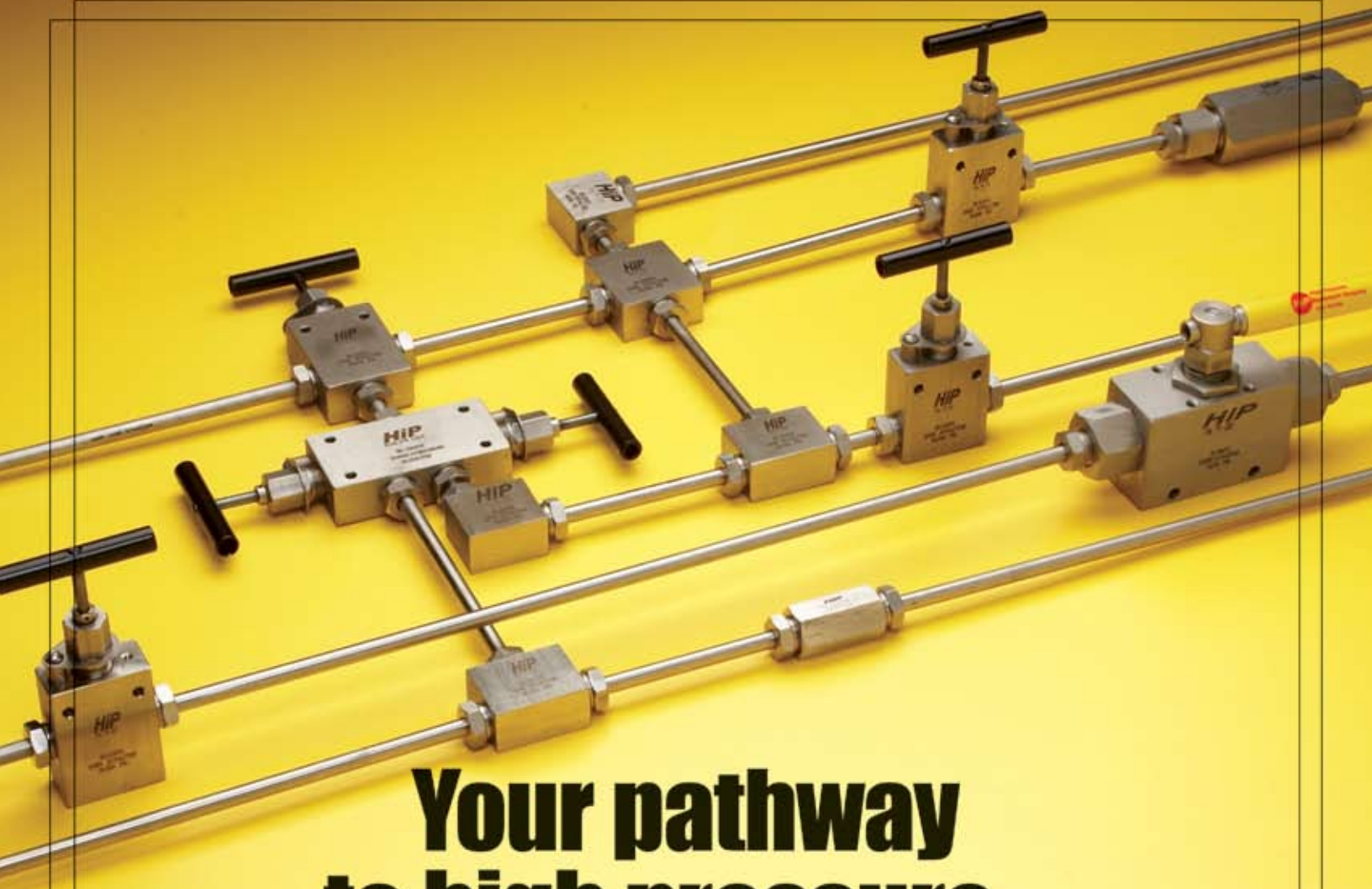

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