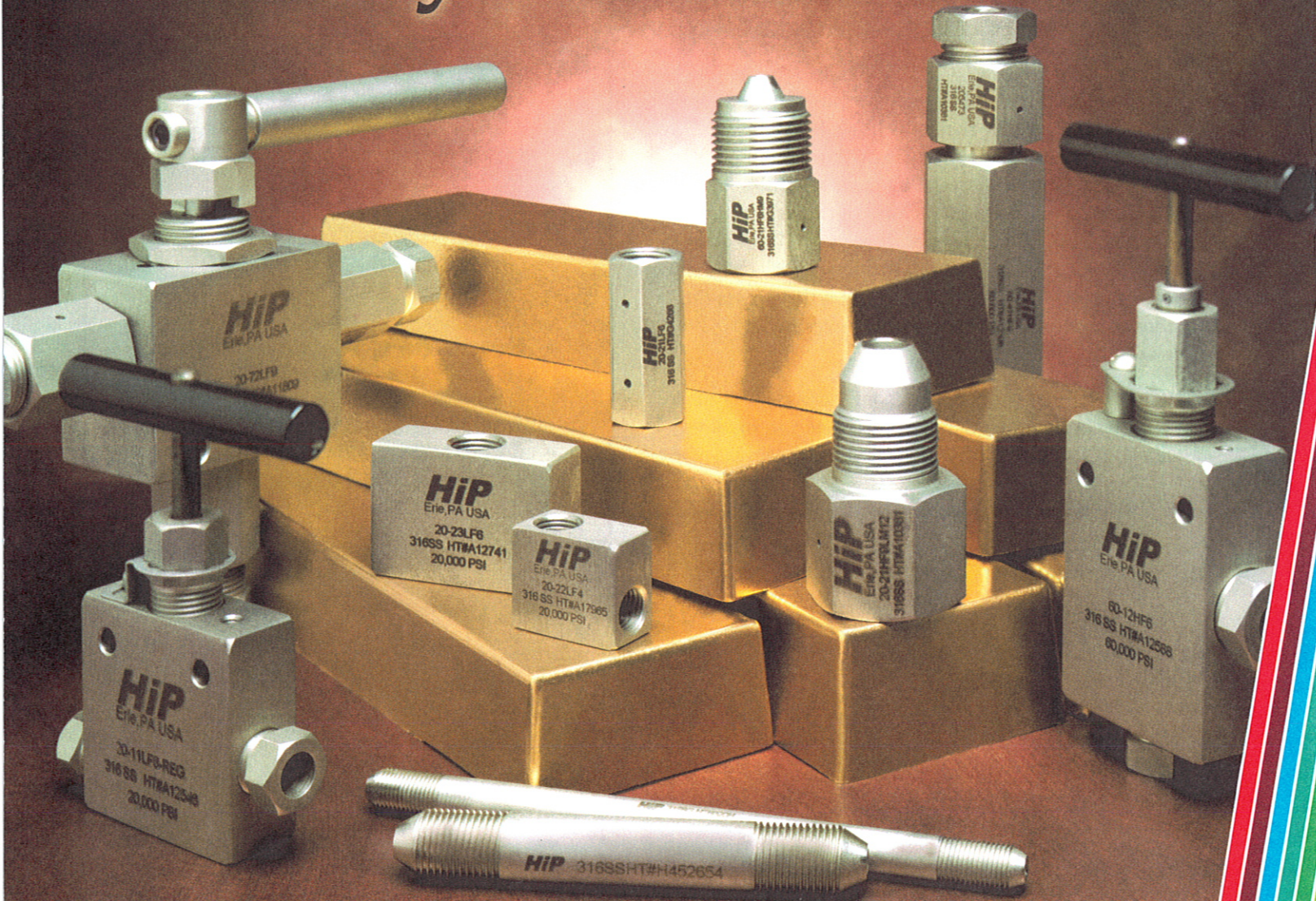


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## WJTA Jet News

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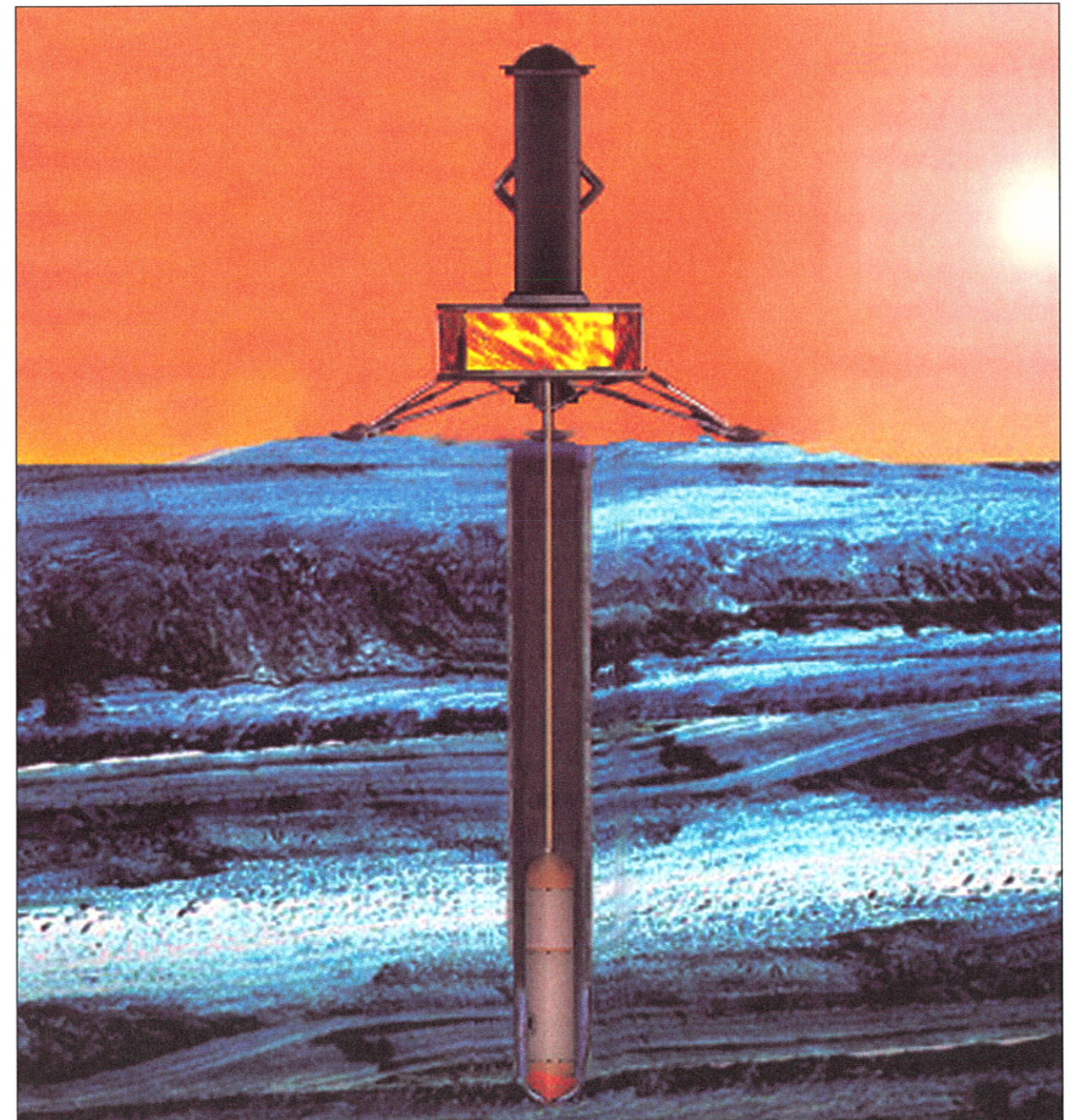


