

For contractors caught short-handed, facing impossible schedules, challenged to improve safety and environmental responsibility

For over 23 years StoneAge has built waterjet tools for industrial service contractors, municipalities, and sewer contractors.

Contractors trying to reduce exposure to waterjet hazards need safer StoneAge mechanized systems.

Contractors also face unique challenges when injuries or incidents force a customer to discontinue old methods that have proven too hazardous. Mechanized StoneAge equipment minimizes - or eliminates - exposure of people to the hazards of high pressure jets.



Contractors facing impossible turnaround schedules need the productivity and thoroughness of StoneAge tools.



Customers' plants often go down unexpectedly due to equipment failure, power outages, or severe weather. Maintenance neglected as too costly during periods of slow product demand often must be done when inventories are low, and sales are lost for every minute of downtime. Contractors facing impossible time schedules need the productivity and thoroughness of StoneAge tools. Those who are flexible enough to handle their customers' changing schedules add value to their service.

Short-handed contractors need the power and productivity of StoneAge tools.



Smart contractors know they will be short-handed from time to time with crews spread too thin on too many jobs. They might face all their nightmare jobs at once, with too few experienced people to cover all job locations. The customer's plant might go down during holidays. A planned outage might be unexpectedly re-scheduled, or grow in scope. Whatever the reason, short-handed contractors need the power and productivity of StoneAge tools, designed to replace manual methods with mechanized equipment.

Plants facing new environmental regulation need the reliability of StoneAge tools.

Increased cost of waste disposal, or new environmental regulations also force change. StoneAge tools allow more efficient, more thorough cleaning, using less water. StoneAge tools handle recycled water without plugging up or loss of function.

Contractors weary of ineffective methods need the power and thoroughness of StoneAge tools.

Contractors who are weary of ineffective methods, doing the same job over and over again for a frustrated customer need the power and thoroughness of StoneAge tools. Thorough results prolong the cycle until cleaning is again necessary, results more valuable to the customer.

Our mission is to lead the world in design, manufacture, and service of premium quality waterblast tools. We serve as a technical resource for specific waterjet cleaning jobs, recommending alternative approaches and equipment.

We thank our customers for their support, and for the privilege of serving their needs.



Durango, Colorado Phone 970-259-2869
www.stoneagetools.com FAX 970-259-2868

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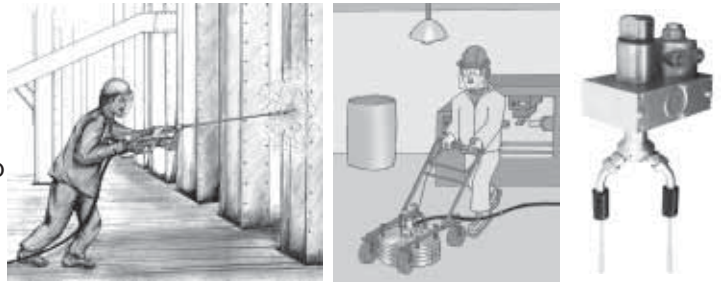
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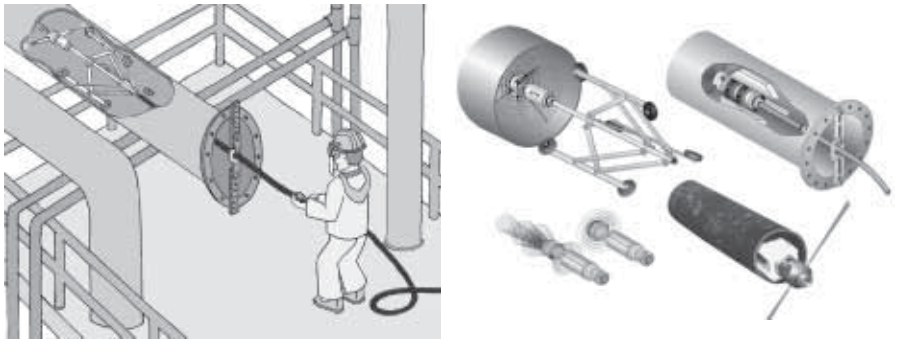
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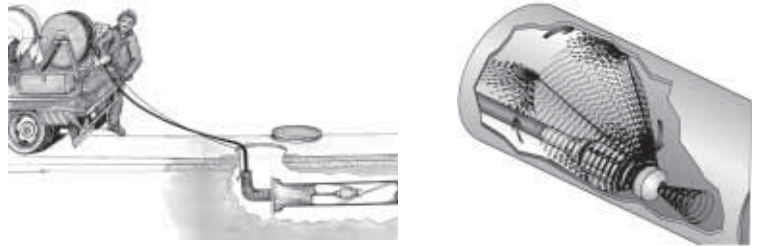
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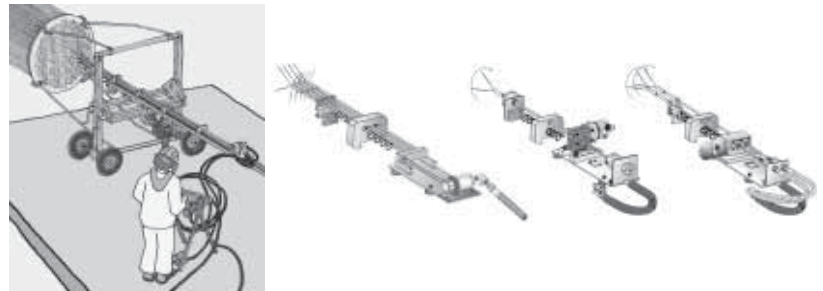
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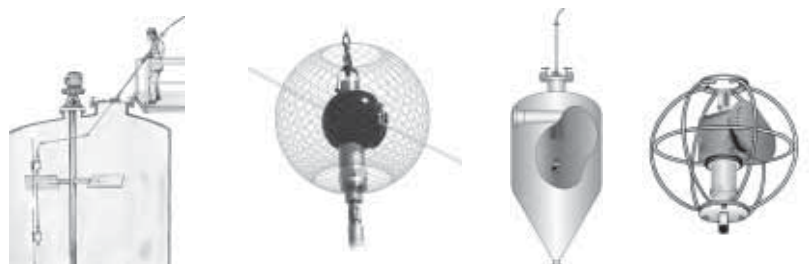
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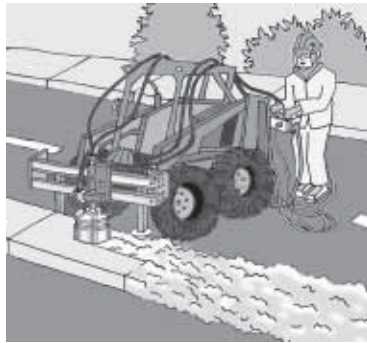
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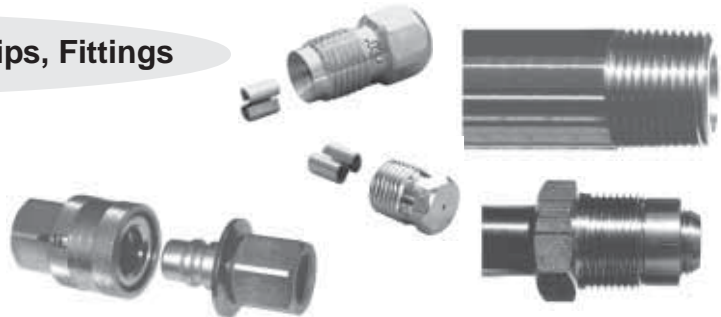
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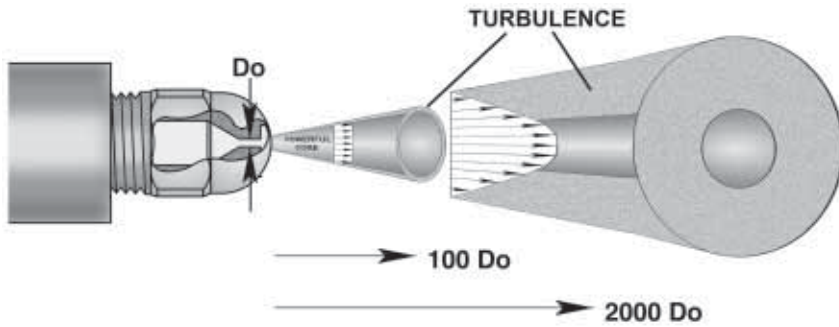
Made in the USA



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WATERJET TOOLS

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Waterjet Basics - Delivering Power



