

WJTA

Waterjet Technology
Association



Jet News

JANUARY 1999

*Published by the
WaterJet Technology
Association
for the benefit of its
members*

17 Locust Street, Suite 1100 • St. Louis, MO 63101-1413, USA • Telephone: (314)241-1445, Fax: (314)241-144

The 630-foot Gateway Geyser — The Nation's Tallest Fountain



See article on page 2

The 630-Foot Gateway Geyser — The Nation's Tallest Fountain, from page 1

The Gateway Geyser is shown here on the Mississippi riverfront in E. St. Louis, Illinois. Downtown St. Louis, Missouri, is shown in the background. The "Gateway to the West" Arch appears in the background and frames the historic U.S. Courthouse where the Dred Scott case was tried in 1857. Busch Memorial Stadium, home of the St. Louis Cardinals (and Mark McGwire) appears to the left of the Arch. The Gateway Geyser is 630 feet high, high enough to have its time of operation restricted by the Federal Aviation Administration. The fountain can only operate for 15 minutes per day. In addition the fountain is shut down if the wind exceeds 13 miles per hour in order to control the spray.

The fountain is powered by three 800-horsepower pumps which force 8,000 gallons of water per minute at 550 psi up through a 20-inch-diameter pipe and through a six-foot-long aerated nozzle fitted with straightening veins. The jet is generated by flushing the 8,000 gallons of water per minute

through the nozzle where it attains an exit velocity of 250 feet per second. In order to avoid damage by the "water hammer" effect, the valves which control the 8,000 gallons per minute must open and shut gradually.

The Gateway Geyser was designed and engineered by Hydro Dramatics, the Fountain Division of Missouri

Machinery & Engineering Company of St. Louis. Hydro Dramatics has furnished the engineering designs for projects throughout the United States and in several international countries. For more information, contact Hydro Dramatics, 918 S. 4th Street, St. Louis, MO 63102, (314)231-9806, fax (314)231-5844.

— George A. Savanick

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- ◆ Ideal for unit mounting or remote site applications.



Abstracts Due Now For 10th American Waterjet Conference

Authors who wish to present papers at the 10th American Waterjet Conference should submit abstracts immediately to ensure consideration. Abstracts will be accepted through January 15, 1999.

To submit an abstract(s) please complete the Abstract Submission Form enclosed and forward to the attention of the Conference Coordinator at the WaterJet Technology Association.

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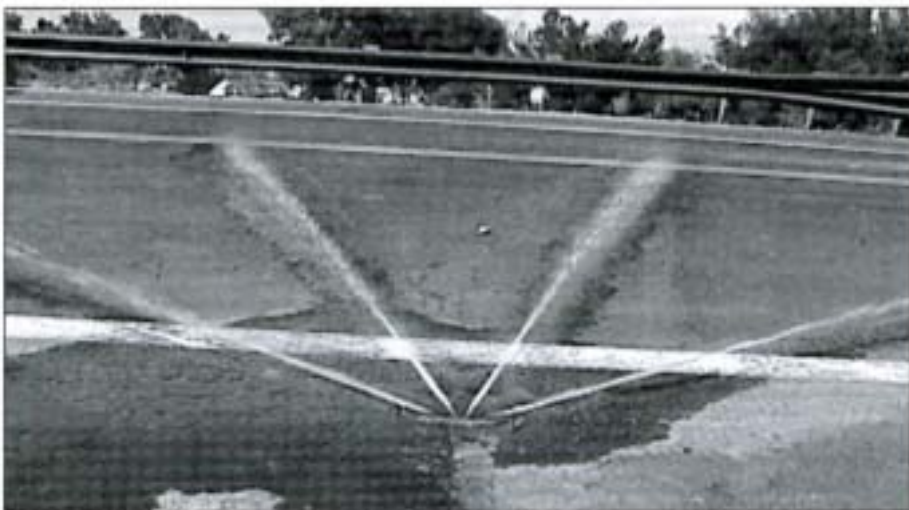
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Odin offers a small system called "Minuteman" that is a prepackaged system for treating several hundred feet of roadway, parking lot, etc.

For more information, contact Odin Systems, International, Inc., 620 Sea Island Road, St. Simons Island, Georgia 31522, phone: (912)638-2400, fax: (912)638-2800, e-mail: jwaldman@odin.com

— George A. Savanick

Abrasive Waterjet Milling

Flow International Corporation recently introduced a significant new development in abrasive waterjet technology: milling with abrasive waterjets.

For years, the manufacturing world has struggled with pocket milling and weight removal in exotic materials. Whether manufacturers needed pocket milling in titanium or nickel alloys, or milling of composites like graphite epoxy or kevlar, precision removal of material without damage or property change was difficult if not impossible to achieve. Dr. Mohamed Hashish of Flow International Corporation, an inventor of abrasive waterjet, is proving that waterjet can effectively and productively remove material on



the most sensitive materials without reducing material fatigue life or inducing mechanical stresses.

"Through extensive R & D, we've been able to apply the principles used

in abrasive waterjet cutting to abrasive waterjet milling," says Dr. Hashish. "A big advantage to milling with waterjets is that abrasive waterjet milling is more environmentally friendly than chemical milling."

Other advantages of waterjet milling are: 1) they can mill virtually any material with an accuracy of ± 0.002 "; 2) skin left can be as thin as 0.010" thick; and 3) the same machine can both waterjet cut and mill. The waterjets can also mill complex shapes and brittle composites as well as both conventional and exotic materials.

Potential applications for this technology are in the aerospace, defense, electronics, and job shop industries.

Classified Ads

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The WaterJet Technology Association's

10th American Waterjet Conference

August 14-17, 1999

JW Marriott Hotel • Houston, Texas

Preliminary Schedule of Events

Saturday, August 14

- | | |
|---------------------|---|
| 8:30 a.m.-Noon | Concurrent Sessions <ul style="list-style-type: none">• Short Course on the Fundamentals and Applications of Waterjet Technology• Safety Seminar• Program to be announced |
| Noon-1:30 p.m. | Luncheon for course participants |
| 1:30 p.m.-4:30 p.m. | Concurrent Sessions (continued) |
| 6:30 p.m.-9:30 p.m. | Welcoming Reception In The Exhibit Hall — Exhibit Opens |

Sunday, August 15

- | | |
|----------------------|---|
| 8:30 a.m.-11:30 a.m. | Contractor's Program |
| 8:30 a.m.-11:30 a.m. | Research & Development Sessions |
| 9:30 a.m.-5:00 p.m. | Exhibits |
| 11:30 a.m.-2:30 p.m. | Lunch in Exhibit Hall |
| 2:30 p.m.-5:00 p.m. | Contractor's Program (continued) |
| 2:30 p.m.-5:00 p.m. | Research & Development Sessions (continued) |
| 5:30 p.m.-6:30 p.m. | WJTA Biennial Business Meeting |