JULY 2002

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## Waterjetting On Mars – The Cryobot



Photograph courtesy of NASA/Jet Propulsion Laboratory/Caltech.

See cryobot article on page 2



## Waterjetting On Mars – The Cryobot

A cryobot is a vehicle carried by a planetary lander. After a gentle touchdown on an icy planet, the lander activates the ice penetrating robot (cryobot) it carries. Ice is melted by heating the nose of this torpedo-shaped cryobot. It is pulled by gravity through the tunnel it melts in the ice. Instruments within the body of the cryobot will take measurements and make analyses.

The cryobot uses a combination of passive heating and active drilling. In passive heating, a hot object melts its way through ice using the force of gravity. Active drilling employs a jet of hot water which impinges against the ice so that there is an enhanced heat exchange as well as the sweeping away of granular material.

The active and passive systems work together as follows: the heating probe melts the ice. Some of the melt water enters inside the cryobot through a hole in its side. The water is then heated and pressurized to 14 psi. The water is then forced out of the single nozzle as a one-liter-per-minute hot waterjet which impinges on the ice beneath the cryobot and melts it.

The cryobot is 1.5 meters long and 10-12 centimeters in diameter and weighs about 40 kilograms.

Cryobot probes might investigate the ice of the moon Europa, the Mars Polar Regions, or numerous other unexplored locations across the solar system.

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

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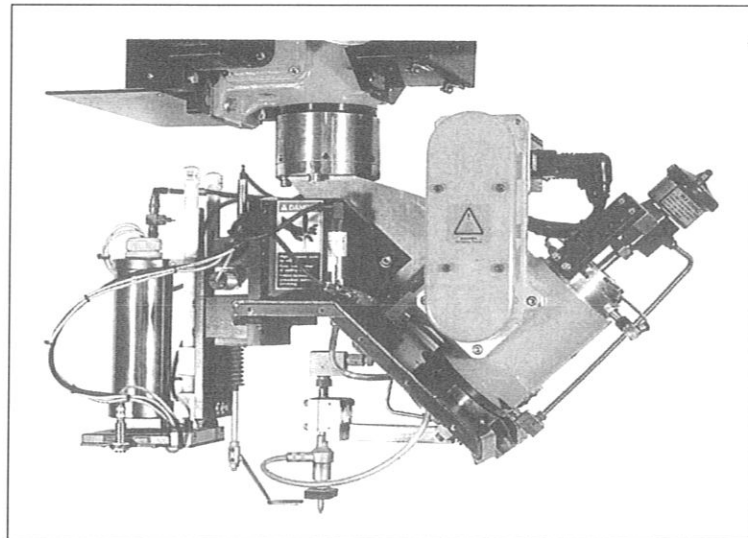
## Waterjet Bevel Head

**E** SAB Cutting Systems announces the release of its Waterjet Bevel Head for use with the ESAB Vision NT CNC Windows®-based cutting machine controller. The new Waterjet Bevel Head allows for high quality waterjet contour or straightedge bevel cuts for 3-axis and 5-axis applications at an affordable price.

ESAB's Vision NT CNC precisely controls AC digital drives providing 360°/minute rotation speeds for fast and precise bevel transitions. The bevel cutting head allows for beveling in flat sheet material at any angle from -90° to +90° A-axis, and -360° to +360° C-axis rotation. These ranges also provide maximum contour beveling flexibility for 5-axis applications.

The Waterjet Bevel Head includes initial height sensing for piercing and the following features:

- .005" total TIR at the nozzle tip
- .1° (360 arc seconds) accuracy (per axis)
- .05° (180 arc seconds) total repeatability (per axis)
- Z-axis non-programmable (3 axis) or programmable (5 axis) lift and carriage



ESAB Cutting Systems Waterjet Bevel Head

- Optional Process Vision System providing remote monitoring of the cut process.
- Optional Alignment Vision System providing automatic tool alignment.

Machines offering the waterjet beveling feature include ESAB's Hydrocut High Rail providing 3-axis or 5-axis bevel cutting with cut area up to and including 12' x 12'. Alternately, the Hydrocut LR3 gantry system offers 3-axis waterjet bevel cutting for flat plate cut areas exceeding a 12' x 12' work envelope.

ESAB Cutting Systems, based in Florence, South Carolina, produces mechanized plasma, oxyfuel, laser and waterjet cutting equipment for virtually every requirement, from custom fabrication shops to large production operations.

For more information, contact ESAB Cutting Systems at 843-664-4394.

## Waterjet-Propelled Dragonflies

**W**aterjet propulsion occurs in animals. There have been previous articles published in *Jet News* on jet propulsion in squid (*Jet News*, February 1995) and cuttlefish (*Jet News*, March 2002). The September 1994 issue of *Jet News* contains an article on "spitting" fish.