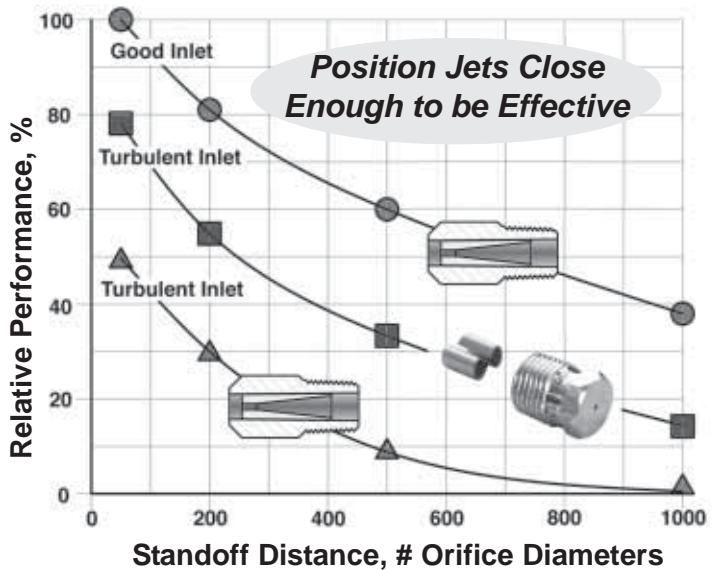
A waterjet nozzle is simply a flow restriction that causes water velocity to rapidly increase. In the first 8 to 25 orifice diameters past the orifice exit, a powerful super-sonic core is set up. At the outer surface of the jet, high velocity water drags air with it, forming a turbulent zone of air bubbles in water, and water droplets in air. The turbulent zone travels at lower velocities and does not have enough energy for effective cleaning. At greater distances away from the jet, the turbulent zone grows at the expense of the powerful core, until no cleaning power remains at all.

Control Upstream Flow Turbulence

Upstream of the jet, it is important to cause as little flow turbulence as possible. The best quality jets use a cone-shaped inlet to the orifice to smoothly accelerate the water velocity. Even with the best quality jets, turbulence causes power to deteriorate by about 6% at 100 orifice diameters, and 62% at 1000 diameters. Power loss can be even more severely reduced by abrupt diameter changes, or flow direction changes, which cause inlet flow turbulence. StoneAge Attack Nozzle Tips use a flow straightening device in the orifice that recovers about half the power lost to upstream turbulence.

Upstream of the jet, it is important to cause as little flow turbulence as possible. The best quality jets use a cone-shaped inlet to the orifice to smoothly accelerate the water

Effect of Turbulence & Standoff Distance



As Few Jets As Big As Possible for Power



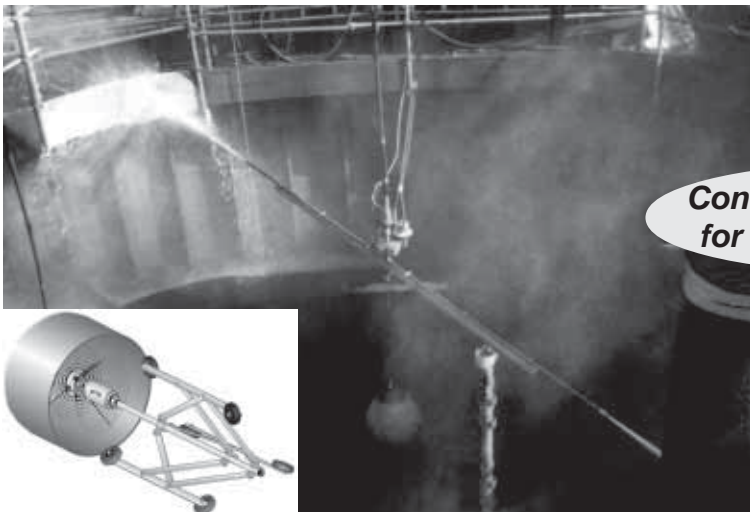
In order to deliver the most jet power possible to the surfaces to be cleaned, it is best to use as few jets as possible, making each as big as possible. Jets are rotated to cover all surfaces to be cleaned. Jet paths look like the threads on a bolt. This helical jet path proves very effective and powerful.

When a waterjet is rotated inside a pipe or vessel, the jet is moved sideways on the surface to be cleaned. If rotated too fast, this sideways velocity seriously deteriorates jet quality. We have found that the jet must be controlled to no more than 22 ft/sec transverse velocity in order to deliver maximum power to the surface to be cleaned. Of course the bigger the diameter, the lower the rotation rate allowed. There are exceptions, but in most cases the 22 ft/sec guideline is used whether we're cleaning a small pipe, or a large storage tank.

Jet Velocity at Wall < 22 ft/sec

Pipe ID	4"	8"	18"	36"	60"	180"
Max. RPM	1240	620	280	140	80	27

Control Rotation Rate for Maximum Power



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Waterjet Safety - A Summary

The plant operator who hires waterblast services cannot afford the interruption presented by an accident or injury. Incidents require supervision to stop work until the injured workers are tended to, hazards are investigated, and appropriate preventative measures taken. Even if no one is seriously hurt, time is wasted - time that costs up to \$ 15,000 an hour in lost production alone in many large single line process plants. The dependable waterblast contractor gets the job done, but does so without accident or injury, and doesn't need close safety supervision. Key skills include recognition of hazards, and knowledge of appropriate precautions to take in complex and changing situations. Trained and experienced waterblast operators are essential. Finally, safety responsibility should be demanded of the on-site supervisor, as well as each operator doing the work. Effective safety management promotes teamwork, avoiding a situation where safety is someone else's concern.

Confined spaces, heights, obstructions, tripping hazards, sharp objects, falling objects, moving vehicles and equipment, rigging, powered equipment, noise, fumes, dust, acids, corrosives, poisons, pathogens, flying debris, noise to cause permanent hearing loss, burst equipment, missiles, unpredictable waterjet direction, unpredictable reaction forces, waterjet injury, slipping, falling, muscle strain.

Excellent safety information is available from the organizations listed below, which can be used to build a comprehensive waterblast safety and training program. The tips we suggest below are important, but not comprehensive.

1. Minimum personal protective equipment includes hearing protection, hard hat, safety goggles, rain suit, safety toe boots with non-skid soles, shin guards, and waterproof gloves.
2. Control the worksite with safety ribbon and barricades as needed to keep bystanders out, and prevent people from being injured by flying debris.
3. Get the "Medical Alert" card from the Waterjet Technology Association for each worker involved in waterblast operations. The information for medical emergency room physicians can be life-saving in the event of an injury.
4. Jet hand-held guns for no more jet reaction force than 1/3 the weight of the operator.
5. Short hand-held guns are dangerous. Don't use one that is short enough for the operator to jet himself.
6. Lots of workers in a confined space with hand-held waterblast guns is a dangerous practice. Instead, invest in a mechanized system to do the job. It will pay big dividends in downtime reduction, thorough results, and safety.
7. Don't look into something being jetted, with pressure on.
8. Pressure dump or shutoff devices should be controlled by the operator most likely to get hurt.
9. Do not defeat overpressure protection devices.
10. Use line mole backout preventers to avoid injury from failed equipment or hose coming out of the pipe towards the operator.
11. Use rigid pipe or centralizer on inlet line to mole nozzles that prevent the nozzle from reversing direction.
12. Use rigid pipe or colored leader hose inlet the jetting nozzle as an indicator that the nozzle is close to being pulled out of the pipe or vessel being cleaned.
13. Anticipate unbalanced jet reaction forces, by design or due to jet plugging. Take effective precautions to keep unbalanced nozzles under control.

Useful Safety Information, Training Aids

Water Jet Technology Association
St. Louis, MO, USA
Phone 314-241-1445
FAX 314-241-1449
www.wjta.org

Water Jetting Association
Huntingdon, Cambridgeshire, UK
Phone 44-1487-834034
FAX 44-1487-832232
www.waterjetting.org.uk



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Puts teeth into tough cleaning jobs!

More Economical in the Long Run!