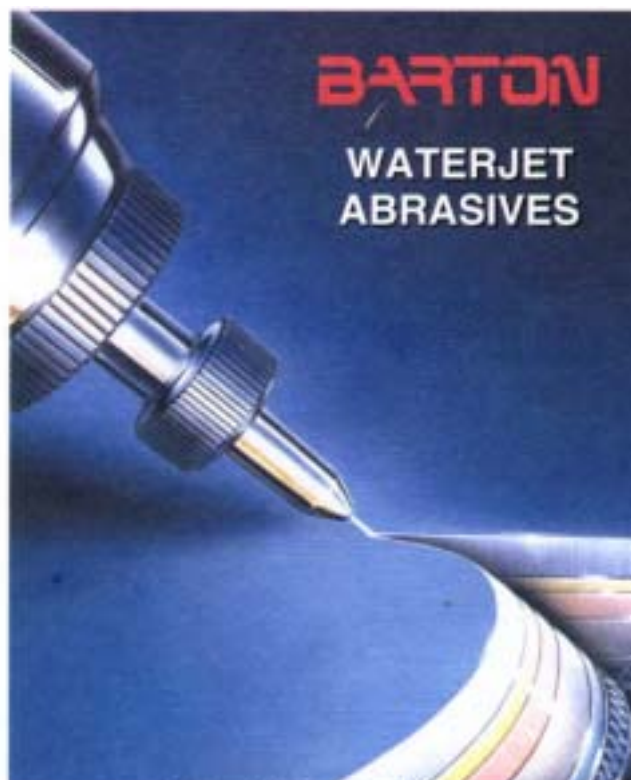
Monday, August 16

- | | |
|------------------------|---|
| 8:30 a.m.-11:30 a.m. | Contractor's Program |
| 8:30 a.m.-11:30 a.m. | Research & Development Sessions |
| 9:30 a.m.-2:30 p.m. | Exhibits |
| 11:30 a.m.-2:00 p.m. | Luncheon in Exhibit Hall |
| 2:00 p.m.-5:00 p.m. | Contractor's Program (continued) |
| 2:00 p.m.-5:00 p.m. | Research & Development Sessions (continued) |
| 6:30 p.m. - 11:00 p.m. | Awards Presentation/Party |

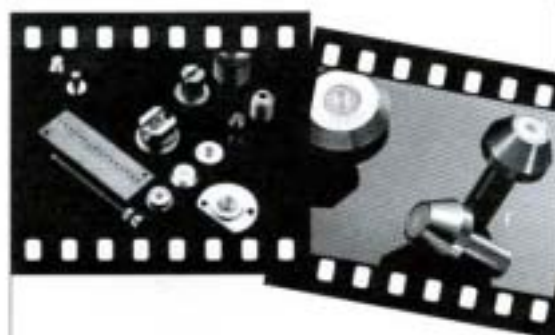
Tuesday, August 17

- | | |
|---------------------|---|
| 8:00 a.m.-3:00 p.m. | Technical Tour and Field Demonstrations |
|---------------------|---|

Plan NOW to attend the Waterjet Conference!
To make hotel reservations, see page 19.



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Nominations Open For WJTA Board Of Directors

"Nominations for the WaterJet Technology Association (WJTA) Board of Directors are now open," announced Dr. Andrew Conn, secretary of the WaterJet Technology Association.

"The WaterJet Technology Association is growing rapidly, and the Association needs dedicated directors to lead the members as the WJTA grows," says Dr. Conn who is also chairman of the Committee on Nomination. "The duties of the directors are truly challenging and rewarding."

The four-year terms of office of Paul Bowser, Pat DeBusk, Lydia Frenzel, Ph.D., Thomas J. Kim, Ph.D.,

(continued on page 8)

Nominations/Elections Procedures

In accordance with the bylaws of the WaterJet Technology Association, revised in 1993, nominations and elections to the Board of Directors include the following procedures:

- At least two calls for nominations to the board of directors will be published in the *Jet News*. The first call for nominations appears in this issue. **Nominations will be accepted through May 17, 1999.**
- A list of the eligible nominees and a brief biographical sketch for each individual will be published in the June 1999 issue of *Jet News*.
- An official ballot listing the eligible nominees will then be forwarded by mail to all eligible voting members of the Association on July 2, 1999. **Signed and executed, ballots must be mailed to the Association's office for tallying by August 11, 1999.**
- The names of newly elected board members will be announced on Sunday, August 15, 1999, at the WJTA general membership meeting held in conjunction with the 10th American Waterjet Conference in Houston, Texas.

Only eligible members of the WaterJet Technology Association may submit a nomination and nominees must be eligible members of the WaterJet Technology Association.

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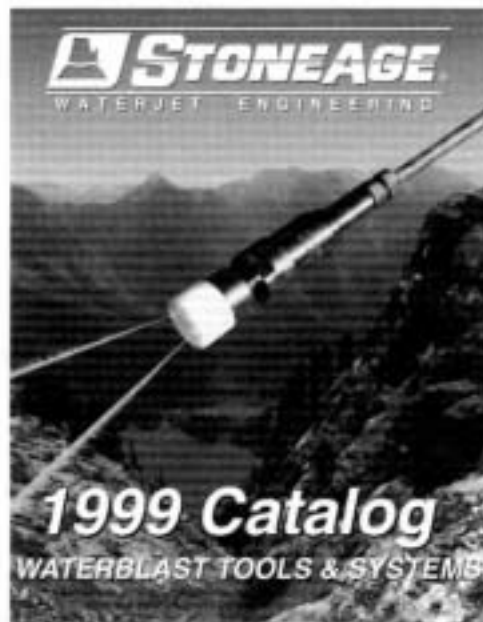
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Extreme Tube Lancing

The problem was at a well water treatment plant in the Sultanate of Oman, located just East of Saudi Arabia. Calcium sulfate plugging had interrupted operations at a slurry brine concentrator. A total of 1490 vertical titanium tubes, 2 inch diameter, 50 feet long were plugged solid. A local waterblast contractor unplugged the tubes using a 150 HP, 15 Kpsi pump with hand lances. But a hard deposit was left on the wall that prevented adequate heat transfer. Use of sea water for cooling is common in this desert area, resulting in similar salt deposits in desalination, water treatment, and other process plants.

A US manufacturer of water treatment plants contacted Powerflo Rentals in Dubai, U.A.E. for assistance. Powerflo Rentals sells and rents hydroblast pumps and accessories for use in process plants, oil fields, and refineries in the region.