Waterjet propulsion is also exhibited by immature phases of dragonflies. Dragonflies are relatively large, beautifully colored, flying insects. In their immature stages (nymphs), dragonflies are aquatic and breathe by means of gills. The gills of the dragonfly nymph exist in the form of ridges in the rectum. When the dragonfly nymph breathes, it draws water into its rectum through the anus and then expels it. If the insect is in a hurry, this expulsion of the water from the anus is the chief means of locomotion. The nymph moves by jet propulsion.

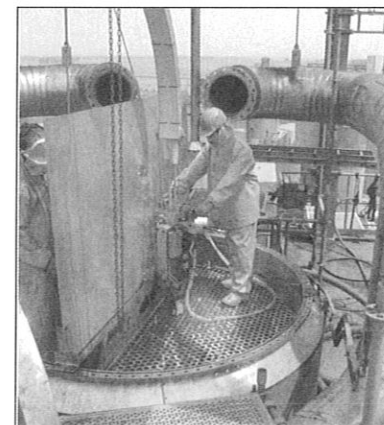
This motion of the jet-propelled dragonfly nymph is in short spurts. Fly fisherman try to induce fish to bite by mimicking this motion with artificial flies.

### Trans Line Exchanger Cleaner, from page 11

- **Controls** - Manual by manipulating switch functions in and out.
- **Weight** - Standard approx. 52.9 Lbs. (24 Kg)
- **Water Pressure** - Depending on the hoses used (40,000 PSI/2800 Bar is possible).
- **Water Flow** - Depending on the hoses used.

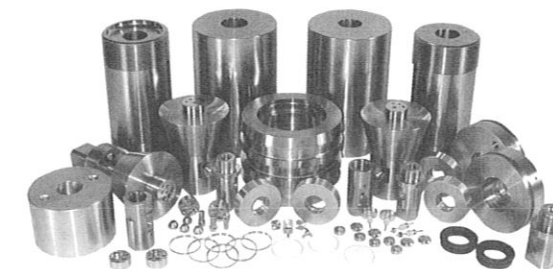
### Flex Lances

- **Pitch (Max. 2 hoses)** - Adjustable to the pitch of the tubes.
- **Lance Dimensions** - Upon request. Max. O.D. is 0.78" (20 mm). Min. O.D. is 3/8" (9.5 mm). Standard = 2 pcs. 5/2 or 6/2 hoses and 1 pc. 10/4.
- **Length of Stroke** - Depending on the length of hoses used.
- **Lance speed** - Standard. Max. 300 feet/min. (1.5 m/sec.). Min. is 20 feet/min. (10 cm/sec.).



Vertical application of the TLE.

For more information, contact Gardner Denver Water Jetting Systems, Inc., [www.waterjetting.com](http://www.waterjetting.com), e-mail: [mktg.wjs@gardnerdenver.com](mailto:mktg.wjs@gardnerdenver.com), call 800-231-3628, fax: 281-448-7500.



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## Upcoming Events

### 2002

**October 7-10, 2002**

7th International Symposium on Environmental Issues and Waste  
Management in Energy and Mineral production, Hotel Setar,  
Cagliari, Sardinia, Italy. Mining and environmental issues,  
among other topics, will be addressed during the Conference  
program, which includes the presentation of selected papers in  
oral and poster sessions, three half-day technical trips, an  
exhibition and optional post-congress tours. For more  
information, contact the web sites [www.swemp.com](http://www.swemp.com) or <http://geoing.unica.it/digita/swemp/index.htm> or write Kassiopea  
Group Srl, Via S. Satta, 47 09128, Cagliari, Sardinia, Italy.

**October 16-18, 2002**

BHR Group 16th International Conference on Waterjetting: New  
Developments, Applications, Technologies, Centre de Congres,  
Aix-en-Provence, France. Technical papers and case studies  
are invited for presentation on all aspects of waterjetting in a  
variety of areas. Contact Emma Abson, Conference Organizer,  
BHR Group Limited, The Fluid Engineering Centre, Cranfield,  
Bedfordshire MK43 0AJ, UK, phone [44](0)1234-750422, fax:  
[44](0)1234 750074, e-mail: [eabson@bhrgroup.com](mailto:eabson@bhrgroup.com), web:  
[www.bhrgroup.com](http://www.bhrgroup.com)

**November 3-7, 2002**

SSPC 2002, the Industrial Protective Coatings Conference and  
Exhibit sponsored by The Society for Protective Coatings,  
Tampa Convention Center, Tampa, Florida. Visit [www.sspc.org](http://www.sspc.org),  
call 412-281-2331 or write 40 24th Street, 6th Floor, Pittsburgh,  
PA 15222-4656.

### 2003

**May 18-22, 2003**

7th Pacific Rim International Conference on Water Jetting  
Technology, Seogwipo KAL Hotel, Jeju, Korea. Abstracts are  
now being accepted for the program. Contact Conference  
Chairman Prof. Chung-In Lee or Conference Secretary General  
Dr. Wan-Mo Kim, The Korean Society of Water Jet Technology,  
Research Institute of Energy & Resources, Seoul National  
University, San 56-1 Shilim-Dong, Gwanak-Gu, Seoul, 151-742,  
Korea, phone +82-2-880-7233, fax +82-2-873-2717, e-mail:  
[kswjt@kojet.org](mailto:kswjt@kojet.org), web site: [www.kojet.org](http://www.kojet.org)

**August 16-19, 2003**

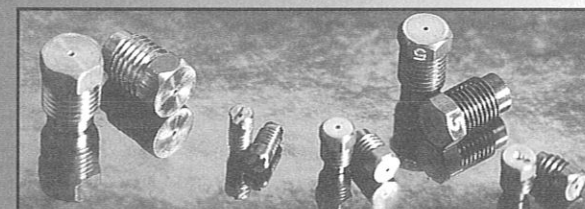
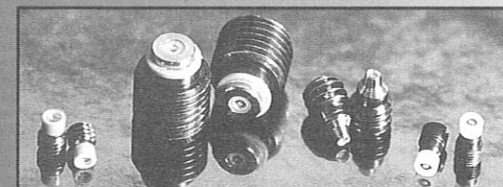
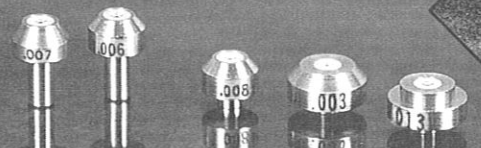
WJTA American Waterjet Conference, Adam's Mark Hotel,  
Houston, Texas.