- Replaceable nozzle tips
- Centrifugal rotation speed control
- No-leak seals put all the power to work.
- Rugged and dependable, easy to maintain

**Original Model BC-K
2-20 Kpsi - Same Tool!**

**New Model BC-UH
20-40 Kpsi Operation**

Rotation Speed Control

BC-K 2-Jet for Thick Deposits

BC-K 4-Jet for Surface Cleaning

BC-UH for Thin Hard Coatings

Specifications	BC-K		BC-UH	
• Flow Capacity	15 gpm	57 l/min	10 gpm	38 lpm
• Flow Rating	0.43 Cv		0.38 Cv	
• Length Overall	7.8 in	20 cm	7.8 in.	20 cm
• Body Diameter	1.8 in	4.6 cm	1.8 in.	4.6 cm
• Weight	2.9 lb	1.3 kg	3.0 lb	1.4 kg
• Rotation Speed	1000-2000 rpm		1000-2000 rpm	
• Inlet Port	9/16 MP		9/16 HP	
• Adaptors Avail.	3/8 & 1/2 npt		None	

Barracuda Jetting - Flow in gpm

2-Jet - Model BC-K-P4							4-Jet - Model BC-K-P2							4-Jet - Model BC-UH						
AP4	Pressure, Kpsi						AP2	Pressure, Kpsi						OS-S7	Pressure, Kpsi					
ID	2	3	4	5	10	15	20	ID	2	3	4	5	10	15	20	ID	28	32	36	40
.024							4.4	.018						4.3	4.9	.016			3.6	3.8
.026							4.4	5.1	.020					5.2	6.1	.017		3.9	4.1	4.3
.029							5.5	6.4	.022				5.2	6.3	7.3	.018	4.1	4.4	4.6	4.8
.032					5.5	6.7	7.7	.024					6.1	7.5		.019	4.5	4.8	5.1	5.4
.035					6.5	8.0		.026				5.1	7.2	8.8		.020	5.0	5.4	5.6	6.0
.038					7.6	9.4		.029			5.6	6.3	8.8			.021	5.5	5.9	6.2	
.042			5.8	6.5	9.2			.032	5.8	6.7	7.5	10.6				.022	6.0	6.5		
.047	6.2	7.2	8.1	11.4				.035	6.9	7.9	8.9					.023	6.6			
.052	7.5	8.7	9.7					.038	7.9	9.2	10.3					.024	7.1			
.057	8.8	10.1	11.3					.042	7.7	9.4	10.9	12.1								
.063	8.4	10.3	11.9	13.3				.047	9.2	11.2	13.0	14.5								
.069	9.7	11.8	13.7	15.3				.052	10.6											
.075	10.8																			

Maintenance Kits & Tools

- **BC 600-K or U Service Kit** - HP seal, seat, syringe, ATF fluid, and O-rings
- **BC 602-K or U Seal Kit** - HP seal, seat, and O-ring
- **BC 610-K or U Overhaul Kit** - Bearings, sleeve, shaft seals, HP seal, seal holder and seat, ATF fluid, and port screw
- **BC 410 Syringe Assembly** - For replenishing ATF lubricant
- **BC 612-K or U Tool Kit** - Two tools for seating shaft seals



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Waterblast Floor Cleaners & Concrete Preparation

15 & 20 Kpsi (1000 & 1380 bar) Models

Remove Paint from
Paint Line Gratings
and Floors

Remediate
Contaminated
Surfaces

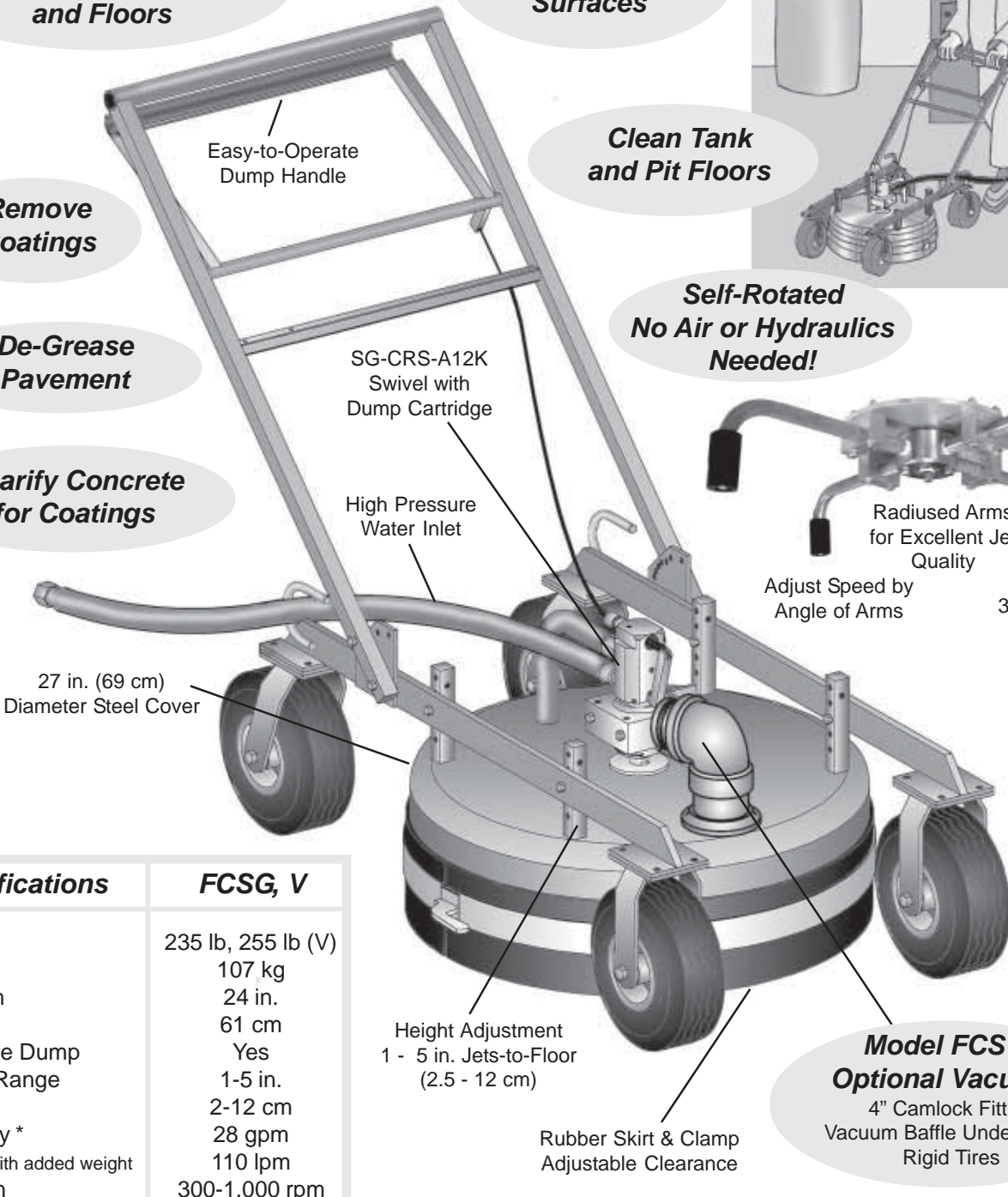
Remove
Coatings

De-Grease
Pavement

Scarify Concrete
for Coatings

Clean Tank
and Pit Floors

Self-Rotated
No Air or Hydraulics
Needed!



Easy-to-Operate
Dump Handle

SG-CRS-A12K
Swivel with
Dump Cartridge

High Pressure
Water Inlet

27 in. (69 cm)
Diameter Steel Cover



Radiused Arms
for Excellent Jet
Quality

Adjust Speed by
Angle of Arms

Self-Rotates
300-1,000 rpm

Height Adjustment
1 - 5 in. Jets-to-Floor
(2.5 - 12 cm)

Rubber Skirt & Clamp
Adjustable Clearance

Model FCSV
Optional Vacuum
4" Camlock Fitting
Vacuum Baffle Under Cover
Rigid Tires

Specifications

FCSG, V

Weight	235 lb, 255 lb (V) 107 kg
Jet Path	24 in. 61 cm
Pressure Dump	Yes
Height Range	1-5 in. 2-12 cm
Capacity *	28 gpm 110 lpm
* More with added weight	
Rotation	300-1,000 rpm

Maintenance Kits & Tools

- **SG 600-CCN Service Kit** - One set carbide face seals, O-rings, and wave springs
- **SG 610-CCN Overhaul Kit** - Bearings, shaft seals, high pressure CCN seal set
- **SG 612 Tool Kit** - Tools to seat SG 006 and SG 007 Shaft seals
- **FC 301 Dump Cartridge**

STONEAGE
WATERJET TOOLS

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SG-30 Free Spinner for Surface Cleaning