The plant is located 300 miles inland from Muscat, in a dusty, dry, gravel desert. Daytime temperature reached 136° F during the job. The top

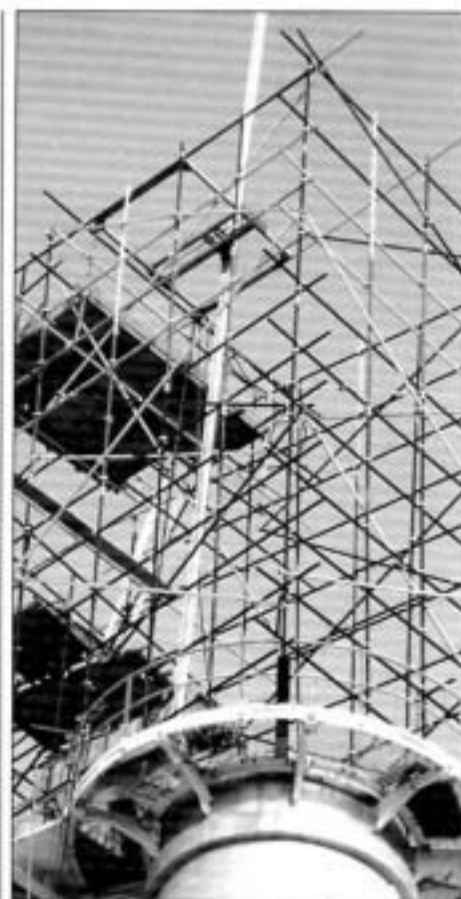
tubesheet was 110 feet off the ground. It's certainly not a pleasant climate for any type of outdoor work.

With no structure above the unit, the operator wanted to avoid setting up scaffolding to support the 30 Kpsi rigid lancing machine recommended by Powerflo Rentals. So tests were conducted with rotating nozzles, a 14.5 Kpsi, 225 HP pump, and video inspection equipment. The StoneAge Marten self-rotating nozzle was successful in removing about 75% of the deposits, but the manual nature of the operation could not assure complete removal. Pressure was also marginal for the difficult salt deposits. A decision was made to use the rigid lancing machine.

Scaffolding was erected to support the StoneAge Lancing System. The 55-foot-long single rotary lancing machine was held by a manual positioner attached to the scaffolding. A WOMA Ecomaster 30 Kpsi pump was used, producing 5.3 gpm flow. Four powerful jets were produced at 35° angle in a 1.75 inch diameter nozzle on the end of the rotating lance.

The nozzle was manufactured by Powerflo Rental's using nozzle inserts by A.M. Gatti. Cleaning results were excellent, and achieved an average rate of 100 tubes/day.

This case study illustrates two important facts. Firstly, mechanized rigid lancing machines stroke the rotating jets at constant, controlled speed; providing complete and uniform results. Secondly, it shows the importance of knowledgeable local equipment suppliers who are willing to make the



equipment work for the customer in even the harshest conditions!

Editorial Contacts:

Mike Biddle - Powerflo Rentals
(Dubai) L.L.C., 971-433-9200
Mark House - StoneAge Inc.,
970-259-2869



*Happy Holidays and
Best Wishes for a
Healthy and Prosperous
New Year from the
WJTA Officers, Board
of Directors, and Staff!*

Nominations Open for WJTA Board of Directors, from page 6

Forrest Shook and John Wolgamott will expire on August 15, 1999. Therefore, nominations are sought for six (6) board members, each to serve a four-year term of office beginning August 15, 1999.

According to the WJTA bylaws, each of the above-named individuals are eligible for re-nomination and re-election to the WJTA Board of Directors.

With regard to all first-time nominees, the WJTA bylaws provide that no more than one of the elected board members may be from the same company or organization. Therefore,

board members may not be nominated from facilities that are already represented on the board by individuals whose terms expire in 2001. These facilities include: Conn Consulting, Inc. (Andrew F. Conn, Ph.D.), Flow International Corp. (Mohamed Hashish, Ph.D.), MPW Industrial Services, Inc. (Bruce Wood), VLN Advanced Technologies, Inc. (Mohan Vijay, Ph.D.), and the University of Missouri-Rolla (David A. Summers, Ph.D.).

According to the WJTA bylaws, any WJTA member in good standing (1999 membership dues paid) may submit a nomination(s). Nominees must also be WJTA members in good standing.

The deadline for making nominations is at least eleven (11) weeks prior to the biennial business meeting scheduled for Sunday, August 15. Your nomination(s) should reach the WJTA office no later than May 17, 1999. To submit a nomination(s), complete the form below and return to:

Chairman, Committee On Nomination
WaterJet Technology Association
917 Locust Street, Suite 1100
St. Louis, MO 63101-1413
Phone (314)241-1445
Fax (314)241-1449

Remember, nominations must be received no later than May 17, 1999.

WJTA Administration

Chairman of the Board
John Wolgamott
(970)259-2869

President/Jet News Editor
George A. Savanick, Ph.D.
(612)432-7594

Vice-President
Thomas J. Kirm, Ph.D.
(401)874-2186

Secretary
Andrew F. Conn, Ph.D.
(410)542-5151

Treasurer
Bruce Wood
(740)927-8790

1997-1999 Directors

Paul T. Bowser (814)838-1416	Forrest Shook (248)624-5555
Pat DeBusk (281)499-8611	David Summers, Ph.D. (573)341-4311
Lydia M. Frenzel, Ph.D. (209)267-0992	Mohan Vijay, Ph.D. (613)993-2731
Mohamed Hashish, Ph.D. (206)850-3500	

Emeritus Members

Thomas J. Labus (414)275-5572	Fun-Den Wang, Ph.D. (303)273-3653
----------------------------------	--------------------------------------

Association Managers

Mark S. Birenbaum, Ph.D. • Kenneth C. Carroll
(314)241-1445

WJTA Nomination Form

Name Of Nominee _____ Title _____

Address _____

City _____ State _____

Country _____ Postal Code _____

Telephone _____

In US/Can (_____) _____ Outside US/Can (_____) (_____) _____
(area code) (country code) (city code)

Fax _____

In US/Can (_____) _____ Outside US/Can (_____) (_____) _____
(area code) (country code) (city code)

Attach biographical information with a brief statement of your nominee's mission and vision for WJTA.

Name Of Nominator _____ Title _____

Address _____

City _____ State _____

Country _____ Postal Code _____

Telephone _____

In US/Can (_____) _____ Outside US/Can (_____) (_____) _____
(area code) (country code) (city code)

Fax _____

In US/Can (_____) _____ Outside US/Can (_____) (_____) _____
(area code) (country code) (city code)

Waterjet Sculpture At Rolla, Missouri

Waterjets are being used to create a second sculpture on the campus of the University of Missouri-Rolla (UMR). In the early 1980s Dr. David Summers and his staff at the UMR Rock Mechanics and Explosives Research Center used waterjets to cut a series of granite blocks for a model of Stonehenge that is now displayed on campus. This sculpture will soon be joined by another sculpture created from monoliths shaped by waterjet cutting.

