WJTA Jet News

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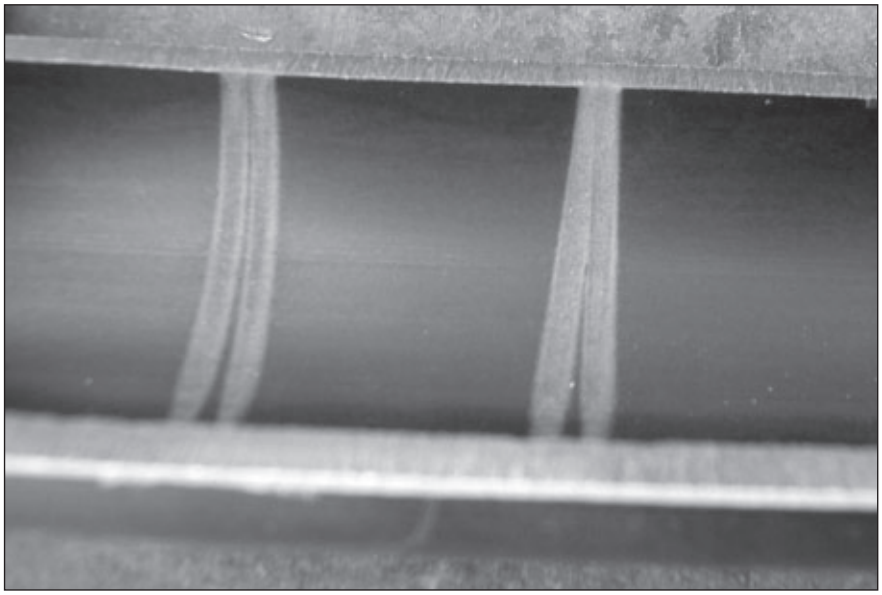
Waterjet Cleaning Of Steel Process Lines Without Damage To The Steel Wall

by: D. Wright, J. Wolgamott, G. Zink, StoneAge, Inc., Durango, Colorado, U.S.A.



Rotating Jet Damage at 140 MPa (20,000 psi), Drilled Steel Nozzles, Time Periods of 30 and 60 Seconds

ABSTRACT

Steel process lines and tubes are commonly cleaned using waterjet systems with pressures up to 40,000 psi. There is a risk of damaging these lines depending on operating parameters such as jet pressure, angle, rotation and rate of traverse. These lines vary from small diameter heat exchanger tubes to larger pipes. The highest energy concentrations with greatest risk typically occur in the small diameter tubes. Testing was performed to identify the operating parameters for which no damage would be caused to steel process lines.

1. INTRODUCTION

Waterjet cleaning of steel tubes, piping and vessels is routinely conducted at pressures from 5,000

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On the inside

to 40,000 psi. The concerns by plant operators have been damage by high pressure waterjets and mechanical wear caused by the rubbing of the nozzle against the wall of the tube. Another sometimes overlooked failure mode of piping and tubing is due to corrosion related to the plant process, in both carbon steel and stainless steel materials. There have been instances of blame placed on waterblast contractors for damage that was actually due to corrosion, because the waterjet cleaning removed the material from the corrosion pits and cracks that had been keeping the tubes from leaking through these tiny pits and cracks. A corrosion damaged stainless steel tube is shown in Figures 1 and 2. The pitting caused by corrosion has relatively sharp edges. A waterjet attacks steel through the process of cavitation erosion by water droplet impact, which looks much more smooth and rounded (see Figures 4, 6, 9, 12, 14 and 15). The purpose of this testing was to determine operating parameters which will not result in waterjet damage to the tubes, and to illustrate what the damage caused by waterjet action looks like.

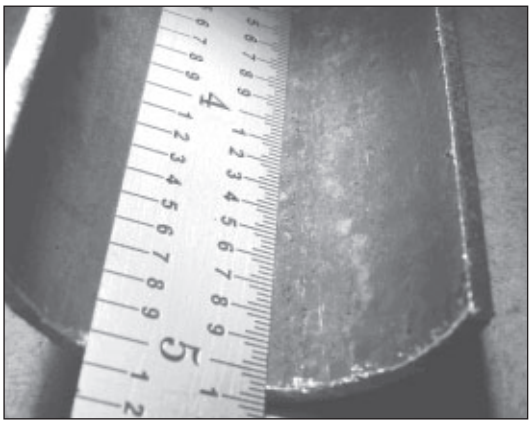

Figure 1. Pitting Caused by Corrosion in Stainless Steel Tube

Figure 2. Detail of Corrosion Pits in Stainless Steel Tube

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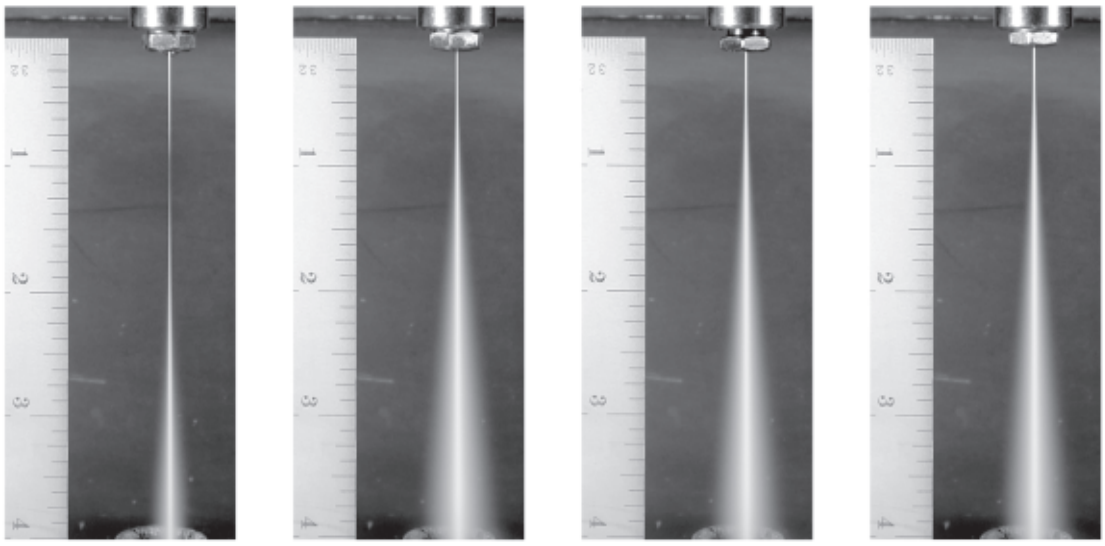