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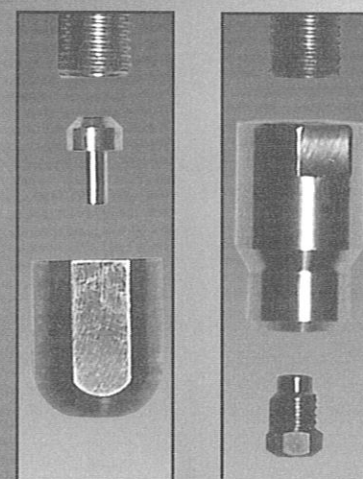
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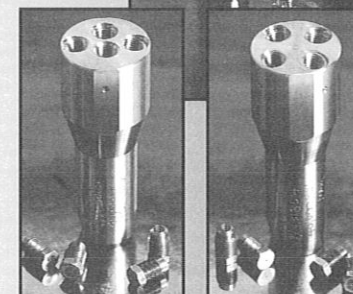
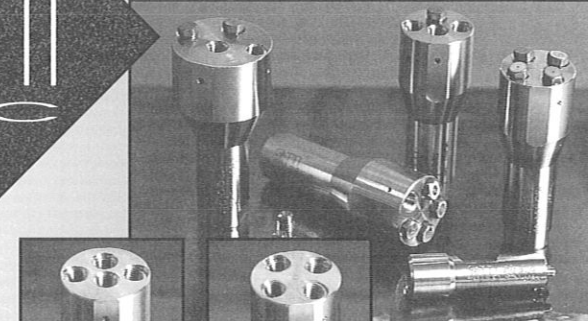
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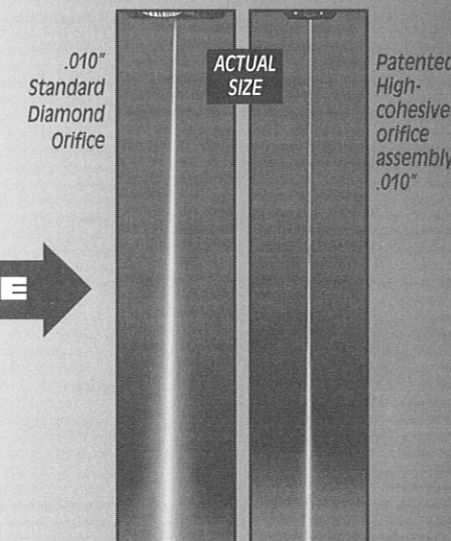
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## SAFETY: Secure Your Pump

A recent incident at a waterjet work site points up the need to constrain your pump during pumping operations. A pump was left running on an incline by the side of the road, but no chock blocks were placed under the wheels. During the pumping operation the pump rolled out into the traffic in the road. The vibration of the pump while it was operating was sufficient to cause the pump to move. It ran down the slope and out into the road. Fortunately, no one was hurt and nothing was damaged, but serious harm could have occurred.

To avoid this problem, chock blocks should be placed under the wheels of the pump whenever it is operating.

In a related incident, a pump on a tractor trailer was placed in operation after the jacks were set onto the

ground. After several hours of operation, the jacks were driven into the ground by the vibration of the pumps. To avoid this, the jack pods should not bear directly onto the ground, but should rest on 2" x 12" wooden planks placed on the ground.

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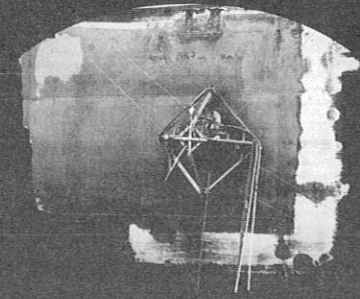
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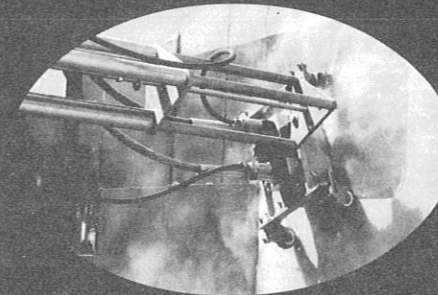
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When this Turtleskin WaterArmor gaiter saved an operator from injury at 36,000 psi, only this toe panel needed to be replaced. A view of the backside of same toe panel shows no penetration.



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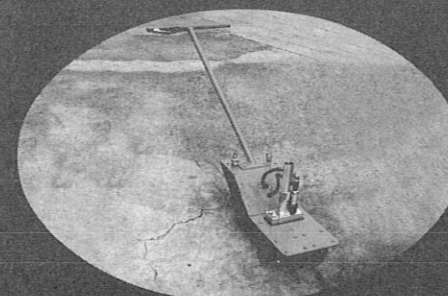
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## TurtleSkin WaterArmor Meets New British Requirement, from page 5

protection against such injuries.” TurtleSkin WaterArmor has been used in the US markets for several years, and has been credited with saving numerous operators from injury.

HSE’s new directive calls for PPE that provides, “enhanced resistance to penetration of the water jet” and is “currently requiring the provision of such PPE for UHP jetting.”

TurtleSkin WaterArmor meets the requirements specifically listed in the HSE document:

- Made from a tight weave of Kevlar
- 12 lightweight panels
- Each panel is held in place by straps
- Hinged points to allow bending at both the knees and the waist
- Choose protection for the most at risk parts
- Sections to cover the foot, including ankle, metatarsal and toe panels
- CE approval

The Utilities National Group (UNG) will be monitoring the effectiveness of the new PPE with consideration of extending its use to lower pressure water jetting.

TurtleSkin WaterArmor uses space age technology to give water jet operators better puncture resistance without sacrificing

flexibility. Its patented TurtleSkin fabric contains Kevlar, fiber two times the strength of steel and five times lighter. A TurtleSkin fabric was also used in the crash bags

that allowed the NASA’s spacecraft Pathfinder to land successfully on Mars in 1997, and will be used in three upcoming missions to Mars from both the UK and the US in 2003. TurtleSkin WaterArmor is now available through pump manufacturers throughout the US and Europe. For information and photographs of actual saves from an ultra high pressure water jetting accident, contact Warwick at +1-603-878-1565 or visit [www.waterarmor.com](http://www.waterarmor.com).