Artist Edwina Sandys (pronounced Sands), granddaughter of the former British Prime Minister Winston Churchill, has designed the sculpture "Millennium Arch," a 15-foot-tall, 60-ton sculpture to stand near Castleman Hall on the UMR Campus.

"Millennium Arch" will consist of five pieces of Missouri red granite, including:

- a three-piece stone arch composed of two vertical pillars, each 15 feet x 5 feet x 2 feet and a horizontal cross piece measuring 15 feet x 3 feet x 3 feet, and
- two figures, one of man and one of woman, cut out of the vertical pieces. These pieces will be polished and placed free standing a few feet from the arch. The arch will not be polished, but will be rough-hewn.

Dr. Summers and his staff will use high pressure waterjets to shape the rock to Sandys' specifications. Each rock weighs about 70,000 pounds. A sturdy X-Y table will be built around each rock in order to move it under the cutting jet. Deep cuts in the granite will be made with abrasive jets.



Artist's Impression of Millennium Arch on proposed site at Castleman Hall. The height of the sculpture is somewhat exaggerated.

Trimming will be done with a plain waterjet at pressures in excess of 14,000 psi.

Cutting began on December 3, 1998.
Progress on the "Millennium Arch"

project can be monitored by checking the web site —

www.umn.edu/~milenum.

— George A. Savanick

Calendar Of Events

July 2-5, 1999

1999 International Cleaning & Laundering Machine Expo, Shanghai Exhibition Center, China. For information, contact:

Sheng Xiong Xue
General Machinery Research Institute of National Machinery Industry
Bureau, Hefei
No. 888, West Changjiang Road
Hefei, Anhui Province 230031
P. R. China
Phone: [86](551)5312800-2207
Fax: [86](551)5312185

Candidates Sought For 1999 WJTA Awards

You are invited to submit candidates for these special awards that are presented biennially by the WaterJet Technology Association to honor a company, organization or individual who has made a significant contribution to the industry through accomplishments that directly enhance waterjet technology and the industry as a whole.

Candidates must be received no later than July 1, 1999. The award recipient, to be selected by the Awards Committee of the WaterJet Technology Association, will be honored at a presentation ceremony on Monday, August 16, 1999, in conjunction with the 10th American Waterjet Conference in Houston, Texas.

Following is an official form for candidate nominations. Complete one form for each nomination submitted. Please make additional copies of the form as needed. Nominations providing complete written information specified on the form may be faxed to (314)241-1449 or mailed to the WaterJet Technology Association, 917 Locust Street, Suite 1100, St. Louis, MO 63101-1413, USA.

1999 WJTA Awards Nomination Form

Instructions: Complete sections below and submit a narrative (300-word maximum) to support your nomination on a separate sheet of paper. Please print or type all information.

I nominate the following company, organization, or person as a candidate to receive a 1999 WJTA Award (CHECK ONE AWARD):

☐ **Distinguished Pioneer Award**

The nominee must:

- Have made contributions to the waterjet industry;
- Have made contributions to the achievement of the goals of WJTA;
- Have high moral character;
- Have strong personal and business ethics;
- Be dedicated to the future of the waterjet industry and to the growth of WJTA.

☐ Service Award

How has the nominated company, organization or individual contributed in time and talent toward improvement in the Waterjet Technology Association?

☐ **Safety Award**

What has the nominated company, organization or individual done to introduce new and innovative ideas in safety? This could include, but is not limited to new products, new concepts, new safety techniques . . . any unique activity which increases the overall safety of waterjet equipment.

☐ Technology Award

What has the nominated company, organization or individual done to introduce new and innovative ideas in engineering or manufacturing? This could include, but is not limited to, new products, new manufacturing techniques, patents . . . any unique activity that advanced the technology of the waterjet industry.

Candidate: _____ Company: _____

Address: _____ City: _____

State: _____ Country: _____ Postal Code: _____

Phone In US/Canada () _____
area code

Fax () _____
area code

Phone Outside US/Canada [] ()
country code city code

Fax [] ()
country code city code

Candidate Submitted By: _____ Company: _____

Address: _____ City: _____

State: _____ Country: _____ Postal Code: _____

Phone In US/Canada () _____
area code

Fax () _____
area code

Phone Outside US/Canada [] ()
country code city code

Fax [] ()
country code city code

Signed: _____ Date: _____

Nominations must be received no later than July 1, 1999. For a prompt response, fax completed form to (314)241-1449, or mail to the WJTA, 917 Locust Street, Suite 1100, St. Louis, MO 63101-1413, USA.

WJTA Request For Proposals

The Waterjet Technology Association (WJTA) is requesting proposals for the preparation of reports on topics of interest to our membership. These reports will be literature searches, surveys, and data gathering activities only, not research and development work. These reports will then be made available to WJTA members at a minimal cost.

The following topics are of interest:

1. Spark hazard, or lack of, with abrasive waterjets.
2. The use of pipe threads and other pipes found in high pressure connections.
3. Concrete demolition rates using waterjets.
4. Market size for waterblast equipment or services.
5. An index of papers in WJTA publications, cross-referenced by subject and author.
6. Types of abrasives — characteristics and applications.

Please submit your proposals to: WJTA, 917 Locust Street, Suite 1100, St. Louis, MO 63101-1413.

Include a description of the scope of work to be performed, total cost, author's credentials and anticipated time to complete the work. Proposals will be evaluated and funds committed by the WJTA Monograph Committee (John Wolgamott, Thomas J. Kim, Ph.D., Lydia Frenzel, Ph.D., and Mohamed Hashish, Ph.D.). Once a topic has been assigned, it will be announced in *Jet News* and members will be encouraged to submit information to the author(s). Proposals for reports on other topics will also be considered.

A total of \$5,000 has been budgeted for the first reports. The number of topics this will fund will depend on the cost of each report. If the initial reports are judged as worthwhile, more funding will be made available and additional reports will be solicited. WJTA members are encouraged to submit ideas for other topics to study.

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10th American Waterjet Conference

August 14-17, 1999

J.W. Marriott Hotel
Houston, Texas

Plan NOW to be there!

To make hotel reservations, see page 19

Joint Venture With Flow International Corporation

The Robert E. Morris Company, one of the world's premier machine tool distributors and a leading distributor of Flow International Corporation's ultrahigh-pressure abrasive waterjet machines, soon will open the Morris Technology Center in Hudson, Mass. The leading-edge Morris Technology Center combines The Robert E. Morris Company's vast knowledge and experience of traditional machining techniques with FLOW's advanced abrasive waterjet technology to provide the marketplace with innovative solutions to help manufacturers meet their unique production needs.