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2. TESTING

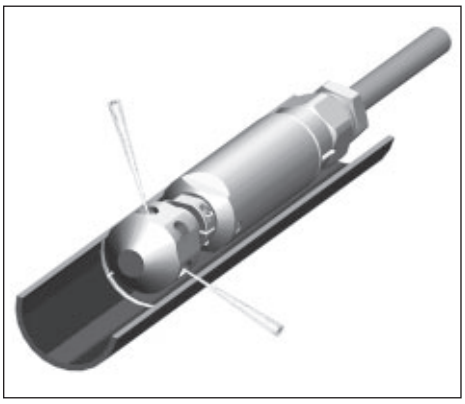

Figure 3. Rotating Nozzle Test Arrangement

Tests were performed using a single fixed jet and multiple rotating jets; Figure 3 illustrates the typical test arrangement for multiple rotating jets. The standoff distances used would be typical of tube and small pipe cleaning but considered relatively close for pipe sizes larger than six inches unless provisions were made to place the jets closer to the pipe wall. For tests performed at and below 140 MPa (20,000 psi), two types of nozzle were used, one being drilled steel of poor quality, and the second high quality stainless steel nozzles with flow straighteners. Tests performed at 250 MPa (36,000 psi) used good quality sapphire nozzles. The tube samples on which the tests were conducted consisted of new 304 stainless steel and 1018 DOM carbon steel, both 1.88 in. inside diameter. The amount and type of damage was found to be quite similar in the stainless steel and the carbon steel, so most of the testing was done in the 1018 carbon steel to allow for better visual contrast. The damage was quantified and compared in terms of depth of material removal.

3. RESULTS

3.1 Stationary Jets

The first of these tests used a poor quality drilled steel nozzle orifice, typical of small tube cleaning nozzles without replaceable inserts. An orifice size of 1.07 mm (.042 in.) was drilled at 90° in the head and tested with the jet perpendicular to the tube wall, at a standoff distance of 9.6 mm (.38 in.) Tests were run on both carbon steel and stainless steel for periods of 10, 30 and 60 seconds at pressures of 70, 105

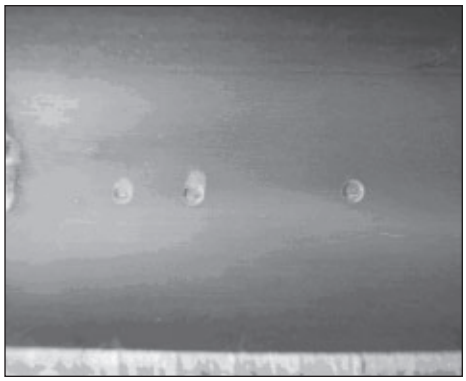

Figure 4. Damage to Carbon Steel Tubing, at 140 MPa (20,000 psi) with Stationary Drilled Steel Nozzle, for Time Periods of 10, 30 and 60 Seconds

(continued on page 10)

Industrial Vacuumers Consider Publishing Best Practices

"From a contractor's standpoint, you can hardly offer waterjet service and not offer vacuum truck service and vice versa," says Pat Debusk of Debusk Industrial Services and a board member of the WaterJet Technology Association (WJTA). "But even though both types of equipment work the same job, their operators face different hazards."

Clearly, both waterjet and vacuum truck operators need safety training. High-pressure presents an obvious danger to operators and the people around waterjet equipment. High-powered vacuums are also potentially dangerous, and some combination vacuum units use high-pressure water as well. Vacuum operators often work in confined areas and trenches, and must cope with electrical cables, pressurized pipes, and potentially hazardous structures.

Twenty-one years ago, the newly formed WJTA addressed safe and efficient waterjet use with its guide, *Recommended Practices for the Use of Manually Operated High Pressure Water Jetting Equipment*. This collection of best operating practices quickly became the industry's safety bible.

Guidelines

Now WJTA has begun exploring whether it should create a similar set of guidelines for vacuum truck operators.

"Our waterjet handbook is not a training manual, but a set of tried and proven practices developed by people throughout the industry, says WTJA Association Manager Ken Carroll. "Many of the vacuum companies have really good safety programs that we could pull together into a single guide."

A need appears to exist. Although OSHA does not specifically regulate portable equipment, managers and supervisors must comply with relevant OSHA regulations. Larger companies often have specialists who monitor safety requirements and manage training and compliance. This is often more difficult for smaller firms.

Adopting a single, generic set of operating guidelines and personnel classifications would benefit both smaller and larger companies.

Advantages

To start with, managers would find it easier to tell whether their safety

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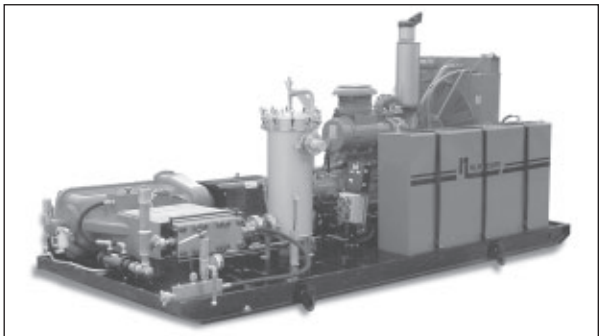
NLB 605 Convertible Pump Sets Bar For Flow And Horsepower

The 605 Series water jet pump units from NLB Corp. offer higher horsepower and flow than any other convertible pump — up to 600 hp and 143 gpm (447 kw and 541 lpm). A simple conversion kit lets users operate at any of five pressures to suit their applications: 6,000, 8,000, 10,000, 15,000, or 20,000 psi (414 to 1,400 bar).