The simple self-rotating solution for surface cleaning applications

Clean Paint Line
Parts Carriers

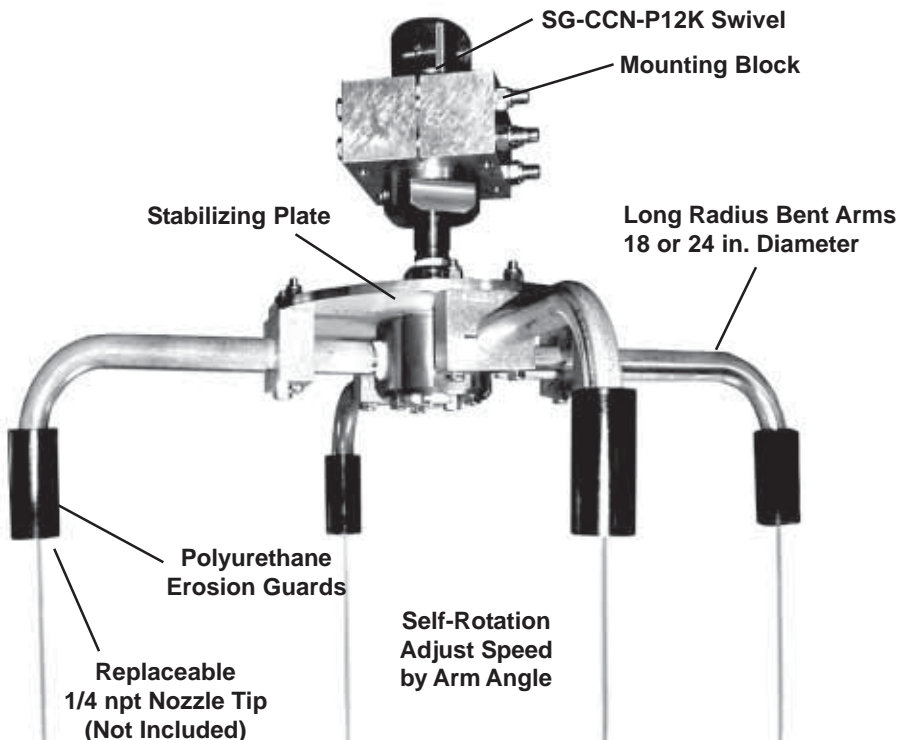
Scarify Concrete
for Coatings

Build Custom
Surface Cleaners

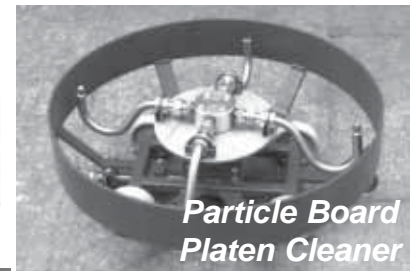
Clean Airport
Runways

Clean Belts,
Screens,
Conveyors

De-Grease
Concrete
Surfaces



Boiler Pendant
Tube Skid



Particle Board
Platen Cleaner



Solar Power
Mirror
Cleaner



Highway
Pavement
Cleaner

Specifications	SG-30-P12	SG-30-A12
Swivel Model	SG-CCN-P12K	SG-CCN-A12K
Max. Pressure	15 Kpsi 1000 bar	20 Kpsi 1380 bar
Rotation Speed	300 - 1,000 rpm	300 - 1,000 rpm
Rotation Diameter		
4-Arm Small	18 in. 46 cm	18 in. 46 cm
4-Arm Large	24 in. 62 cm	24 in. 62 cm
Inlet Ports	3/4 npt 0° or 90°	3/4 MP * 0° or 90°
Flow Capacity	60 gpm 230 l/min	50 gpm 190 l/min
Flow Rating	2.3 Cv	2.0 Cv
Height Overall	13 in 33 cm	13 in. 33 cm
Weight	25 lb 11.3 kg	26 lb 11.8 kg

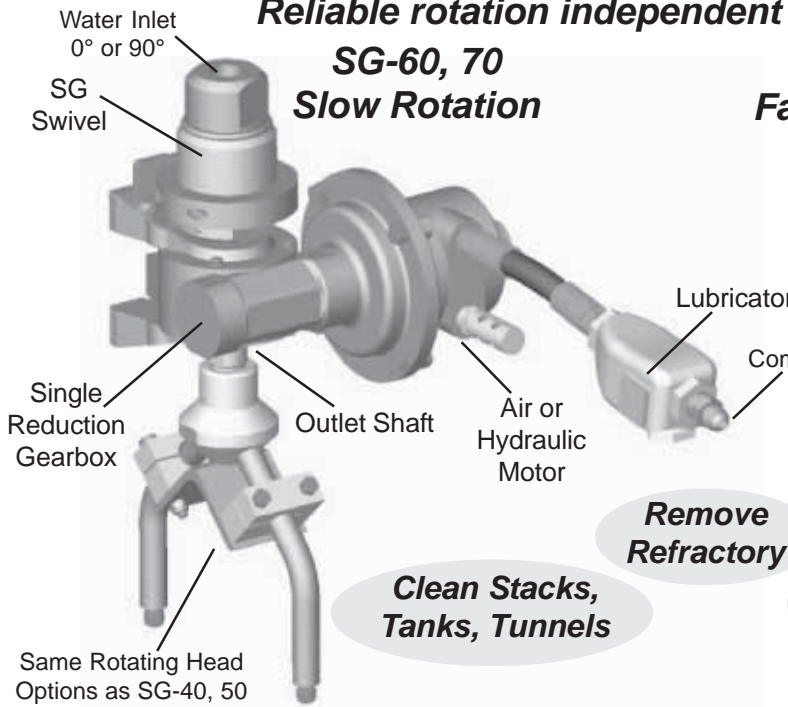
* Cone & Thread Medium Pressure Connection



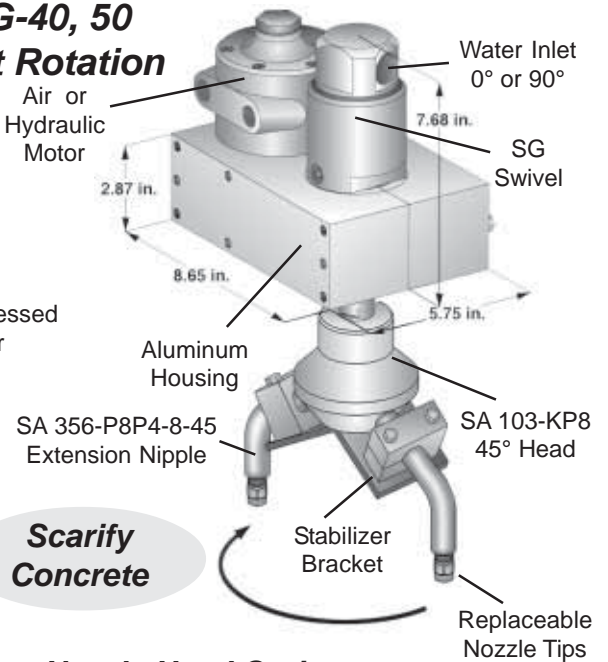
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SG-40, 50, 60, 70 Powered Rotation

Reliable rotation independent of flow or pressure



SG-40, 50 Fast Rotation



Clean Conveyors, Screens, Belts, Chain



SA 103-KP8 Two-Arm Head



SA 103-KP4-8 Multi-Port Bar Head



SA 103-KP4 Multi-Port Head



FCSG-15K.1
FCSG-20K.1
4-Arm Assembly

Clean Heat Exchanger Bundles



Drive Motor	Air	SG-40	SG-60
	Hydraulic	SG-50	SG-70
Swivel		SG-CCN-P12K	SG-P12KM
Max. Pressure		15 Kpsi 1,000 bar	15 Kpsi 1,000 bar
Flow Rating		2.3 Cv	5.0 Cv
Flow Capacity		50 gpm 230 lpm	110 gpm 420 lpm
Inlet Port		3/4 npt	3/4 npt
Outlet Shaft		1-1/8 in. K**	3/4 npt
Swivel		SG-CCN-A12K	SG-A12KM
Max. Pressure		20 Kpsi 1,380 bar	20 Kpsi 1,380 bar
Flow Rating		2.0 Cv	2.0 Cv
Flow Capacity		50 gpm 190 lpm	50 gpm 190 lpm
Inlet Port		3/4 MP*	3/4 MP*
Outlet Shaft		1-1/8 in. K**	3/4 or 1 MP*
Rotation Speed			
Slow	60:1 Ratio	NA	8 - 40 rpm
Medium	10:1 Ratio	NA	50 - 250 rpm
Fast	2:1 Ratio	250 - 1,000 rpm	NA
Air Supply at 80 psi		40 CFM 20 l/sec	40 CFM 20 l/sec
Weight, without Head		26 lb 11.8 kg	40 lb 18.1 kg