Opened in November, the Morris Technology Center features waterjet application engineering and a full range of FLOW waterjet machines for demonstrations, customer visits, contract work, prototyping, and hands-on-training. This technology center will feature an applications lab for cutting prototypes, an amphitheater for product training and seminars, and a waterjet machine demonstration area with live demonstrations of FLOW's BENGAL, BENGAL 4 x 4, BENGAL 4 x 8, and A-Series waterjet machines.

"Now that abrasive waterjet machining has come of age, it is a very natural progression to integrate waterjet technology with more traditional machining," said Ron Tarrant, chairman, president and CEO of Flow International Corporation. "Abrasive waterjets are frequently used to cut material to net shape and near net shape. If secondary operations for a specific part are required, the part can be automatically transferred to a grinding machine and measuring system to measure the accuracy of the part. This joint

technology effort is just one example of how waterjet technology can be integrated with traditional machining methods. We're very excited to be a part of this new technology center."

"We're very pleased to partner with Flow International, the industry leader in abrasive waterjet technology," said Mark Dupuis, director of abrasive technology and grinding services at The Robert E. Morris Company. "We have many customers in New England who have found the FLOW BENGAL product to be the most significant new piece of equipment to ever hit their job shop floor. From rapid prototyping to high volume production applications, these machines reduce labor and material costs as well as delivery lead times. Our new technology center will help enable our customers to remain competitive in their prospective marketplaces."

FLOW's ultrahigh-pressure waterjet shape-cutting systems are quickly becoming the global "machine technology of choice." FLOW's abrasive waterjet cutting systems are ideally suited for cutting tough materials such as titanium, Inconel, brass, steel, aluminum, glass, stone, composites, and other materials from 1/16 inch to 8 inches

thick with accuracies between +/- 0.003 to +/- 0.010 inch.

The Robert E. Morris Company, headquartered in Farmington, Conn., distributes manufacturing equipment to job and machine shops located throughout the eastern, southern, and mid-central U.S. Since 1941, the company has established its reputation as an organization dedicated to providing its customers with the best solutions to manufacturing problems.

For more information, contact Flow International Corp., 23500 64th Avenue South, Kent Washington 98032, Phone: (206)850-3500, Fax: (206)813-3285.

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10th American Waterjet Conference

August 14-17, 1999 • JW Marriott • Houston, Texas • USA

Abstract submission deadline extended to January 15, 1999

Impressive progress and a fast-growing understanding of the diversified applications of waterjet technology are generating a growing excitement in the industry. New techniques and applications are being developed and current ones are being improved upon. Waterjet technology, now being used in nearly all types of industry — manufacturing, mining, construction, concrete, stone, aerospace, engineering, process, and medical industries — continues to expand at a rapid pace.

The 10th American Waterjet Conference will focus, from a practical and scientific viewpoint, on the most up-to-date industry advances in waterjetting equipment, techniques, and applications. Some of the areas to be addressed include but are not limited to:

- Abrasives, Water, and the Environment
- Advanced Industrial Applications
- Advances In High Pressure Technology
- Automotive Applications
- Cleaning and Coating Removal
- Components and Systems
- Construction and Non-Manufacturing Applications
- Contractor Applications and Processes
- Demilitarization, including removal of land mines (demining).
- Drilling Applications
- Excavation, Tunneling, and Mining Applications
- High Pressure Equipment and Systems
- Jet Mechanics
- Jet-Material Interaction
- Manufacturing Processes
- Market and Future Needs
- Novel Jets and Applications
- Process Modeling and Control Studies
- Rock Cutting
- Safety, Training, and Environmental Protection

Commercial and academic authors are encouraged to submit titles and abstracts for consideration. To submit an abstract(s), please complete the abstract submission form on the back of this sheet, attach a copy of your abstract(s), and forward to the attention of the Conference Coordinator at the Waterjet Technology Association. The deadline date for submission of abstracts is January 15, 1999.

An Abstract Review Committee consisting of four referees, chosen from the Organizing Committee and the International Advisors, will review the abstracts. Authors will be advised by February 3, 1999, regarding the decision of the Abstract Review Committee.

The 10th American Waterjet Conference is organized by the **Waterjet Technology Association** and is endorsed by the **International Society of Water Jet Technology**. The Waterjet Technology Association looks forward to providing this forum and to your involvement and participation.

1999 WJTA Conference Committee

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10th American Waterjet Conference

August 14*-17, 1999

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Abstract Submission Form

For each paper to be submitted for consideration, please complete this form, **attach a copy of the abstract**, and mail or fax to WJTA by January 15, 1999. Authors will be advised by February 3, 1999, regarding the decision of the Abstract Review Committee. Please send this form even if you e-mail your abstract.

Paper Information

Paper Title _____

Authors _____

Contact Person

(Please print or type)

Name _____

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Please check the category that best describes the topic of your paper. ☐ Applications ☐ Research

Indexing words (Check the boxes under the different categories that apply to your paper):

Type of Study

- ☐ Modeling (theoretical)
- ☐ Experimental study
- ☐ Hardware development
- ☐ Contractor case study
- ☐ Manufacturing case study
- ☐ Software development
- ☐ Economic analysis
- ☐ Legal
- ☐ Other _____

Jets

- ☐ Waterjet
- ☐ Abrasive-waterjet
- ☐ Abrasive suspension jet
- ☐ Pulsed
- ☐ Cavitation
- ☐ Polymer Jets
- ☐ Other _____

Process

- ☐ Cutting
- ☐ Drilling
- ☐ Surface preparation
- ☐ Cleaning
- ☐ Stripping
- ☐ Safety
- ☐ Milling
- ☐ Jet-assisted
- ☐ Other _____

Material

- ☐ Metal
- ☐ Rock
- ☐ Glass
- ☐ Ceramic
- ☐ Composite
- ☐ Concrete
- ☐ Other _____

Related Industry

- ☐ Generic
- ☐ Shipyard
- ☐ Mining
- ☐ Construction
- ☐ Aerospace/Aircraft
- ☐ Automotive
- ☐ Oil/Gas/Refinery
- ☐ Quarrying
- ☐ Other _____

Environment

- ☐ Field work
- ☐ Factory work
- ☐ Submerged
- ☐ Nuclear
- ☐ Demilitarization
- ☐ Offshore
- ☐ Other _____

*August 14 is reserved for the Waterjet "Short Course," safety seminar, and Conference Welcoming Reception.

Mail completed form and abstract, **NO LATER THAN JANUARY 15, 1999**, to: **Conference Coordinator, 10th American Waterjet Conference, Waterjet Technology Association, 917 Locust Street, Suite 1100, St. Louis, MO 63101-1413, USA, telephone: (314)241-1445, fax: (314)241-1449, e-mail: wjta@primary.net, website: www.wjta.org**

Abrasive Injection Nozzle

Aqua-Dyne, Inc. offers DYNASAW® a patented abrasive injection nozzle that permits the introduction of a large variety of abrasives into a high pressure water stream.