Since the conversion can be completed with just six parts (and no manifold change), operating efficiency is high and maintenance is easy. The NLB 605 has many wear-reducing features, including a slow-running triplex plunger pump and hard-coated valves and plungers. Corrosion-resistant stainless steel is used throughout the pump, instead of carbon steel. Minimum flow is 34 gpm (129 lpm).



NLB 605 Series water jet pump unit

The NLB 605 Series units all feature an internal gear pac instead of a traditional external drive. Other important features include a heavy-duty poly-chain system with belt guard and water pressure-actuated throttle control to adjust output to operator demand.

NLB Corp. manufactures a full line of quality waterjetting systems and accessories for contractor and industrial uses. These include surface preparation, paint removal, tank and tube cleaning, concrete hydrodemolition, concrete and pipe cutting, and more. For more information, visit www.nlbcorp.com.

Jetstream Updates Waterblasters For Reduced Maintenance

Jetstream of Houston, a manufacturer of high-quality waterblast equipment, recently announced several improvements to Jetstream waterblasters that increase reliability and reduce routine maintenance requirements for greater uptime and reduced owning and operating costs.

Several changes add to the reduction in maintenance requirements. First and foremost, according to Tony Fuller, director, Industrial Sales & Marketing, is that the PTO has been redesigned with an oil-bath lubricated bearing. "Instead of requiring daily greasing, you change the oil after extended intervals, much as you would do an engine oil change," he said. "We realize that, in the reality of the contractor's work day, daily maintenance may sometimes be neglected. More than that, we know that this maintenance can be difficult to do in the field. This 'greaseless solution' significantly reduces daily maintenance requirements and will extend the life of the power takeoff."

Fuller pointed out other changes that will reduce routine maintenance and extend machine life, including the new shutdown harness, which is sealed from water and pre-tested to ensure reliable operation in virtually all conditions. The Uni-valve cartridge has also been redesigned to last longer, while still offering the same maintenance characteristics as the original.

Another key improvement is the switch to banded belts. "The banding reduces the likelihood that the belts will creep over on one another or roll," Fuller said. "This means you get more life out of the belts, less downtime and generally smoother, more consistent operation."

A new control panel, consistent across all models, is easy to read and reach, so the operator is better able to observe and control operations. New, long-life LED lights are shock proof and energy efficient. "When it's easier to see, operation is safer," said Fuller. "And these lights are designed to last, without maintenance."

He noted that later this spring, Jetstream waterblasters will incorporate certain additional features, including an automatic belt tensioner, which keeps the belts running tight on the idlers. Other improvements soon to be available include an integral filter on the water tank and trailer-to-skid conversion kit.

Jetstream produces waterblasters up to 40,000 psi, along with parts and accessories for Jetstream and competitive equipment. Product offerings include skid-and trailer-mounted units, pumps, control guns, valves, hoses, replacement parts and nozzles.

Jetstream of Houston is a subsidiary of Federal Signal Corporation's (NYSE:FSS) Environmental Products Group, which includes Elgin Sweeper, Vactor Manufacturing, Guzzler Manufacturing, and Leach Company. For more information, call 800-231-8192 or visit www.waterblast.com.

New Massive Pumps From KMT Waterjet Systems

KMT Waterjet Systems, a manufacturer of extreme-pressure waterjet equipment, has introduced new ***massive*** pumps for waterjet cutting: the SL-V 150 hp and the SL-V 200hp. These are the latest additions to the Streamline™ series of intensifiers, providing more pump sizes to better accommodate specific applications.

Designed for customers who need more horsepower but who do not want to increase the number of pumps, the new ***massive*** pumps eliminate the need to have several smaller pumps driving large numbers of cutting heads. These new pumps produce water under extreme pressure using just two intensifiers, leaving room for a backup (redundant) intensifier. The net benefit is lower operating costs.

The new pumps set a new industry standard for ease of operation by using the same, proven technology as the smaller pumps along with the added benefits of: stacked intensifiers on the very front of the machines for easier access, electronic proportional control which automates changing the pressure to any level desired, balancing and stroke control software, and doors with windows for easy visual inspection.

When compared to other pumps, the new massive pumps in 150hp and 200hp sizes produce more high pressure water at a lower cost per gallon.

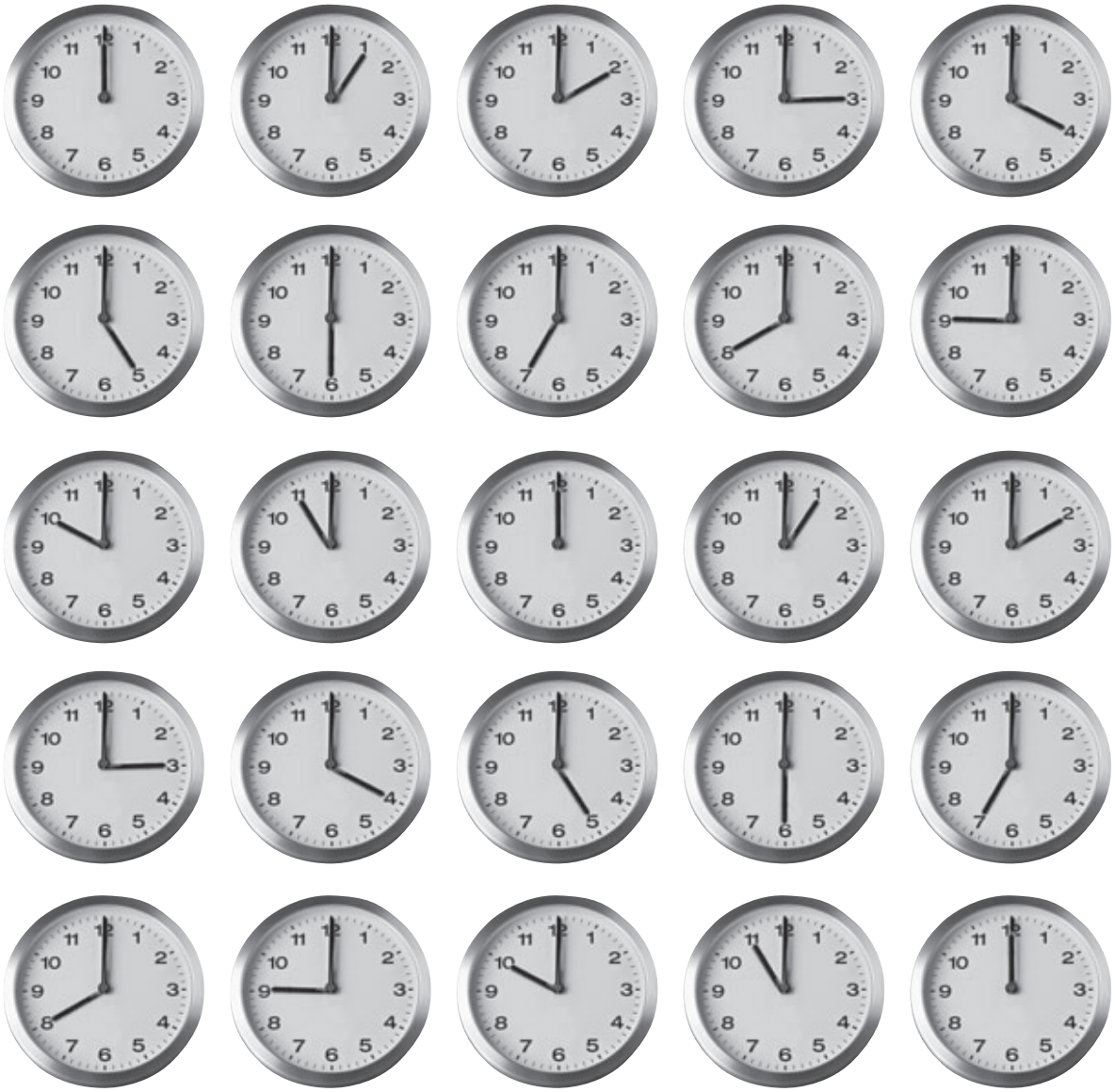
Additional features:

- Redundant Option – Add an extra intensifier as backup, for a total of three intensifiers, and more assurance that at least 2gpm will be available.
- Largest High Pressure Intensifiers – Output for just one intensifier is up to 2gpm, using any of up to three intensifiers. Total maximum output at any time is 4gpm for the 200hp model and 3gpm for the 150hp machine.
- Easier to Maintain – Thread-together cylinder design for ease of access to components, seals, and parts.
- Biggest Attenuator Capacity – Up to 1.5 gallons for more consistent pressure signal and smoother cuts.

KMT Waterjet delivers extreme-pressure waterjet systems which have great reliability and ease of use at pressures up to 60,000 psi and provides high levels of customer service.

KMT Waterjet Systems is part of the KMT Group which markets, develops and manufactures advanced production solutions for the engineering industry within precision grinding, sheet metal working, tube forming, and waterjet cutting. The KMT holding company, Karolin Machine Tool AB, is quoted on the "O" list of the Stockholm Stock Exchange.

For more information, visit www.kmt-waterjet.com.



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and 140 MPa (10,000, 15,000, and 20,000 psi). Figure 4 shows the damage created at 140 MPa (20,000 psi) with a drilled jet in carbon steel; the carbon steel results are graphed in Figure 5. Figure 6 is a photograph of the damage created at 140 MPa (20,000 psi) in stainless steel; the stainless steel results are plotted in Figure 7. Note that there is very little difference in results between the two materials. At 70 and 105 MPa (10,000 and 15,000 psi), no damage was caused at the 10 second exposure, while slight damage occurred at 140 MPa (20,000 psi). The damage caused at 70 MPa (10,000 psi) can only be felt as surface roughness rather than depth; after exposure for 120 seconds the damage did not increase.

The next series of stationary jet tests used a high quality steel nozzle with a flow straightener and an orifice diameter of .97 mm (.038 in.), exiting from a nozzle head at 90° to the tube wall. Due to the nature of the cavitation mechanism by which the waterjet damages the tube wall, this more coherent jet did not produce any damage up to or including 140 MPa (20,000 psi) after 60 seconds when the standoff distance was 9.6 mm (.38 in.) from the tube wall. Cavitation and damage did occur when this nozzle was tested with increasing standoff distance at 105 MPa (15,000 psi) for 30 seconds at each point. These results are shown in Figure 8.

The final series of stationary jet tests, conducted at 250 MPa (36,000 psi), used a sapphire nozzle insert, diameter .61mm (.024 in.), tested at 80° to the surface of the tube wall. Results showed that allowing a nozzle operating at this pressure to stop rotating or traversing can result in significant damage to the tube wall. Figure 9 shows the test sample used and the resulting damage. These results are plotted in Figure 10, along with the results at 140 MPa (20,000 psi) from the drilled jet tests for comparison.

3.2 Rotating Jets

Use of rotation as a means of keeping the jet moving over the surface can greatly reduce or eliminate damage to steel tubes and pipes. Figure 11 illustrates the great difference between rotating and stationary jet damage; a stationary jet at 140 MPa (20,000 psi) can cause more damage than rotating jets at 250 MPa (36,000 psi).

Damage by rotating jets will still be incurred if the tool is left rotating in the same place; the amount of time to cause damage is dependent on the pressure. At 70 MPa (10,000 psi) a head rotating 500 rpm with three drilled steel jets of .84 mm (.033 in.) diameter (30 kW) at 85° in the same path, at a standoff distance of 9.6 mm (.38 in.), did not cause any damage after 4 minutes in the same location,