* MP Medium Pressure Cone & Thread **1-1/8 in. Ø O-ring

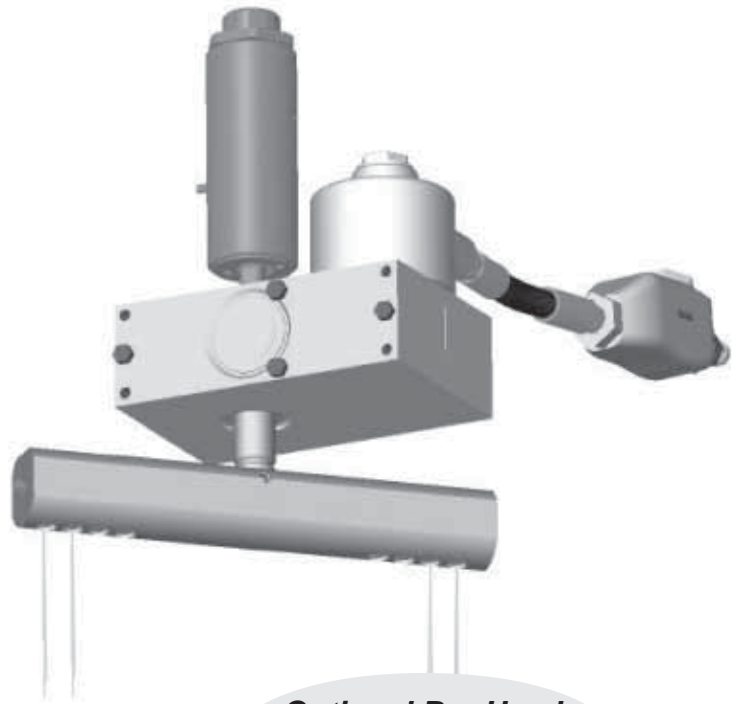


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UH-40 40 Kpsi Powered Rotation

The productive solution for coatings, corrosion, or scale removal

The **UH-40 & 50 Powered Rotation Assembly** features the reliable StoneAge **UH-H9H6 Swivel** and belt drive system for thorough and productive surface cleaning. Replaceable, excellent quality sapphire jets provide hard-hitting power for epoxy coatings removal or other surface preparation. Air motor or hydraulic motor drives are available.

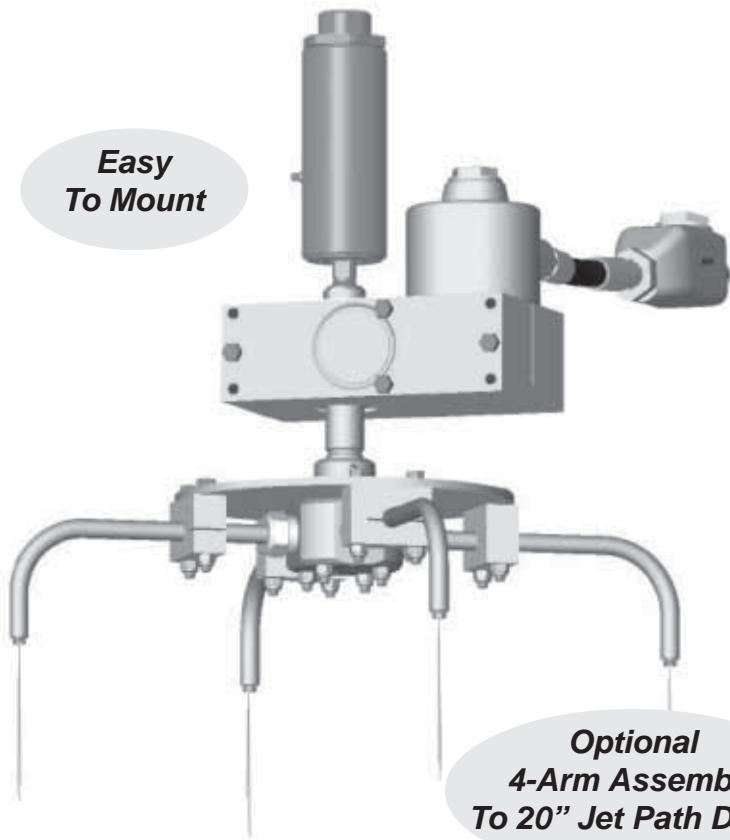


More Productive Than Hand-Held Gun

Rugged High Capacity Design

Optional Bar Head To 12" Jet Path Diam.

Easy To Mount



Optional 4-Arm Assembly To 20" Jet Path Diam.

Drive	Air	UH-40	UH-50
	Hydraulic		
Swivel		UH-H9H6	
Max. Pressure		40 Kpsi	2750 bar
Flow Rating		0.64 Cv	
Flow Capacity		20 gpm	76 lpm
Inlet Port		9/16 HP*	
Outlet Shaft		3/8 HP*	
Rotation Speed			
Fast	2:1 Ratio	250 - 1,000 rpm	
Air Supply at 80 psi		42 CFM	20 l/sec
Weight, without Head		26 lb	11.8 kg

Applications

The **UH-40** and **UH-50 Assemblies** are easily mounted to build:

- Conveyor Cleaners
- Screen Cleaners
- Platen Cleaners
- Deck Blasters
- Hull Cleaners



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Because All Pipes Are Not Straight...

**Viscous Fluid
Rotation Speed
Control**

**Durable Stainless
Steel Construction**

**Up to 100 lb
Pulling Force**

**Replaceable
AP2 Nozzle Tips**

2.5 in. OD
63.5 mm OD

Rotating Jets:
2 @ 135°
2 @ 90°
1 @ 15°

**For
4" to 12" ID
Piping**

**Compact Design
Goes Around 4" Elbows**

**Rigid Pipe Required
For 6" and Larger Lines ***

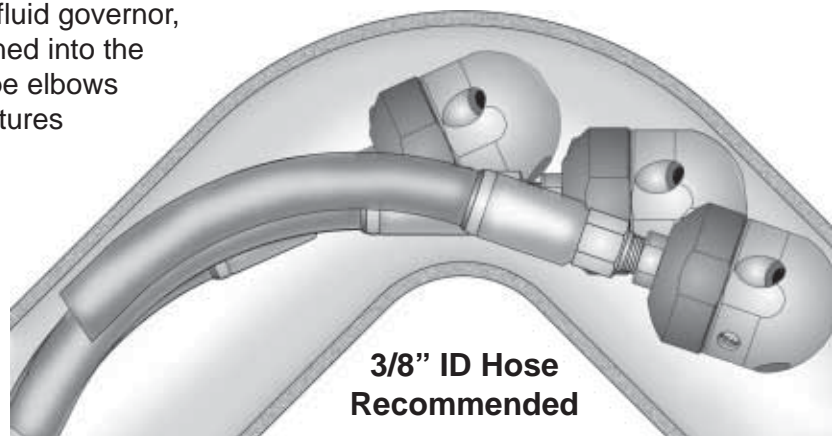
* Prevents nozzle from reversing direction, a safety hazard.

Badger Specifications		
Max. Pressure	15,000 psi	1000 bar
Rotation Rate		
Fast	75-220 rpm	
Slow	20-80 rpm	
Flow Range		
BA-P6-R22	10-19 gpm	38-72 lpm
BA-P6-R14	16-30 gpm	61-114 lpm
Flow Rating	1.6 Cv	
Weight	2.5 lb	1.1 kg
Diameter	2.5 in.	63.5 mm
Length	3.51 in.	89 mm
Inlet Port	3/8 npt	
Outlet Ports	1/8 npt	

The **Badger** delivers powerful cleaning due to excellent rotation speed control and high quality jets. With the viscous fluid governor, sealed bearings, and high pressure seal designed into the head, this compact 2D nozzle goes through pipe elbows as small as 4". This unique combination of features makes the **Badger** a valuable tool for all waterblast contractors.