The stainless steel DYNASAW is rated to a pressure of 20,000 psi and contains Tungsten carbide inserts. The nozzle assembly is offered in a 0 degree, 15 degree fan, or 30 degree fan pattern. The 9/16 AE or 3/8 NPT connection permits the DYNASAW to connect to a wide variety of waterjetting guns.

Aqua-Dyne's abrasive metering hopper is mounted on a two-wheeled hand dolly. Abrasive flows from a tube in the bottom of the cone shaped hopper to the DYNASAW nozzle.



20,000 psi cleaning or cutting with DYNASAW® and Metering Hopper.

For additional information about Aqua-Dyne's full line of WATER ENERGY™ equipment, call toll free: 800-324-5151 or 713-864-0313 or visit Aqua-Dyne's web site at www.aqua-dyne.com.

NLB Names Recknagel Eastern Sales Representative

NLB Corporation has appointed Richard Recknagel sales representative for the northeastern United States and eastern Canada.

This territory includes eight states – northern New Jersey, New York, Connecticut, Rhode Island, Massachusetts, New Hampshire, Vermont, and Maine – as well as Quebec and the Maritime Provinces of Canada.

Recknagel, who spent 15 years in utility contracting and capital equipment sales before joining NLB, will be based in Bath, Maine, with rental and service support from NLB's eastern regional facility in Mickleton, NJ.



Pressures to 40,000 psi
Horsepower to 500 HP

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New Wood Restoration Chemicals

Delco Cleaning Systems of Fort Worth has added two new chemicals to their line of equipment and accessories for power washing contractors. DSR-49 and DSR-50 are designed for the wood restoration industry. They offer unique new solutions to restoring wood decks, fences, siding and roofs.

DSR-49 is a disodium peroxydicarbonate based restorer formulated to prepare wood surfaces for the applications of sealants. It removes mildew stains, algae and dirt while restoring a natural and bright look. With DSR-49, gray, weather beaten surfaces come clean in minutes. The treatment contains no acid or chlorine bleaching agents. It is biodegradable

and safe on most grasses and plants. DSR-49 is shipped in a convenient powder concentrate and is easily prepared by mixing with water.

Delco's new sodium hydroxide based deck and siding restorer, DSR-50, can also be used as a stripper. It provides added cleaning power to tackle tough stains and discoloration. DSR-50 is safe and effective on vinyl and aluminum siding, concrete, asphalt, and fiberglass shingles. It easily removes mold and mildew, oil stains and pre-existing sealants. Like DSR-49, the DSR-50 formulation gives tired looking wood surfaces a bright, natural new appearance.

DSR-49 and DSR-50 both contain thickening agents designed to make them effective on vertical surfaces as well as horizontal areas. Contractors in the wood restoration field now have two powerful, new chemical treatments to add to their arsenal of tools and equipment.

Delco Cleaning Systems of Fort Worth is a nation-wide distributor of pressure washers, cleaning equipment, chemicals, parts and accessories for contract cleaners. For more information, Delco can be contacted toll free at 1-800-433-2113 or by e-mail at delco@des1.com. Visit them on the World Wide Web at www.des1.com.

Automatic Collision And Height Sensor

Flow International Corporation has introduced its new automatic collision and height sensor technology, designed to increase efficiency and improve job shop operations.

FLOW's new automatic collision and height sensor further increases the efficiency of abrasive waterjet cutting by maintaining perfect standoff height and preventing accidental mixing tube breakage. This state-of-the-art technology also ensures optimal standoff distance between the work piece and the mixing tube.

"This technology of detecting a collision and setting the nozzle-to-workpiece standoff height has been perfected over the past couple years by our European division," says Chip Burnham, FLOW's vice president of marketing. "North American

customers have quickly realized the benefits of these automation enhancements."

FLOW's ultrahigh-pressure waterjet shapecutting systems are quickly becoming the global "machine technology of choice" for many applications. FLOW's abrasive waterjet cutting systems are ideally suited for cutting tough and lucrative applications and materials such as titanium, Inconel, brass, steel, aluminum, glass, stone, composites, and other materials from 1/16 inch to 8 inches thick with accuracies between ± 0.003 to ± 0.010 inch.

For more information, contact FLOW International Corp., 23500 64th Avenue South, Kent, Washington 98032, phone (206)850-3500, fax (206)813-3285.



FLOW's automatic collision & height sensor increases cutting efficiency, maintains optimal standoff distance for higher quality parts and reduces mixing tube breakage.

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NLB's compact ULTRA-CLEAN 40™ delivers water jet power of 40,000 psi (2,800 bar). And its slow-running triplex plunger pump, proven over many years, reduces wear and downtime to lower your operating and maintenance costs.

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Model 4030D has a 44 hp diesel engine.

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Aqua-Dyne, Inc., Product Brochure

Houston-based Aqua-Dyne, Inc. has introduced its **40,000 psi Corporate Product Brochure**.

The brochure includes color photos of its newest **WATER ENERGY™** pump systems, recommendations for waterjetting applications, recommended working pressures and flow rates for specific industries and over 40 **WATER ENERGY™** accessory tools. Examples include tools for waterjet cutting, 40,000 psi oscillating and rotary guns, couplings, pipe cutters, linear track cutters and 2, 3 and 4 gun flow splitters. The brochure also features various heat exchanger lancing and shell side cleaning tools, bundle extractors, telescoping tank cleaners, RHD pipe cleaners, nozzles and more.

A convenient chart shows horsepower ratings for the four different Aqua-Dyne pumps:

20-25 hp for the
EK units

75-250 hp for the
GA units

Aqua-Dyne also offers a full range of 10,000 psi fittings as described in their new fittings catalog (available free of charge).