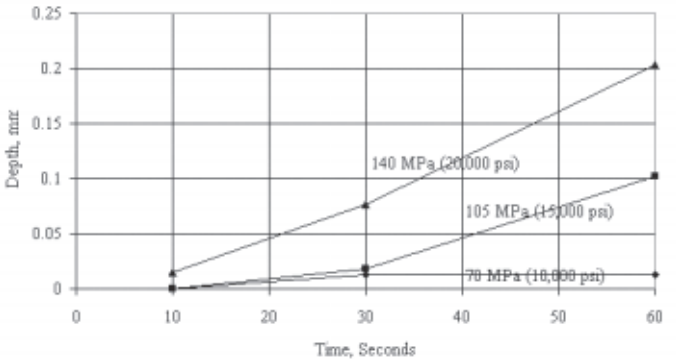

Figure 5. Stationary Drilled Steel Nozzle Damage to 1018 Carbon Steel Tube Wall

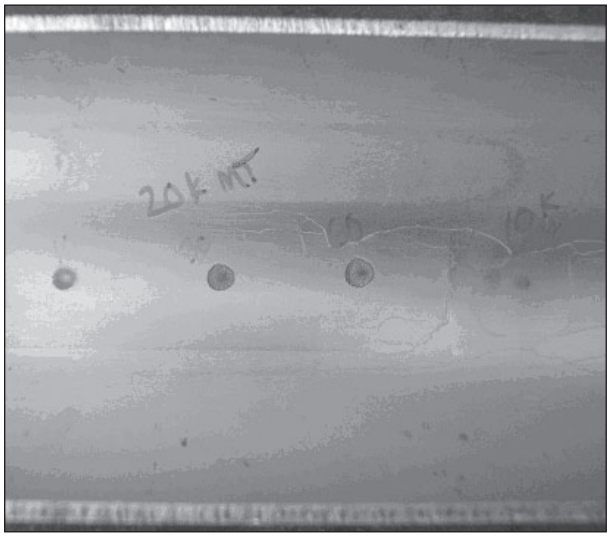

Figure 6. Damage to Stainless Steel at 140 MPa (20,000 psi) with Drilled Steel Nozzle, for Time Periods of 10, 30 and 60 Seconds

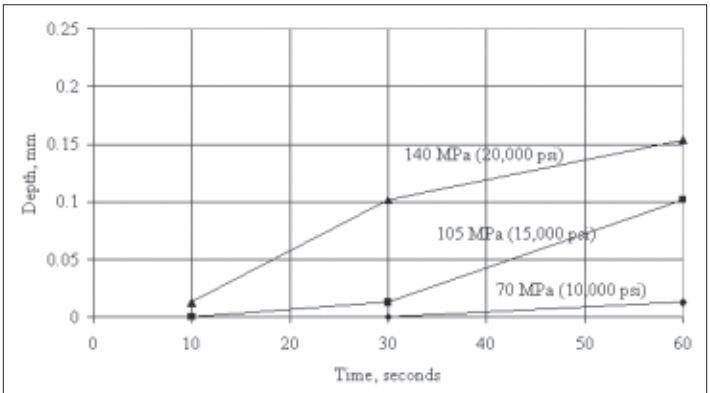

Figure 7. Stationary Drilled Steel Nozzle Damage to 304 Stainless Steel Tube Wall

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Waterjet Cleaning Of Steel Process Lines Without Damage To The Steel Wall, from page 10

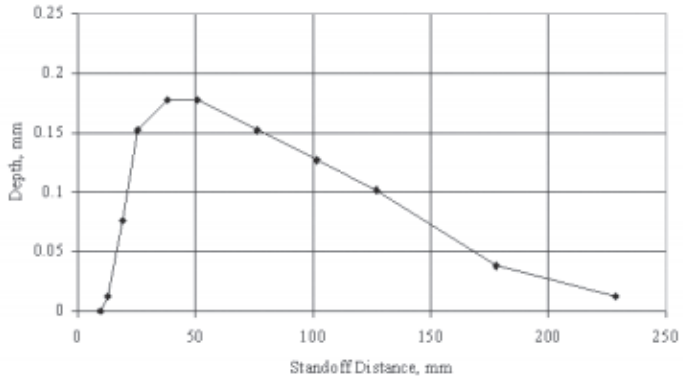

Figure 8. Effect of Standoff Distance with a Stationary High Quality Steel Nozzle With a Flow Straightener at 105 MPa (15,000 psi)

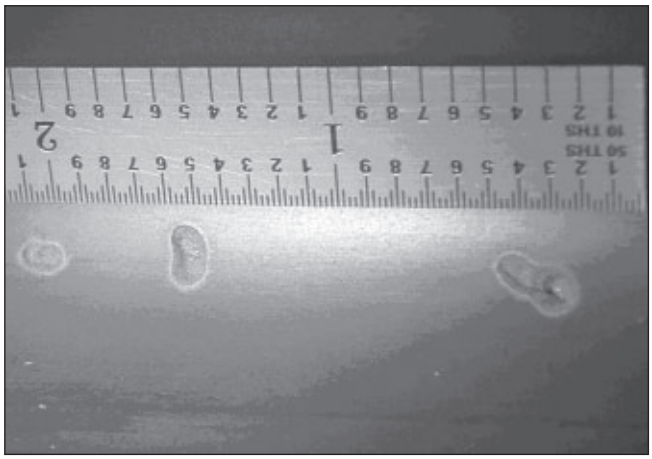

Figure 9. Damage at 250 MPa (36,000 psi), Time Periods of 10, 30 and 60 Seconds

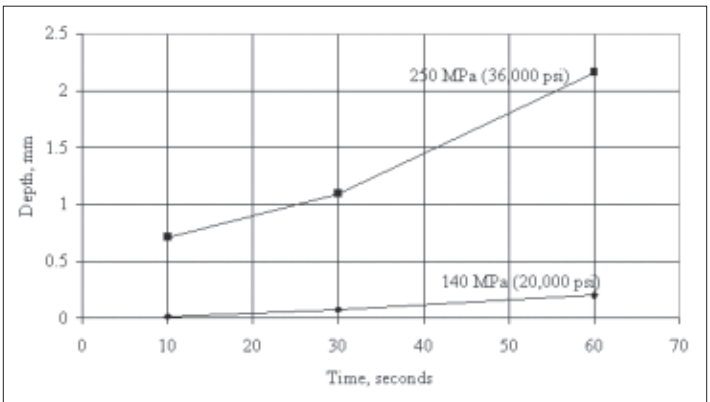

Figure 10. Stationary Sapphire and Drilled Nozzle Damage to 1018 Carbon Steel Tube

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Rotating UHP Water Jets Are Field-repairable

NLB Corp. has introduced two ultra-high pressure (UHP) waterjet accessories that improve performance and can be repaired in the field in under five minutes. The Viper 40™, the first self-rotating head to operate at pressures up to 40,000 psi (2,800 bar), easily attaches to a standard NLB NCG40-286 lance. This new lance is simpler than air-driven UHP lances and eliminates the expense of an air source.