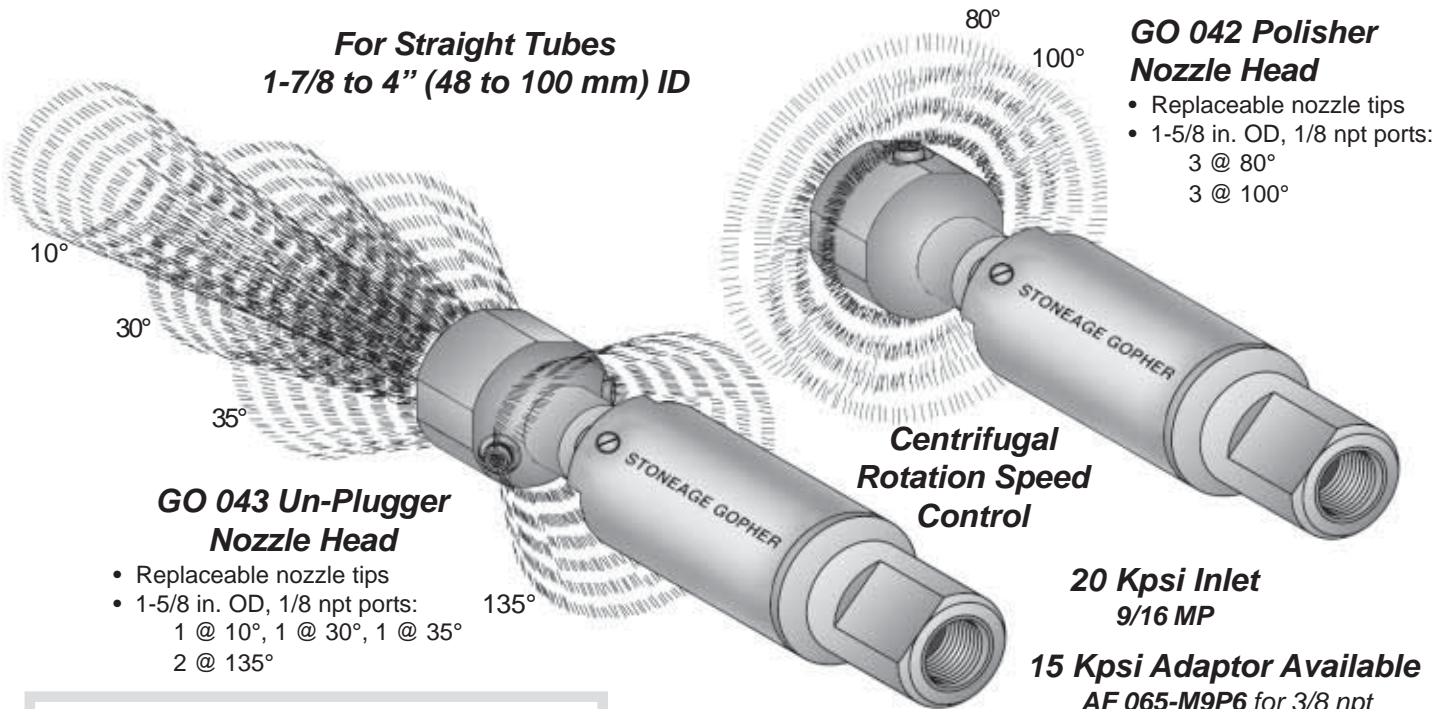
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**3/8" ID Hose
Recommended**

20,000 psi Cleaning Power in a Compact Tool - Centrifugal Rotation Control

For Straight Tubes
1-7/8 to 4" (48 to 100 mm) ID



GO 043 Un-Plugger Nozzle Head

- Replaceable nozzle tips
- 1-5/8 in. OD, 1/8 npt ports:
 - 1 @ 10°, 1 @ 30°, 1 @ 35°
 - 2 @ 135°

GO 042 Polisher Nozzle Head

- Replaceable nozzle tips
- 1-5/8 in. OD, 1/8 npt ports:
 - 3 @ 80°
 - 3 @ 100°

Centrifugal Rotation Speed Control

20 Kpsi Inlet
9/16 MP

15 Kpsi Adaptor Available

AF 065-M9P6 for 3/8 npt
AF 065-M9P8 for 1/2 npt

Specifications

	Gopher	
• Diameter	1-5/8 in.	41 mm
• Inlet Port	9/16 MP	
• Head Diameter	1-5/8 in.	41 mm
• Length Overall	7.8 in.	19.8 cm
• Weight, with Head	4 lb	1.80 kg
• Max. Pressure	20,000 psi	1380 bar
• Flow Capacity	25 gpm	95 l/min
• Flow Rating	0.84 Cv	
• Rotation Speed	600-1,000 rpm	

Clean Piping

Clean Evaporator Tubes

Clean Process Drains

Handles Coke, Polymers,
Coatings, Latex

Select Head with Offset to Match Your Pump!

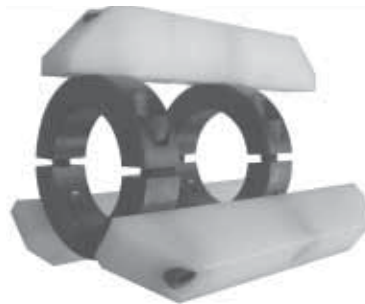
Unplugger Head	Polisher Head
GO 043-R.17 8-14 GPM	GO 042-R.14 7-13 GPM
GO 043-R.08 15-25 GPM	GO 042-R.07 14-25 GPM

Easy Maintenance

- Uses motor oil for lubricant
- Field replacement of high pressure seal

Maintenance Kits & Tools

- GO 600 Service Kit - High pressure seal, seat, syringe, O-ring, and port screw
- GO 602 Seal Kit - High pressure seal, seat, and O-ring
- GO 610 Overhaul Kit - Bearings, shaft seals, high pressure seal, seat, O-rings, and seal holder
- GO 612 Tool Kit - Assembly tools, to seat shaft seals
- GP 044 Motor Oil - NAPA 10W40 lubricant



GO 070 Centralizer
Replaceable Skids
8" Diameter



GO 075 Centralizer
One Piece Plastic
3", or 4.5" Diameter



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RJV 2D Self-Rotating Nozzle

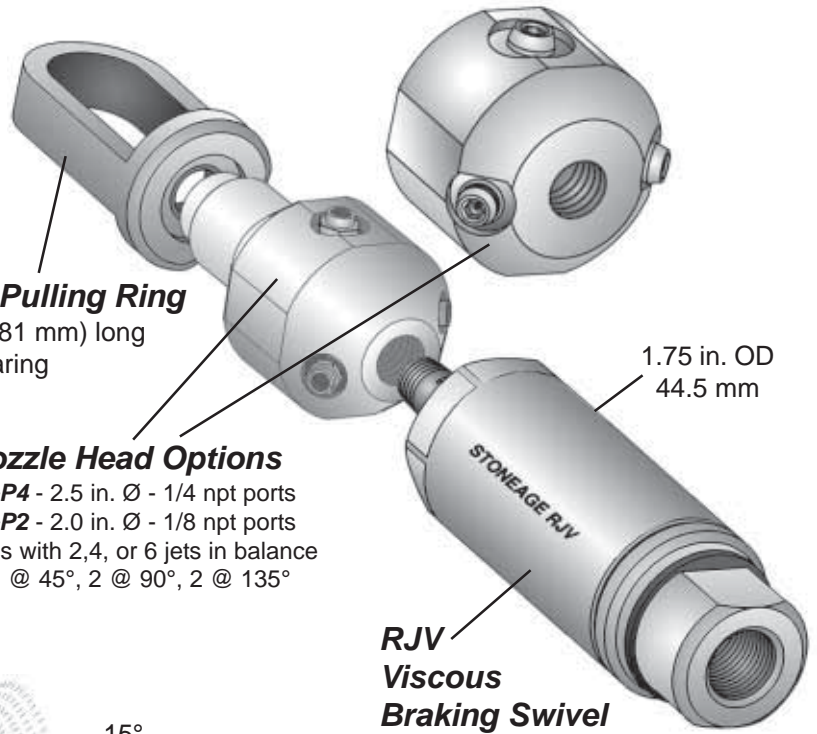
Clean Water Well Screens

Clean Ducts & Exhaust Stacks

Clean Reformer Transfer Lines

Clean Totes & Closed Head Drums

Clean Pipes
3 - 12 in. ID



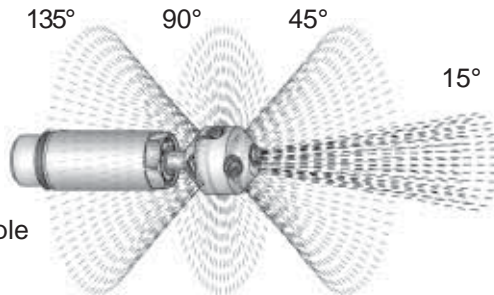
BJ 045 Pulling Ring

- 3.2 in. (81 mm) long
- Ball bearing

Two Nozzle Head Options

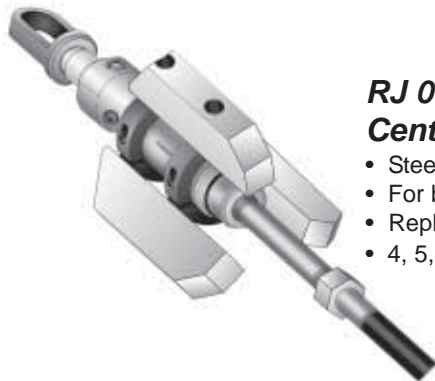
- RJ 044-P4 - 2.5 in. Ø - 1/4 npt ports
- RJ 043-P2 - 2.0 in. Ø - 1/8 npt ports
- Operates with 2, 4, or 6 jets in balance
2 @ 45°, 2 @ 90°, 2 @ 135°