**This TurtleSkin WaterArmor gaiter, accidentally swiped at a pressure of 2500 bar, saved the operator from serious injury.**

## TurtleSkin WaterArmor Meets British Requirement For Ultra-High Pressure (UHP) Water Jetting PPE

The Health and Safety Executive (HSE) of the United Kingdom has announced the required use of safety suits or Personal Protective Equipment (PPE) for ultra-high-pressure (UHP) water jetting applications. TurtleSkin WaterArmor from Warwick offers a twelve-panel suit including gaiters, chaps, vest, and arm protection that meet the requirements outlined by the HSE.

TurtleSkin WaterArmor’s patented system protects operators from accidental swipes from water jet pressures up to 2,800 bar or 40,000 psi (pounds/square inch). Suit components are sold separately allowing operators to buy only the garments they need. In the event of an accidental swipe or damage to an individual panel, single panels are easily replaced piece by piece; this economical approach means operators do not have to repurchase an



**TurtleSkin WaterArmor suit meets new HSE directive for personal protective equipment on all UHP job sites.**

entire suit. Each garment has adjustable straps, so that one size fits all operators. TurtleSkin WaterArmor chaps incorporate built in kneepads that protect knees from both UHP jet streams and hard concrete. The open-back of the WaterArmor vest is

designed to optimize ventilation and keep the operator cool.

UHP water jet applications using a lance or a jetting gun operate above 1,700 bar or 25,000 psi for removal of surface coatings, cleaning and cutting in the marine, chemical and offshore industries. High flow rates pose a substantial risk to operators that may come into accidental contact with a jet stream before they are able to stop the water flow. HSE’s criteria to protect “the most at risk parts of the body” are met by WaterArmor’s unique front panel system.

The HSE states that, “Accidental contact with the UHP water jets can lead to amputation and severe infection due to contaminated water being forced into body tissues. Jetting operators, until recently, had no real

**(continued on page 12)**

## Request the Best...

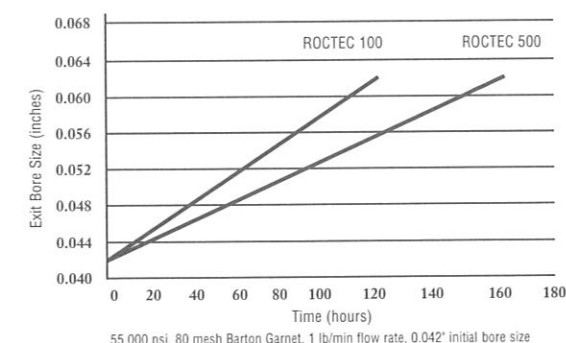
# Roctec® 500

## Abrasive Waterjet Nozzles!

Roctec 500 nozzles are the industry’s most wear-resistant, long-lasting nozzles. Tests prove Roctec nozzles perform up to 30% longer than competitive brands.

Reduce system downtime, increase cutting speed and maintain cutting precision with Boride Roctec 500 nozzles.

### Abrasive Waterjet Nozzle Performance

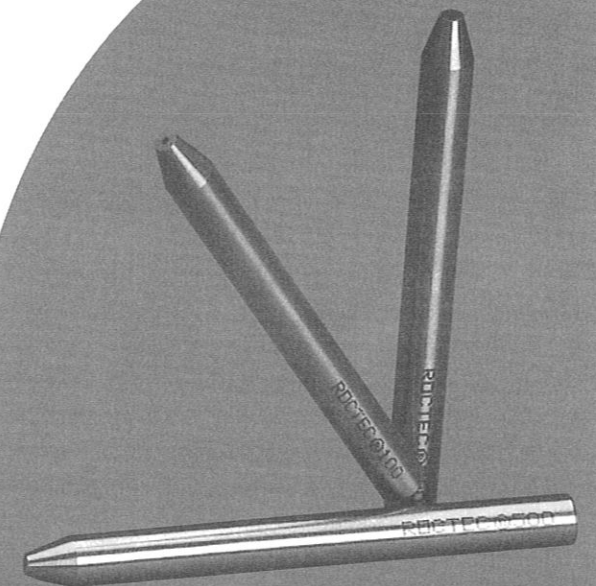


55,000 psi, 80 mesh Barton Garnet, 1 lb/min flow rate, 0.042" initial bore size



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## Coatings Workshop In Texas

A one-day Workshop and Technology Demonstration in Texas Hosted by the Texas Natural Resource Conservation Commission (TNRCC):

The "Clean Water - Safe Harbor" Workshop is a service program of TNRCC Small Business and Environmental Assistance Division which provides Pollution Prevention and Compliance assistance related to coatings and focused on Gulf Coast shipyards and the Petrochemical Industry. This assistance is also relative to the offshore, highways, bridges, dams, and ship repair industries and environmental engineers. The workshop is scheduled for July 25th, 2002, Congressman Solomon Ortiz Center, Corpus Christi, Texas.

The art of meeting environmental regulations and maintaining economic success is one of the most important keys to success. Region VI EPA Director, Samuel Coleman, will address "Taking Actions to Improve Environmental Performance." The newly released Federal Highway Research Administration study "Cost Effective Alternative Methods For Steel Bridge Paint Maintenance" covers economics of eight different technologies.

Learn from the Experiences of others and avoid costly mistakes. Whether your company is in new fabrication or repair, large or small, you are involved in selling your service, influencing change, dealing with customers, and meeting new regulations on an economic basis. This workshop will help to provide the skills you need.

This one-day workshop features presentations by shipyard, contractors, and coatings manufacturer experts who have researched traditional dry blasting processes, water jetting, and wet abrasive blasting. Presenters will share their experiences and lessons

learned. Panel discussion will allow time for brainstorming and questions and answers from the audience. Demonstrations will give a first hand look of the latest best available technology.

This is a program you won't want to miss. Programs where the TNRCC, local area Industrial groups, and Advisory Council are helping you with Compliance Assistance and understanding new trends. Come casual for the demonstrations and working sessions.

Approximately 25% of the 250 participants at the 2000 "Clean Water-Safe Harbor" were from the

shipbuilding and repair sector. We had a great mix of practical experiences with questions and answers from the regulatory agencies. This 2002 conference covers issues on coatings, permitting, and handling that were raised during the 2000 workshops.