The Viper 40™ has a round stainless steel body with recessed nozzle inserts, to reduce damage from nozzle strikes. Its combination of rotating UHP action and a wide spray path make it exceptionally effective in a wide range of product removal applications. Unlike previous SPIN-NOZZLE® heads, which must be returned to the factory for repairs, the Viper 40™ can be repaired in the field in less than five minutes.

The NCG40-286 lance is also field-repairable, thanks to a unique quick-change cartridge seal that can be replaced in just 60 seconds. This lightweight lance features a patented trigger design (Patent No. 5,636,789) that allows the operator to dump pressure instantly. Other operator-friendly features include easy trigger actuation and adjustable shoulder stock and handgrip.

For more information, visit www.nlbcorp.com.

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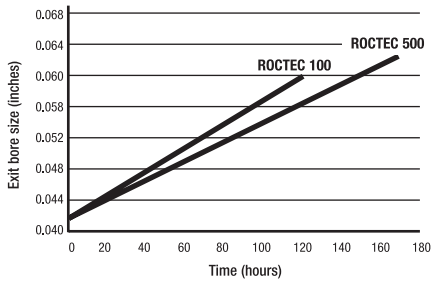
AWJ Nozzle Performance Comparison



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Veolia Environmental Services Industrial Services formerly ONYX Industrial Services Inc.

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Jetstream Names Krupowicz VP, General Manager

Jetstream of Houston, LLP is pleased to announce the appointment of Bill Krupowicz to vice president, general manager. Krupowicz replaces Ron Schmidt, who has been named vice president of technology development at the Federal Signal Environmental Products Group. Jetstream is a subsidiary of this group.

In his new role, Krupowicz will assist Jetstream with current growth initiatives as the company continues to pursue a global leadership position in the high-quality, high-pressure waterblasting equipment industry. Krupowicz, who joined Federal Signal in 2000, was most recently vice president, general manager of Leach Company, another subsidiary of the Federal Signal Environmental Products Group.

"Bill brings a wealth of engineering, product management and international business knowledge to Jetstream," said Mark Weber, president, Federal Signal Environmental Products Group. "His experience is a great complement to Jetstream, which has significant revenue growth opportunities in new domestic applications and international markets."

Jetstream manufactures industrial high-pressure waterblasting equipment operated at pressures up to 40,000 psi for a wide range of industrial cleaning and surface prep applications. Product offerings include a complete line of skid- and trailer-mounted pump units, control guns, valves, hoses, replacement parts and nozzles.

For more information, call 1-800/231-8192, or visit Jetstream online at www.waterblast.com.

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and only slight damage had occurred after 6 minutes. With the same conditions at 105 MPa (15,000 psi) and .79 mm (.031 in.) diameter jets (48 kW), no damage was caused after 60 seconds, with slight damage after 120 seconds, and at 140 MPa (20,000 psi) with .79 mm (.031 in.) diameter jets (74 kW), slight damage was caused after 30 seconds. The damage produced at the latter condition is shown in Figure 12. The plotted results are shown in Figure 13 in addition to those obtained from a rotating head at 250 MPa (36,000 psi) with three nozzles, .48 mm (.019 in.) diameter (62 kW) at 80° to the tube wall with 9.6 mm (.38 in.) standoff distance. At 250 MPa (36,000 psi), a small amount of damage was caused after 10 seconds, and a fair amount was created after 60 seconds. Figures 14 and 15 show the test sample used and the resulting damage. When operating at 250 MPa (36,000 psi), even with rotation, the tool should be kept moving along the tube.

3.3 Jet Angle

The effect of jet angle of impingement on the tube wall was studied at 250 MPa (36,000 psi) with rotating jets to determine if a shallow angle resulted in reduced damage. A single .61 mm (.024 in.) sapphire nozzle was used. At 10 degrees, no damage occurred after 60 seconds of exposure, but a small amount of damage did begin to occur at 20 degrees after 30 seconds, and after 10 seconds with a 30 degree angle. These results are shown in Figure 16.

4.0 CONCLUSIONS

Waterjet damage to steel tubing and pipe is quite dependent on the operating pressure, rotation or other motion of the jet, and the amount of time the jets are left in the same place. Damage is also dependent on the standoff distance and somewhat dependent on the quality of the jet. There is a fairly high risk of damage at 250 MPa (36,000 psi); the jets must be kept continuously rotating and traversing along the tube or pipe; if the rotation or linear motion stops for as much as 10 seconds, damage may be caused. There is a decrease in risk when the pressure is lowered to 140 MPa (20,000 psi); however, a stationary jet is still likely to cause damage and the operator should not allow a rotating tool to be left in the same place for 30 seconds or more. The risk decreases considerably further at 105 MPa (15,000 psi); rotating jets require over a minute in the same location to begin to create damage, while a stationary jet could cause a small amount of damage after 30 seconds. Operating pressures at or below 70 MPa (10,000 psi) are at very slight risk of causing damage with any combination of conditions.

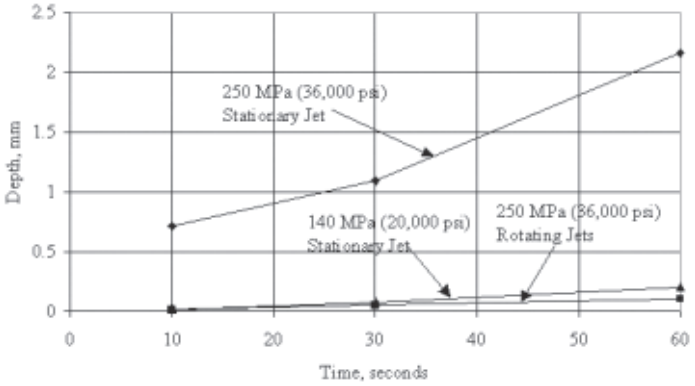

Figure 11. Rotating Jet Damage Compared to Stationary Jet Damage

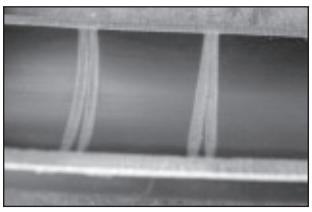

Figure 12. Rotating Jet Damage at 140 MPa (20,000 psi), Drilled Steel Nozzles, Time Periods of 30 and 60 Seconds Also pictured on the cover