RJV
Viscous
Braking Swivel



RJ 043-P2-7 Nozzle Head

- 15° port for unplugging
replaces pulling ring nipple



RJ 070 Centralizer

- Steel collars with plastic skids
- For bigger diameter piping
- Replaceable plastic skids
- 4, 5, 6, 8, or 12 in. diameter



RJ 075 Centralizer

- One piece plastic
- Keeps head from rubbing
- Slip-on plastic sleeve
- 3" or 4.5" diameter

Specifications

Length Overall	6.0 in.	15 cm
Weight, without Head	3 lb	1.4 kg
Maximum Pressure	15 Kpsi	1000 bar
Rotation Speed		
Fast		50-250 rpm
Slow		10-100 rpm
Flow Capacity	35 gpm	133 l/min
Flow Rating, Cv		1.6
Inlet Port	1/2 npt	
Outlet Port	1/4 npt	

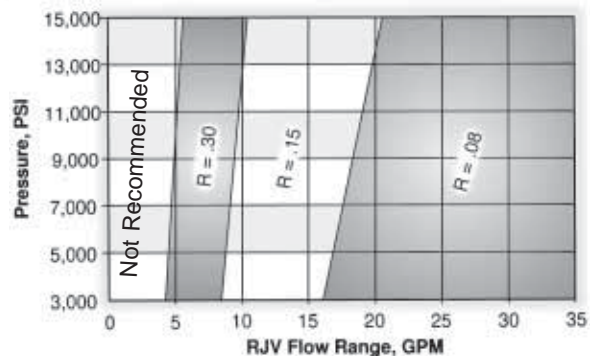
Maintenance Kits & Tools

- RJ 600 Service Kit - High pressure seal, seat, spring, O-rings, and 6 oz. viscous fluid
- RJ 602 Seal Kit - High pressure seal and seat
- RJ 610 Overhaul Kit - Bearings, shaft seals, high pressure seal, seat, spring, O-rings, 6 oz. viscous fluid.
- RJ 612 Tool Kit - Assembly tools, including fill tube and tool to seat shaft seals

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Select Head with Offset to Match Your Pump!



2D Pipe Cleaning Kit

This assembly of tools and accessories will clean common pipe sizes, to be cleaned with 100-200 HP waterblast pumps. It is not appropriate for every contractor or every job. StoneAge salespeople are ready to suggest alternatives for customers' specific needs.

Clean 6 - 24 in. ID Lines with These Accessories

Pulls Itself and Rotates for Thorough Cleaning

6 in. LR Elbow

8 in. SR Elbow

10 in. SR Elbow

12 in. SR Elbow

18-24 in. SR Elbow



BJ 070.1-10 Skid Set



BJ 070.1-8 Skid Set



BJ 600-M-F Service Kit

BJV-M-F Viscous Braking Swivel



BJ 044-P4-6-R35 Head



HC 090 Pulling Ring



OCIH Nozzle Tips



AP4 Nozzle Tips



GP 025-P4 Plugs



SA 567-P4P2 Extension Nipples 2, 3, 4, & 8 in.



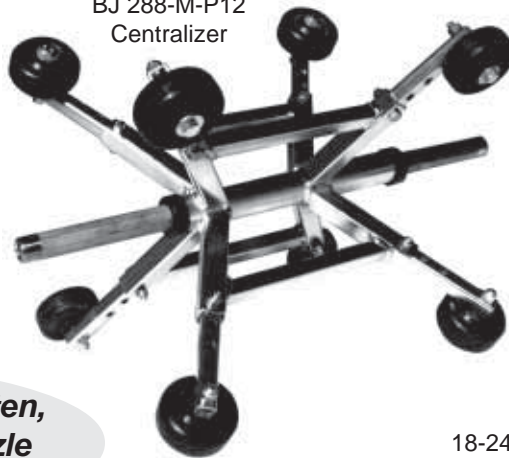
BJ 070-6 Skid Centralizer



AP2 Nozzle Tips



BJ 288-M-P12 Centralizer



Add the Badger 2D Nozzle for Lines with Elbows

Add the RJV, Gopher, Marten, Ferret, or Weasel 2D Nozzle for Small, Straight Lines



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BJV 2D Self-Rotating Nozzles

Controlled Rotation Means Powerful Results!

Use the biggest, most powerful jets possible with your pump. Rotate them to cover the entire inside surface. Powerful, versatile jet angles, eliminate manual twisting of hose can be self-propelled by using stronger back jets controlled rotation for maximum jet power. StoneAge 2-D nozzles use a viscous fluid or centrifugal governor to control rotation rate. Without this important feature, jet quality would be destroyed by turbulence.



Self-Propelled or Tow with Pulling Ring

15 Kpsi, 100 gpm or 20 Kpsi, 60 gpm

6-Port Heads - 2 @ 45°, 2 @ 90°, 2 @ 135°

- Direct Nozzle Tip Insertion or
- Extension Nipple Models

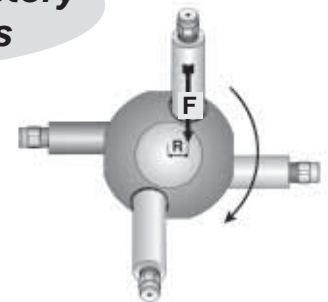
Optional 7-Port Head with 15° Unplugging Port



Clean Tanks, Reactors,
Other Vessels

Clean Pipes,
Drains, Well Screens

Remove Refractory
or Asbestos

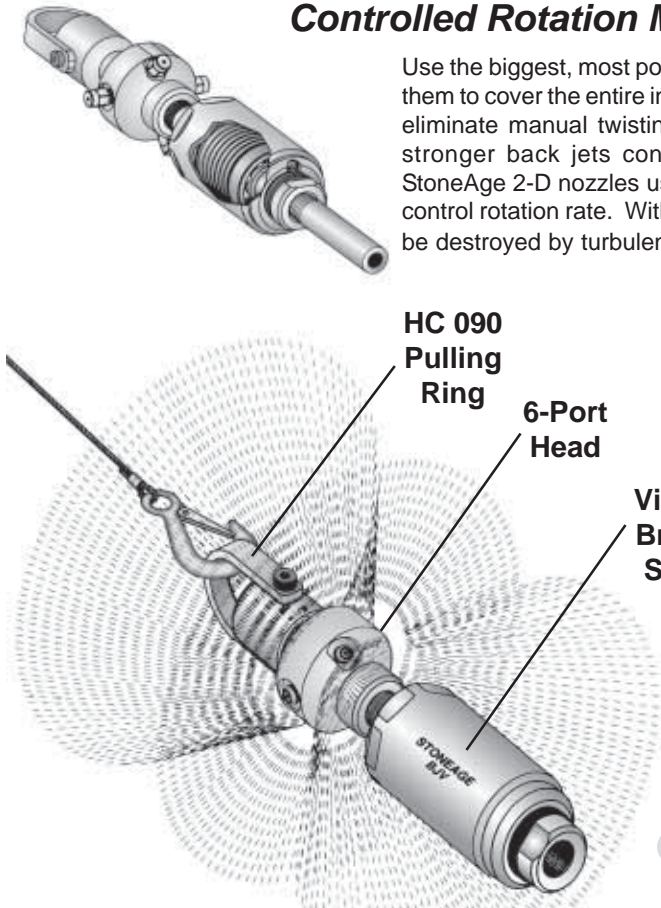


What Makes It Rotate?

Ports in StoneAge nozzle heads are drilled offset (R) from the axis of rotation, providing sufficient mechanical advantage so that the jet reaction force (F) can rotate the unit.