INDUSTRY	APPLICATIONS	RECOMMENDED PRESSURE	
		PSI	Kg/cm ²
ALUMINUM PLANT	hardened bauxite dust on mills, filters, floors, tanks, sumps and sewers.	10,000-40,000	700-2,812
AUTOMOTIVE	paint and solder from booths, machinery, grating and conveyors.	40,000	2,812
AVIATION	expansion joints, grease, rubber and hydraulic fluids on runways.	10,000	700
BREWERIES	yeast, sediments and fermentation residues on vats, pipe and facilities.	3,000	210
CEMENT PLANTS	remove dirt, grease and product build-up on grates, floors, external piping, bins, walls, hopper cars and handling equipment. cooler hearths and preheater columns, bins, hopper cars, floors, rotary kilns, & walls.	3,000 5,000-10,000	210 350-700
CHEMICAL PROCESSING	chemical from boiler tubes, tanks, valves, evaporation, heat exchangers, tube bundles, pipe, vessels, reactors and facilities.	5,000-40,000	350-2,812
CONSTRUCTION	exposing aggregate (retarded).	3,000	210
	asphalt distributors, mixers, tar cookers and pavers.	5,000	350
	asphalt, dirt, concrete, mortar, tar, grease, mastic and clay on vehicles, mix trucks and machinery.	5,000-10,000	350-700
	latents for canals, lifts, dams and runways prior to pours (no retarders).	5,000-40,000	350-2,812
FOOD PROCESSING	grease, fats, oils, dirt and dough; food residues from vats, ovens, mixers, conveyors, and facilities.	10,000-40,000	700-2,812
FOUNDRIES	removal of deposits, metal oxidation, ceramic and sand core materials for casting, furnaces and paddles.	15,000-40,000	1,060-2,812
HIGHWAY MAINTENANCE	cleaning of grease, vegetation, mud, tar, cement or asphalt on vehicles & machinery.	5,000-10,000	350-700
	graffiti, stains, tar and mastics on concrete bridges and overpasses.	10,000-40,000	700-2,812
	removal of expansion joints and paint strips.	10,000	700
	unstop culverts on bridges and clean up overfills.	10,000-40,000	700-2,812
MARINE	removal of marine growth, barnacles, loose paint and rust on ship hulls, docks, ballasts, platforms, storage tanks and boilers.	7,500	530
	underwater cleaning of pipe and drilling platforms of barnacles and marine growth to "white metal".	40,000	2,812
MEAT PACKING	cleaning of grease, fats, blood and soot from ovens, mixers and vats.	3,000	210
METAL WORKING	mill scale, tight rust and weld slag from new vessels, tanks and pipe.	10,000-40,000	700-2,812
MINING	premaintenance cleaning of dumpers, drag lines, underground haulage lines and shafts; aids in the recovery of ore.	7,500-10,000	530-700
	windings plant machinery due to coal, rock dust, mud or oils.	10,000	700
MUNICIPALITIES	reservoirs and containers; sewer & drain pipes; sanitation equipment and refuse vehicles.	3,000-5,000	210-350
	paraffin and crude residues on platforms and storage tanks.	3,000-5,000	210-350
OILFIELD	removal of drilling mud and cement for drill pipe.	10,000-40,000	700-2,812
PETROCHEMICAL PROCESSING	algae, carbon, soot and asbestos in heat exchangers, soft polymers, reboilers, tanks, reactors, cooling towers and facilities.	5,000	350
	calcium carbonate and sulphate, chlorides, hard polymers, iron oxide, coke, hard carbon, PVC and PVA on heat exchangers or reboilers.	10,000-40,000	700-2,812
PHARMACEUTICAL	cleaning of chemicals (liquid and solids) from pipe, kettles, mixers, tubes, heat exchangers, reactors, filters and evaporators.	7,500-40,000	530-2,812
PIPE (INDUSTRIAL)	removal of rust and varnish prior to recoating, dope and oil from pipe threads for inspection, drilling mud and debris in various kinds of pipe (internal).	10,000-40,000	700-2,812
POWER STATION	nuclear decontamination of fuel capsules, "U" tube exchangers, flash from preheater tubes, hand tools and equipment.	10,000-40,000	700-2,812
PUBLIC UTILITY	reactors and insulators, boiler tubes, vehicles and machinery.	5,000-10,000	350-700
PULP & PAPER	cleaning of grease, oil, pitch dirt, and wood pulp from heat exchangers, tubes, foundries, press sections of paper machines, suction rolls, stock chests and lines, black liquor.	5,000 10,000	530 700
RAILROAD	gypsum, potash, cement, lime in hopper cars; removing grease, dirt and deposits in truck and undercarriages and tank cars.	5,000-15,000	350-1,060
REFINERIES	wax, paraffin, grease and crude residues.	3,000	210
RUBBER PROCESSING	water scale, coke, hard carbons and polymers in heat exchangers, pipe, tubes and tanks.	10,000-40,000	700-2,812
	chemigum, latex, SBR and water scale in reactors, storage tanks, heat exchangers, tubing, pipe and facilities.	10,000-40,000	700-2,812
STEEL MILL	water scale, coke, ore or lime in heat exchangers, flues, boilers, open hearths, furnaces, chutes, and hoppers.	10,000-40,000	700-2,812
SURFACE PREPARATION	paint, rust, refractory buildup, salts, concrete and marine growth. cleaned to "white metal".	10,000-15,000 40,000	700-1,060 2,812

Chart reprinted courtesy of Aqua-Dyne, Inc., Houston, Texas, from the Aqua-Dyne 40,000 psi Corporate Product Brochure.

The catalog includes nipples – (six styles), adapters, crosses, female couplings, elbows, tees, plugs and pipe caps. All are available in a variety of thread combinations and lengths.

To obtain a free catalog, call Aqua-Dyne toll-free: 800-324-5151 or 713-864-0313 or visit the web site at www.aqua-dyne.com.

Jim Evans, Bill Wifler join FLOW International Corporation

FLOW International Corporation recently named Jim Evans as the new regional sales manager for the north central U.S. territory.

In his new position, Evans will be responsible for all of FLOW's cutting, surface preparation, automotive, and automation sales efforts in the north central U.S., which includes Minnesota, Wisconsin, Nebraska, North Dakota and South Dakota. Prior to assuming his new responsibilities, Evans held positions within FLOW's electrical engineering department and has served as regional manager for distributor sales.

"Jim's background and experience at FLOW, especially his expertise with FLOW products and the UHP waterjet process have provided him with the ideal tools to maximize the business potential in the north central U.S. territory," says Dick LeBlanc, FLOW's executive vice president of sales for the Americas.

FLOW also named Bill Wifler as vice president of FLOW South America. In his new position, Wifler will be responsible for establishing a direct presence for FLOW in Brazil by setting up operations in Sao Paulo.

"Mr. Wifler's appointment to South America demonstrates FLOW's

strategy of becoming a true global supplier, and its commitment to servicing customers in South America," continues Mr. LeBlanc.

Wifler brings to FLOW an extensive background in operations management, joint ventures, new market development, finance, and strategic planning. His more than 20 years of overseas experience includes ten years in Latin American, where he worked for three years for the Ford Motor Company in Venezuela, and spent seven years with Citibank in Brazil. Most recently, Wifler worked with Citibank in Germany and Belgium.

10th AMERICAN WATERJET CONFERENCE - August 14-17, 1999 Hotel Reservation Request Form

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To expedite your check-in process, and assure your room type preferences are honored as much as possible, we require the following important information: 1) Credit card name, number, and authorization (signature); 2) Bed type (King or two double beds) and smoking preference in order of priority; and 3) Estimated arrival time (Check-in 3:00 p.m., but efforts will be made to room you as soon as possible).