Attendee registration- \$15.00/  
TableTop Exhibit Registration- \$200.00

For more information: contact:  
Advisory Council, Lydia & Charles Frenzel, PO Box 2139, San Marcos, TX 78667, Tel/Fax: 512-392-2210  
E-mails: info@advisorycouncil.org or lydiafrenzel@advisorycouncil.org  
Web sites: www.advisorycouncil.org or www.waterjetting.org

## Waterjet Symposium In Ohio

Over the past six years, Richel, Inc., Kent, OH, has successfully conducted nearly 40 waterjet seminars. Over 200 companies have sent hundreds of people to these seminars. Based on our experience we believe that there exists an opportunity and need to hold a different kind of seminar, a waterjet symposium.

The goals of the symposium are to provide a platform for existing users of waterjets and prospective buyers to learn about: different waterjet systems available from various manufacturers; deionization and water treatment associated with waterjet cutting; abrasive removal and recycling systems with associated costs, savings and performance in cutting; different abrasives and their associated performance; retrofits of controllers onto older waterjet systems; high pressure plumbing fittings and associated pressure losses and

efficiencies; relationships between pressure, pump hp, orifice, nozzle, stand off height and abrasive consumption with cut speed, tolerances and edge quality; accessories available to waterjet operators; and software that helps to optimize and simplify the use of a waterjet.

The waterjet symposium is scheduled for July 21-23, 2002 at the Sheraton Suites Hotel in Akron, Ohio. A wide range of highly experienced guest speakers will share their knowledge on all subjects relating to the waterjet industry and be on hand to answer your questions. There will be live demonstrations on various machines and equipment as well as a day spent in a fully functioning job shop.

For costs and registration please contact RICHEL, Inc. phone: 330-677-9100; fax: 330-677-9121; e-mail: richel@richel.com; www.richel.com.

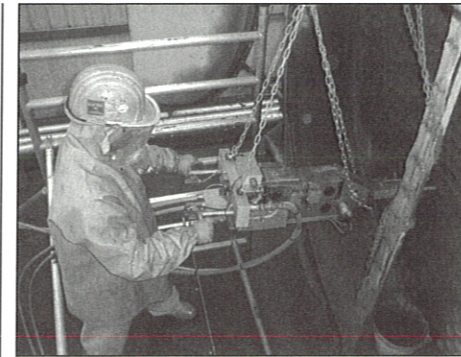
## Trans Line Exchanger Cleaner, Pressures To 40,000 PSI (2800 Bar)

Gardner Denver Water Jetting Systems offers the TLE - Trans Line Exchanger Cleaner. This light-weight machine has been developed to clean vertical trans line exchangers in furnaces and other vertical bundles.

It consists of two air motors: one to feed the hose and one to retract the hose. The body consists of two pieces made from a special aluminum alloy, which can be separated by four small air cylinders for quick-changing of the high pressure hoses. The hoses are moved by two continuous chains with polyurethane blocks, which are powered by the air cylinders.

The TLE is small, light and easy to operate. The operator manipulates the switches on top of the unit to drive the hoses. Two handles can be fixed in several positions to suit the operator.

A balancer with guides for the hoses is also available. It is also possible to



Horizontal application of the TLE.

equip the TLE cleaner with adjustable pitch blocks capable of holding two high pressure hoses, so both hoses can be inserted simultaneously. The TLE may also be used for horizontal applications and with a remote control.

The TLE keeps operators from handling high-pressure hoses. The pneumatic safety switch on the bottom of the machine stops all movement when lifted. The pitch seals off the distance between the tubes and the

TLE to prevent operator exposure to waterjets.

The TLE gives the option of using a variety of nozzles to allow cleaning, both going in and coming out, for consistent results. Production can be doubled by adapting the TLE to handle two hoses for cleaning two tubes at a time.

### Features:

- **Dimensions** - 31.5" high x 5.9" deep x 7.9" wide (80 cm x 15 cm x 20 cm)
- **Mechanical Drives** - Standard 87 PSI (6 Bar), 2 air motors, 0.82 pk = 1.64 pk @ 380 RPM
- **Air Consumption** - 100 PSI @ up to 40 CFM with standard air motors.
- **Safety** - One switch to adjust the length of the hoses (in and out) and one front switch to stop the air motors if the machine is removed from the tube sheet.

(continued on page 15)



AccuBrick™'s durability, smoothness and consistency offer accuracy for an industry that relies on precision. With its superior performance, AccuBrick™ sets the standard for all other water jet bricks.



### AccuBrick™ Features

- Unique internal flute design easily drains water away from cutting area, preventing splash-back for a cleaner, unmarked piece.
- Smooth, flat cutting surface increases accuracy and consistency for cutting parts of all sizes.
- Corrugated flute design prevents small parts from falling through brick and into the holding tank.
- AccuBrick™ is designed for abrasive or straight water jet cutting.
- Corrosion-free cutting surface is made from high density polyethylene (HDPE) for long-lasting performance and reduced noise.

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info@diversi-plast.com

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## Welcome WJTA New Members

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Muscle Shoals, AL 35661  
Phone: (256) 383-2462  
Fax: (256) 383-2479

#### Mike Barnett

2555 LaGrange Road  
Leighton, AL 35646  
Phone: (256) 383-2462  
Fax: (256) 383-2479

#### Barry Springer

5642 Highway 64  
Lexington, AL 35648  
Phone: (256) 383-2462  
Fax: (256) 383-2479

#### Ameri-Force Labor Services Inc.

Dan Tomlinson  
Greg McClendon  
Roger Scott  
3226 Talleyrand Avenue  
Jacksonville, FL 32206  
Phone: (904) 633-9918  
Fax: (904) 633-9753

#### Antecho Buba

Buitendijk Hans  
Abtsdreep 10  
Stqbrobk-Antweep, 8940  
BELGIUM  
Phone: [32](3)5691466  
Fax: [32](3)5691465

#### Cornerstone Technologies LLC

Peter Kanjorski  
Marian Mazurkiewicz  
Chris Davey  
350 Second Street  
Plains Township  
Wilkes-Barre, PA 18702  
Phone: (570) 825-2799  
Fax: (570) 825-5744

#### Diversi-Plast

Mark Theno  
Nat Reidel  
Gary Urbanski  
7425 Laurel Avenue  
Minneapolis, MN 55426  
Phone: (763) 540-9701  
Fax: (763) 540-9709

#### Fluid Process Control Corporation

Joel P. Warren  
David J. Zurawski  
Richard M. Pepicello  
15W700 79<sup>th</sup> Street  
Burr Ridge, IL 60527  
Phone: (630) 986-1600  
Fax: (630) 986-1669