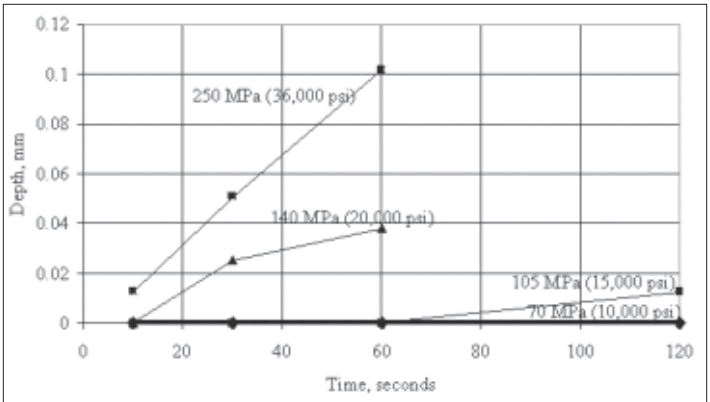

Figure 13. Rotating Jet Damage Drilled Steel and Sapphire Nozzles

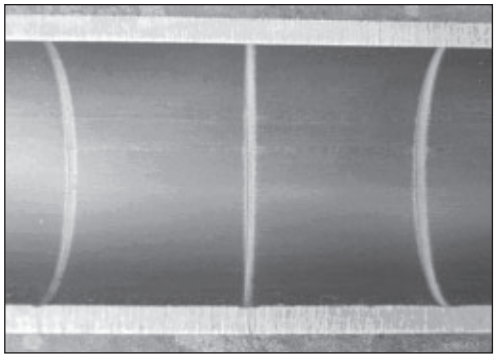

Figure 14. Rotating Jet Damage at 250 MPa (36,000 psi), at Time Periods of 10, 30 and 60 Seconds

(continued on page 15)

Flow International Launches Waterjetpro™ Line Of Cutting Tables

Flow International Corporation (NASDAQ: FLOW) has announced the launch of its WaterjetPRO™ line of waterjet cutting tables.

For less than the price of a used waterjet, WaterjetPRO™ offers affordable tables that are dependable, fast and accurate and include such features as a jogging pendant and programmable Z-axis. WaterjetPRO tables are made possible thanks to Flow's new program, Powered by Flow™, which enables machine tool providers to integrate Flow's ultrahigh-pressure (UHP) pump technology as part of their existing product lines.

Powered by Flow™ gives companies looking to expand their capabilities a consistent, reliable source of ultrahigh-pressure. In addition, customers of this program will receive the award winning, high quality service provided by Flow including 24/7 online parts ordering, trained field service engineers located around the country, and superior technical support and documentation.

"WaterjetPRO™ cutting tables offer companies previously unable to afford waterjet machines the benefits of ultrahigh-pressure waterjet technology, keeping them competitive in today's manufacturing environment," said Marjorie Millay, product manager, Flow International.

Target markets for WaterjetPRO™ tables include stone, tile and decorative glass companies; small job shops; sign shops; university and technical colleges; R & D areas within manufacturing operations; companies seeking economical methods for prototyping, producing small batches and allowing suppliers to quickly deliver product while setting up high capacity cutting such as stamping or die cutting; and anyone seeking a fast, flexible way to cut soft materials.

For more information, visit www.flowcorp.com.

Waterjet Cleaning Of Steel Process Lines Without Damage To The Steel Wall, from page 14

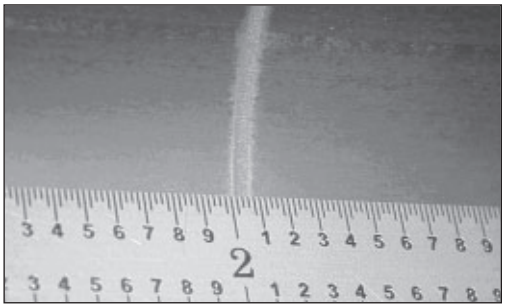

Figure 15. Detail of Damage by 250 MPa (36,000 psi), Rotating Jet after 30 Seconds

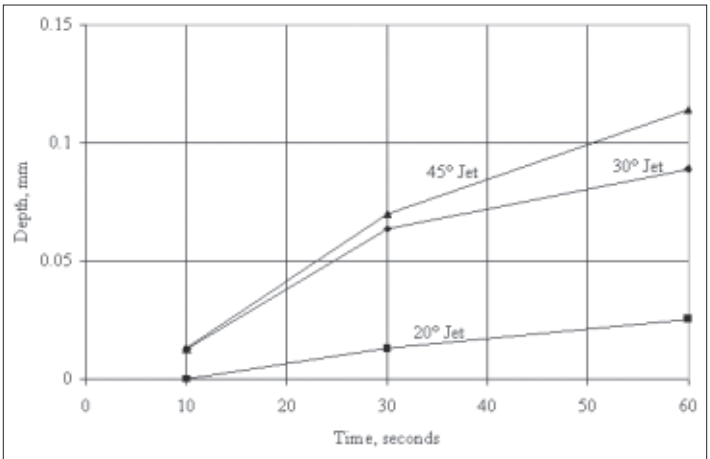

Figure 16. Effect of Jet Impingement Angle at 250 MPa (36,000 psi) with Single Rotating Jet

Safety Committee Solicits Comments On Improvements To *Recommended Practices*

The WJTA Safety Committee hereby solicits comments regarding improvements to the publication, *Recommended Practices for the Use of Manually Operated High Pressure Waterjetting Equipment*. While *Recommended Practices* is reviewed periodically at the biennial conferences of the WaterJet Technology Association, your comments and suggestions for improving the publication are invited and welcome anytime.

Please address your comments and suggestions to: Safety Committee, c/o WJTA, 906 Olive Street, Suite 1200, St. Louis, MO 63101-1434, fax: (314)241-1449, e-mail: wjta@wjta.org, web site: www.wjta.org.