The JW Marriott regrets that it cannot hold your reservation after 6:00 p.m. on the day of arrival without a credit card, or first night's room deposit by check or money order (do not send cash).

Deposits will be refunded only if cancellation notification is given up to 24 hours prior to arrival. If more than one room is requested, please enclose list of names and addresses, indicating which guests share rooms.

Name _____ Company _____

Address ☐ Company ☐ Home _____

City _____ State _____ Country _____ Postal Code _____

Phone In US/Canada (_____) _____ Fax (_____) _____

Phone Outside US/Canada [_____] (_____) _____ Fax [_____] (_____) _____

Room type preference ☐ King ☐ Double/Double Smoking preference: ☐ Non-Smoking ☐ Smoking

Which preference is more important: ☐ Bed type ☐ Smoking preference

Please list names of guests sharing your room _____

For arrival on _____ Depart on _____

☐ Check or money order enclosed — Amount \$ _____

☐ American Express ☐ Carte Blanche ☐ MasterCard (Please include interbank # directly below card #) ☐ VISA ☐ Diners ☐ Discover

Credit Card Number _____ Expiration Date _____

I authorize the JW Marriott Hotel to charge my account for one night's room charge in the event I do not cancel my room by 6:00 p.m., the day of arrival.

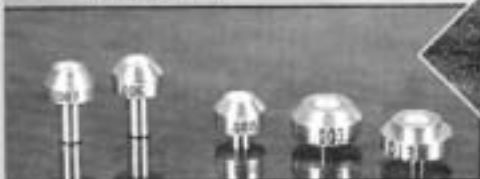
Signature _____ Phone # _____

Check-out time is noon. Rooms may not be available for check-in until after 3:00 p.m. **RESERVATIONS REQUESTED BEYOND THE CUT OFF DATE ARE SUBJECT TO AVAILABILITY. ROOMS MAY STILL BE AVAILABLE AFTER THE CUT OFF DATE, BUT NOT NECESSARILY AT THE ABOVE RATE. PLEASE APPLY 17% SALES AND LODGING TAX TO THE ABOVE RATES. (Tax rates subject to change.)**

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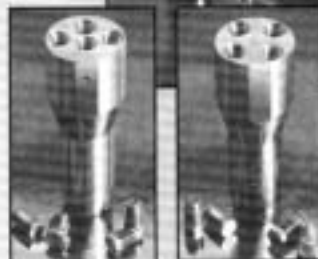
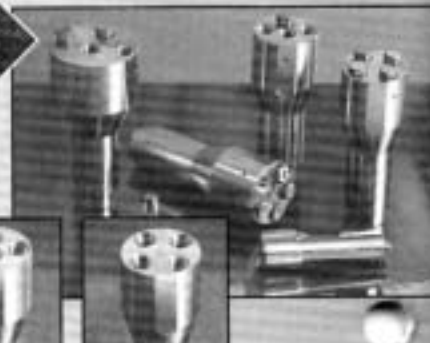
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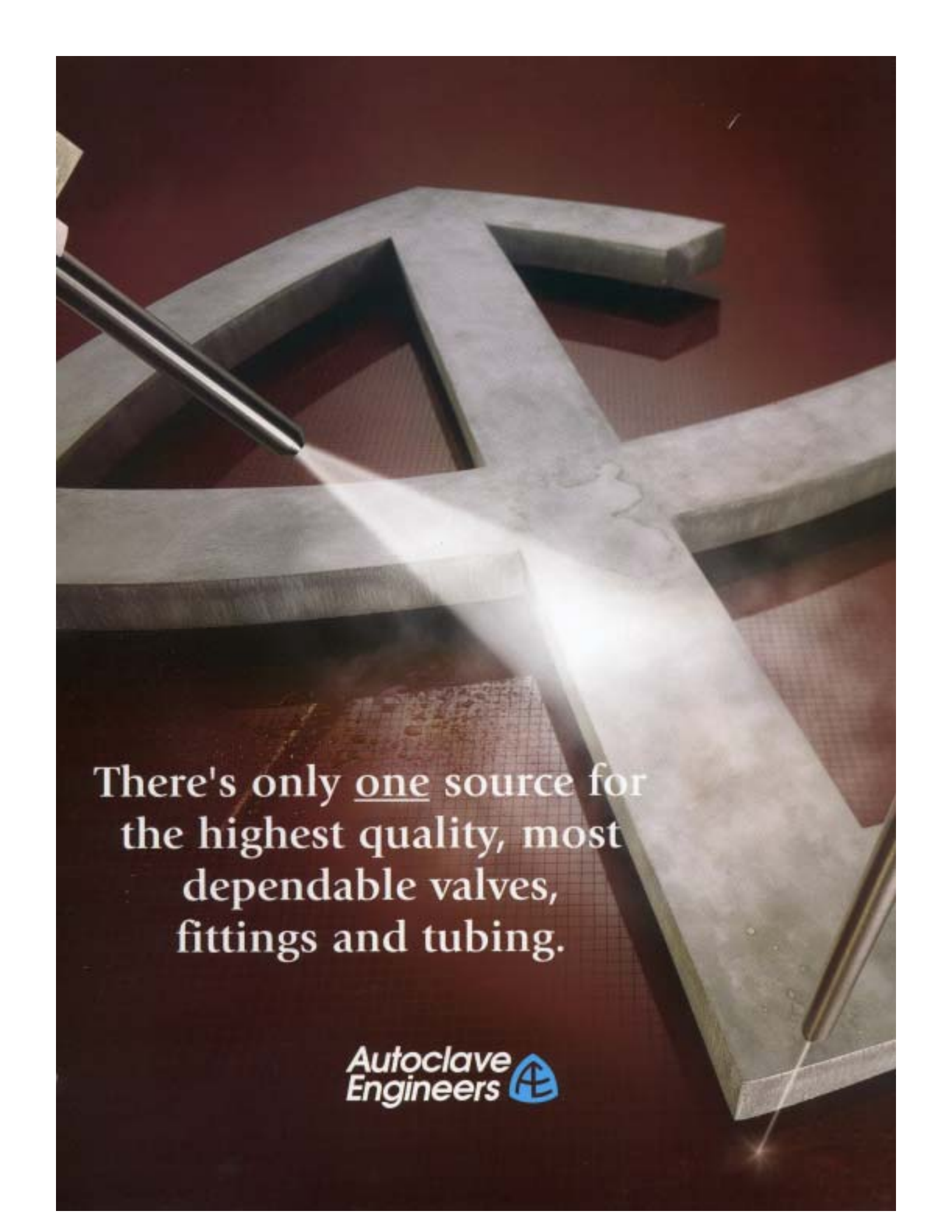
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