#### Induchem Services Inc.

Jorge Arzola Morales  
Hector Soto  
Box 364153  
San Juan 00936-4153  
Puerto Rico  
Phone: (787) 620-8787  
Fax: (787) 272-4361

#### Dewey Santiago

Road 385 Km 5.6 Bo Tallabou  
Penuelas 00624  
Puerto Rico

#### Jetstream of Houston

Steve Mermelstein  
Ron Schmidt  
Richard Padilla  
4930 Cranswick  
Houston, TX 77041-7724  
Phone: (713) 462-7000  
Fax: (713) 462-5387

#### Pressure's On Inc.

Bobby Ray Jr.  
Karla Ray  
Rodney Pyle  
2360 State Route 58E  
Clinton, KY 42031  
Phone: (270) 653-5000  
Fax: (270) 653-5005

#### Rowsun Technology Corporation Ltd.

Rowsun Tan  
Quingwen Guo  
Jianlong Tan  
3-8A Yangming AQ. No. 10  
Xiaoying Rd., Chaoyang Dst.  
Beijing 100101  
CHINA  
Phone: [0086](10)649767  
Fax: [0086](10)6497642

#### WardJet, Inc.

Richard Ward  
4485 Crystal Parkway, Ste. 100  
Kent, OH 44250-8016  
Phone: (330) 677-9100  
Fax: (330) 677-9121

#### Weber Lubrifiants SA

Daniel Weber  
Post Box 46  
Rixheim Cedex 68171  
FRANCE  
Phone: [33](3)89654070  
Fax: [33](3)89449006

### Individual

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Fax: [65]7922779

#### Richard Beard

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603 Brownstone Drive  
Severna Park, MD 21146  
Phone: (406) 925-1128

#### Abid Bengali

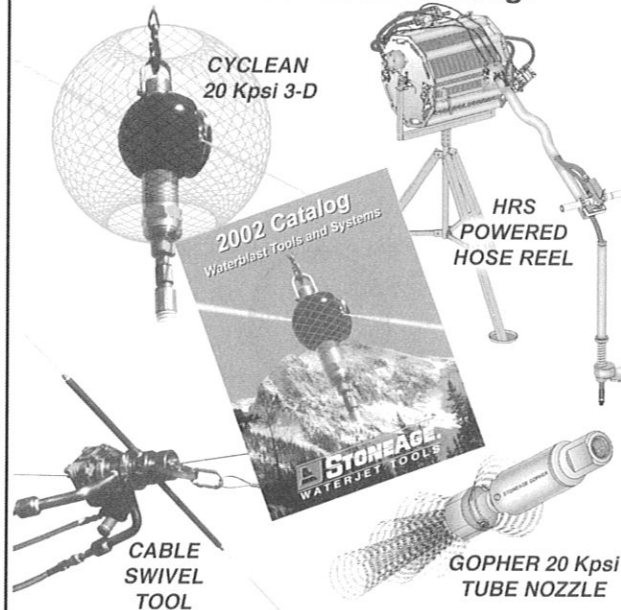
PEL Technologies  
3026 Saratoga Avenue  
Canton, OH 44706  
Phone: (330) 437-7777 x 160  
Fax: (330) 437-7788

#### Fernando Perales Calle

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(continued on page 12)

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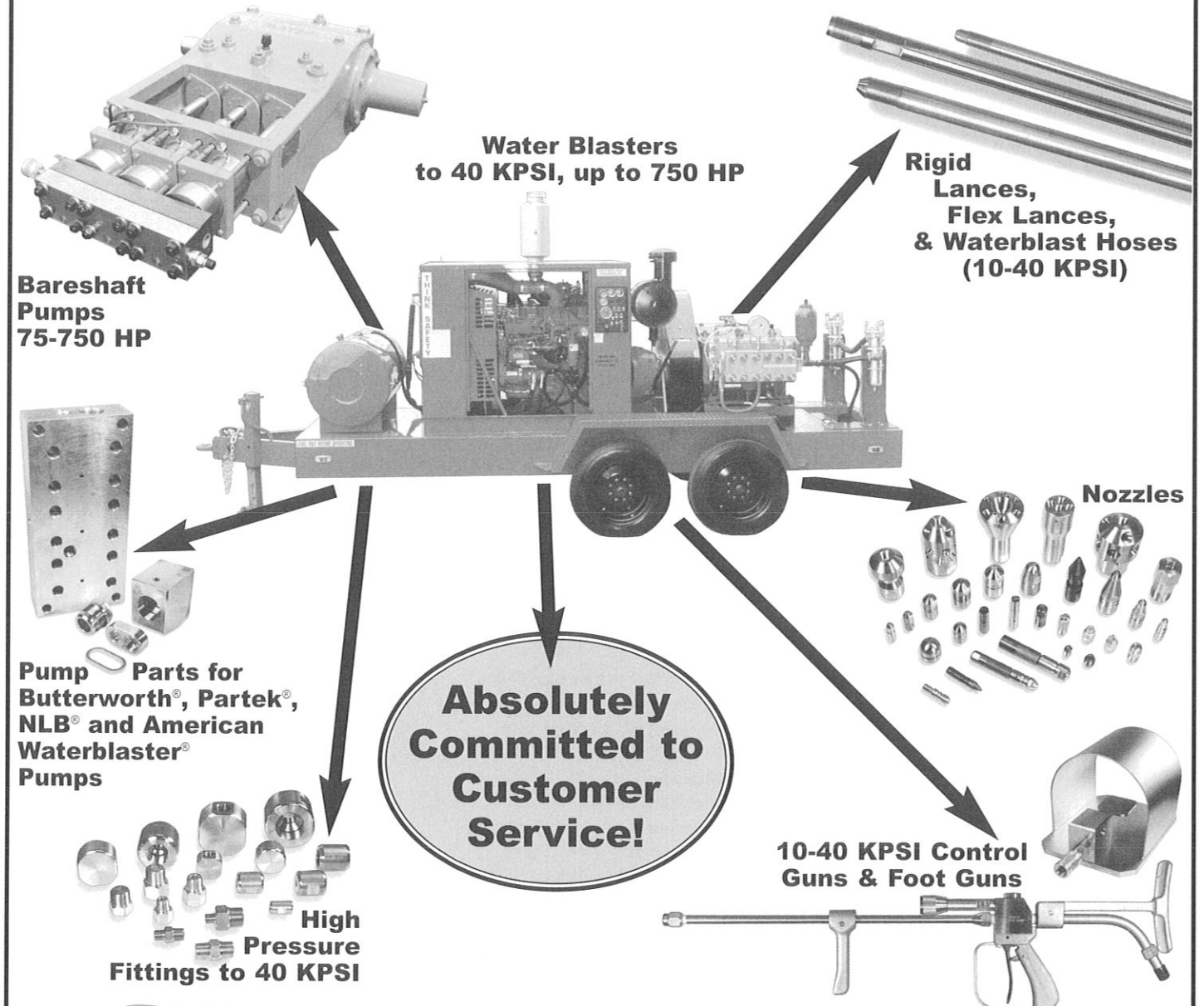