World Of Concrete Debut For New Robot From Aquajet

New robot from Aquajet eliminates the need for hand trimming and offers more stable operation during vertical indexing.

A new top-of-the-range HVD robot from hydrodemolition specialist Aquajet made its debut at the recent World of Concrete Congress in Las Vegas, Nevada.

The new model features an improved front skirt and power head, offering increased versatility and easier access up to the wall edge and into corners. This eliminates the need for final hand trimming any untreated areas of up to 10 cm left by previous models against the wall edge.

A new elevator hoist vertically positions the cutting head. It incorporates a sturdier construction to hold the head more securely when indexing up to 6m freestanding height, ensuring more stable operation and eliminating any flexing and movement.

A stronger dual drive system offers increased hoist safety in the event of a failure with the second unit automatically starting.

The diesel-powered HVD robot also features the proven high pressure lance control system to provide enhanced smooth and exact movement by the highly efficient cutting head.

A splashguard ensures reduced splash by water and debris.

The simplified computer control system assists the operator in avoiding mistakes in programming and the use of the hydrodemolition robot.

The new unit is also shorter to offer increased mobility.

New US distributor

The launch of the new robot at World of Concrete also marked the first appearance by the newly appointed USA distributor, Putzmeister America Water Technology Division.

For further information please contact: Stefan Hilmersson, Aquajet Systems AB, Brunnsvägen 15, SE-570 15 Holsbybrunn, Sweden, Tel: int +46 (0)383 508 01, Fax: int +46 (0)383 507 30, email: aquajet@aquajet.se.

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.

Industrial Vacuumers Consider Publishing Best Practices, from page 7

procedures were the best way to meet OSHA and other regulations. "When we issued our waterjet guidelines 21 years ago, many companies that thought they were in compliance really were not," recalls Debusk.

Third party recommendations also provide greater credibility, says Bill McClister, Onyx Industrial Services Vice President of Support Services and WJTA board member. "The WTJA is a disinterested third party involved with technical education. It has nothing to gain from how it writes its recommendations," he explains.

This is especially important if a lawsuit arises from a vacuum-related accident. Without guidelines that define best practices, lawyers may challenge companies to show that they took all necessary safety precautions.

Established, industry-wide guidelines provide a benchmark for industrial cleaning companies to show they operate safely. "Our guidelines have been cited in court cases as evidence that a company was following recommended practices," says Carroll.

Even more importantly, says McClister, collaborating on best practices gives the entire industry a way to improve its procedures. "We've all made mistakes, we've all had accidents," he explains. "Each one is a black eye for the entire industry. By working together, we can create a central clearing house where we can learn from our individual mistakes and improve safety for everyone."

Moving Forward

The WJTA plans to bring together vacuum equipment operators, end-users, and manufacturers in Chicago this August to discuss potential guideline development.

"While we will go into the meeting with an agenda, our real goal is to listen to what the industry wants from our organization," says Carroll. "Most industrial cleaning companies we've talked with seem interested."

"If you're a leader in this industry, you certainly want to be involved," says Debusk. "This is a chance to state your case and help make our industry safer and more efficient."

If you want to learn more, call Ken Carroll, LeAnn Hampton, or Mark Birenbaum at WJTA at 314-241-1445 or e-mail wjta@wjta.org.

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WJTA Committees

(as of March 21, 2006)

Following is a list of WJTA committees and the members currently serving on those committees. All WJTA members are invited to participate on committee or committees of their choice. Contact the WJTA office to volunteer for a committee.

Conference Committee, 2007 American Waterjet Conference
Recommends and organizes the Conference program and activities.

Pat DeBusk, Co-Chairman
Bill McClister, Co-Chairman
Craig Anderson
Mohamed Hashish, Ph.D.

Membership Committee
Recommends policies to increase membership in WJTA.

Bill McClister, Chairman
Pat DeBusk
Hugh B. Miller, Ph.D.
Pete Mitchell
Carl Olsen

Nominating Committee
Oversees the nomination and election of board members.

Lydia Frenzel, Ph.D., Chairman
Hugh B. Miller, Ph.D.
Forrest Shook
John Wolgamott

Safety Committee
Recommends changes to safety manual.

George A. Savanick, Ph.D., Chairman
Lydia Frenzel, Ph.D.
Rick Hein
Jenny Houston
Marilee Jardine
Kevin Oborn
Forrest Shook
David A. Summers, Ph.D.
Gary Toothe
Bob Turner

Waterjet Short Course Program Committee
Plans and oversees the short course programs held in conjunction with the biennial WJTA Conferences.

Lydia Frenzel, Ph.D.
Thomas Kim, Ph.D.
Hugh B. Miller, Ph.D.
David A. Summers, Ph.D.
John Wolgamott

To volunteer for any of these WJTA Committees, contact: WJTA Committees, 906 Olive Street, Suite 1200, St. Louis, MO 63101-1434, phone: (314) 241-1445, fax: (314) 241-1449, email: wjta@wjta.org, web site: www.wjta.org.

WJTA Welcomes New Members, from pg. 12

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Butech Pressure Systems Restructuring

Butech Pressure Systems has been a division of Haskel International, Inc. for several years. In November 2004, Haskel International, Inc., became a wholly owned subsidiary of Milton Roy, who is part of the United Technologies Corporation (UTC) family of companies. UTC is one of the major US companies with worldwide operations.

The Butech Pressure Systems sales and engineering organization will remain in Erie, Pennsylvania, and it will continue to need parts and services delivered there for their work.

As of January 1, 2006, the Butech Pressure Systems products manufacturing organization was restructured.

The machine shop operations remain in Erie with ownership transferred to the spin-off company Advanced Pressure Technologies, LLC. This new company will be run and staffed by current employees of Butech Pressure Systems.

The assembly and tubing operations will be transferred to the Haskel International plant in Burbank, California, with ownership continuing under Haskel International, Inc.

Advanced Pressure Technologies, LLC in Erie will continue as a primary supplier of machined parts for the Butech Pressure Systems product line, under contact with Haskel International, Inc.

Performance Under Pressure

Count on our proven valves, fittings & tubing for your waterjet cutting & blasting system

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