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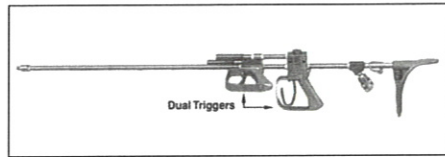
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## New Products

### NLB adds features to dual-trigger lance



NLB NCG10-286DT Lance

NLB's latest waterjet lance gives operators two ways to quickly dump pressure, plus a quick-change cartridge seal so they can rebuild the lance in under a minute. The NCG10-286DT is a dual-trigger lance rated for pressures up to 10,000 psi (700 bar) and flows up to 25 gpm (95 lpm).

Since the new lance requires pressure on both triggers to actuate the flow of water, the operator can immediately dump pressure by releasing either trigger. The same result can be achieved by pushing the trigger forward, thanks to NLB's patented trigger design. The lance requires just 8 to 12 pounds of trigger pressure, and has a one-finger latch to prevent accidental actuation. The shoulder stock and hand grip are adjustable to maximize operator comfort.

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

### New StripeJet™ removes stripes faster

NLB's new StripeJet™ removes pavement markings faster than

grinding, without damage to asphalt or concrete. Its patented rotating water jets (rated at up to 40,000 psi) are mounted to a compact vehicle with a tight turning radius, for easy maneuvering around parking lots, garages and intersections. Vacuum recovery keeps water and debris contained.

The StripeJet has five cleaning head options, from 8 inches to 24 inches, to suit a variety of surfaces and markings. Just 10 feet long, it connects easily to an NLB ultra-high pressure pump unit and a vacuum truck, providing users with a self-contained system. Hydraulic nozzle

## New Products, from page 8

rotation and positioning assures smooth, consistent operation.

The StripeJet brings to areas of limited access the advantages of NLB's StarJet™, a self contained system that removes highway stripes at up to 7,000 ft./hr. The StarJet is mounted to a truck, which tows the pump unit and a water tank.

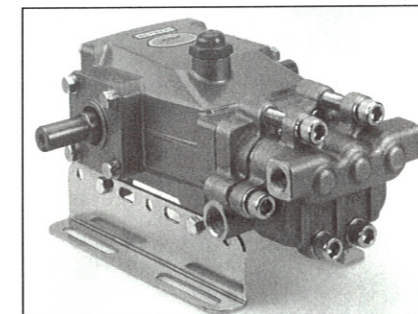


NLB StripeJet™

For more information, visit [www.nlbcorp.com](http://www.nlbcorp.com), call (248)624-5555, fax (248)624-0908, or write NLB Corp., 29830 Beck Road, Wixom, Michigan 48393-2824.

### Stainless Steel CP Pumps from CAT Pumps

The new 5CP Plunger Pump offers high performance in compact, lightweight frame. The 5CP6221 delivers 6 GPM up to 2000 PSI. It features a 316SSL corrosion-resistant split-manifold for easy servicing. This pump was designed for continuous-duty, quality sea-water reverse osmosis systems and offers high energy efficiency and exceptional long life at an affordable price.



CAT Pumps New 5CP Plunger Pump

The near maintenance-free operation of the 5CP pumps is achieved by incorporating the standard long life components found in all CAT PUMPS:

- concentric, high-density, polished, solid ceramic plungers and the specially formulated Hi-Pressure Seals, housed in the 316 Stainless Steel cast [SSL] manifold head, that offer unmatched wet-end performance life

- chrome-moly forged crankshaft and the special high-strength connecting rods that assure exceptional performance from the drive-end

The 5CP is available as a direct-drive pump and motor unit or a custom engineered and tested Power Unit that includes a heavy-duty 2 mill epoxy powder coated, 3/8" steel base with 1/4" channel steel bracing, drive (electric, gas, hydraulic, gearbox or diesel), pump, pulleys, belts, and system accessories.

Model	RPM	Specifications
5CPP6221	1400	6.0 @ 2000
5CP6241CS	1725	4.0 @ 2000
5CP6251	1725	5.0 @ 2000

Contact CAT PUMPS for more information on these special SS Models or our complete line of pumps and accessories, 1681 94<sup>th</sup> Lane N.E., Minneapolis, MN 55449, phone: 763-780-5440, fax: 763-780-2958, e-mail: [sales@catpumps.com](mailto:sales@catpumps.com), web site: [www.catpumps.com](http://www.catpumps.com)

## You get more than a pump from NLB.

Before we sell you a water jet pump, we make sure it's right for tomorrow's needs, as well as today's. And we provide the accessories and support you need, whether you're starting up or looking at new markets. It's simple: as you grow, so do we.

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- an unsurpassed range of pumps and accessories: 2,000 psi to 40,000 psi (140 to 2,800 bar), 15-600 hp (11-447 kw);
- standard-setting reliability;
- the most diversified experience in the water jet industry;
- top-quality parts and service, available when you need them;
- customized purchase, lease and rental plans; and
- convenient regional sales/service/rental centers.

NLB has helped countless contractors become more successful... and we'd like to do the same for you. Before you settle for just a pump, call 1-877-NLB-7988.

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### Waterjet Products

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### What You Need

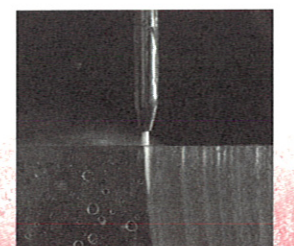
- HPX and HPA waterjet abrasives for every application
- Replacement components for many different systems

### At The Right Price

- Abrasives that deliver performance and value
- Competitively priced replacement components

### When You Need It

- Shipping options to meet your delivery requirements



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