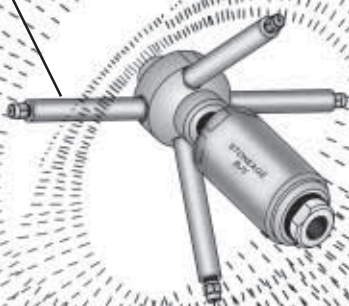
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Clean Stacks, Ducts,
and Tunnels

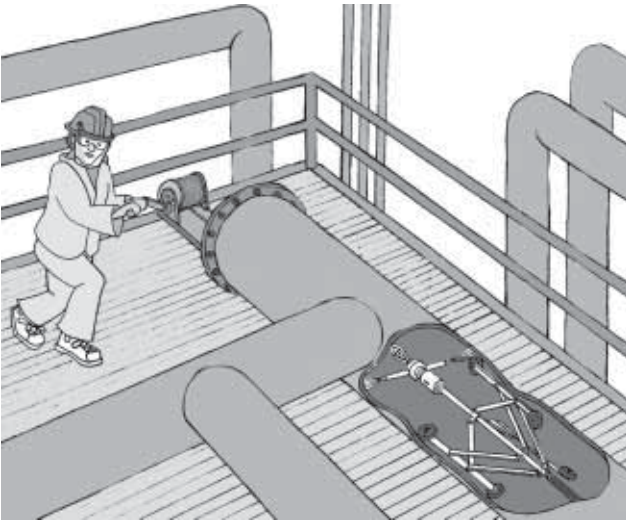
Extension Nipples for
Larger Diameter Pipes
and Vessels



Clean Coker
Pipes and Tubes

Clean Boilers
and Furnaces

BJV 2D Self-Rotating Nozzles



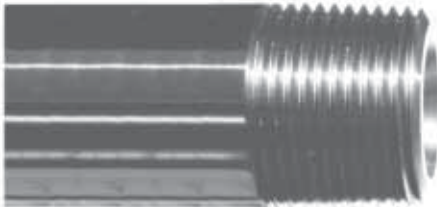
Specifications	BJV-M		BJV-20K	
Maximum Pressure	15 Kpsi	1000 bar	20 Kpsi	1380 bar
Rotation Speed	Fast	40-200 rpm		70-300 rpm
	Slow	5-80 rpm		15-50 rpm
Flow Capacity	100 gpm	380 l/min	60 gpm	230 lpm
Flow Rating, Cv	4.6		2.3	
Inlet Port	3/4 npt		3/4 MP	
Shaft Outlet	3/4 npt		StoneAge J-Shaft	
Weight	8.0 lb	3.6 kg	8.0 lb	3.6 kg
Length	7.25 in.	18.4 cm	8.40 in.	21.3 cm
Standard Head	BJ 044-P4-Rx		BJ 144-P4-Rx	
Diameter	3.0 in.	76 mm	3.0 in.	76 mm
Ports	6 or 7	6 or 7	6 or 7	6 or 7
	1/4 npt	1/4 npt	1/4 npt	1/4 npt
Weight	3.3 lb	1.5 kg	3.3 lb	1.5 kg
Optional Head	BJ 041-P8-Rx		BJ 145-G12-Rx	
Diameter	3.5 in.	89 mm	3.5 in.	89 mm
Ports	6	6	6	6
	1/2 npt	1/2 npt	G12	G12
Weight	5.0 lb	2.3 kg	4.5 lb	2.0 kg

Select a Head for the Right Flow Range!

Flow Range in gpm

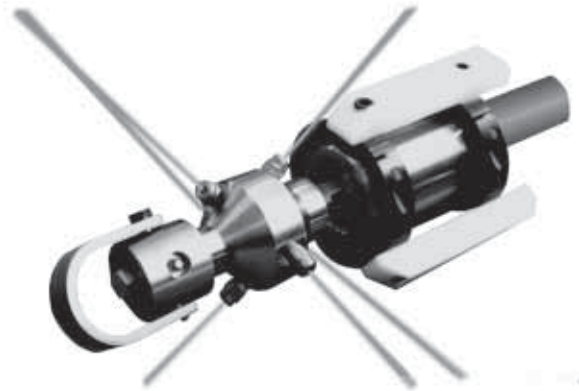
Offset, R=	0.60	0.35	0.20	0.12
BJV-M	10-18	18-32	32-55	55-100
BJV-20K	8-15	15-24	24-40	40-60

15 Kpsi Connections



3/4 npt Connection
1.05" OD Seals with National Tapered Pipe "npt" threads

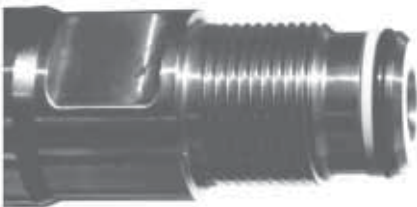
BJV-M



Maintenance Kits & Tools

- **BJ 600-M Service Kit** - HP seal, seat, and 6 oz. viscous fluid
- **BJ 602-M Seal Kit** - High pressure seal and seat
- **BJ 610-M Overhaul Kit** - Bearings, shaft seals, high pressure seal, seat, 6 oz. viscous fluid
- **BJ 612** - Tool for seating BJ 010-D shaft seals, and fill tube

20 Kpsi Connections



J-Shaft Connection Nozzle Head
1.1" OD with o-ring seal

BJV-20K Patent 6,059,202



SA 577-G12P4 Connection Extension Nipples
For 3/4" MP Extension Nipples
Require SA 059 O-Ring
1/4 npt other end

Maintenance Kits & Tools

- **BJK 600 Service Kit** - HP seal, seat, syringe, and 6 oz. viscous fluid
- **BJK 602 Seal Kit** - High pressure seal, seat, O-rings
- **BJK 610 Overhaul Kit** - Bearings, shaft seals, high pressure seal, seat, port screw, 6 oz. viscous fluid
- **BC 410 Syringe** - Used to add viscous fluid
- **BJK 612** - Tool for seating BJ 010-D shaft seals

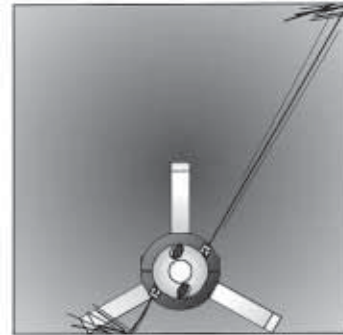
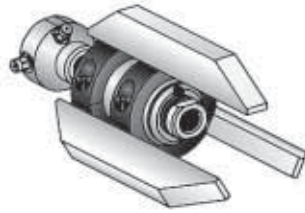


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These centering devices are designed to fit the BJV self-rotating nozzle, but can be adapted to others.

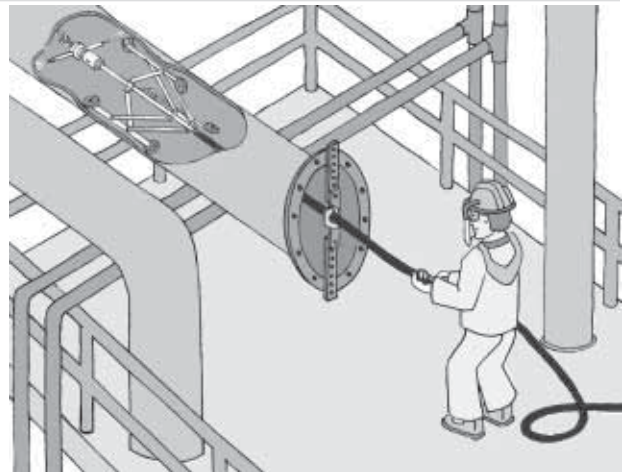
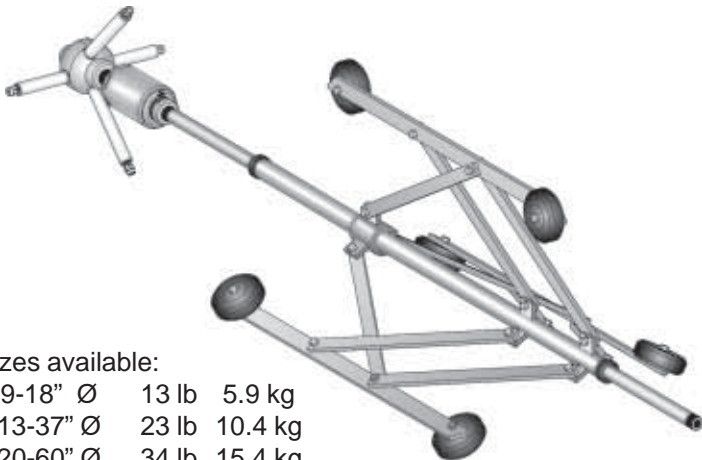
BJ 070 Skid Style

- Works well through elbows
- Fixed size 6-12 in Ø
- Fits 3" OD BJV-M, BJV-20K, & BJV-H
- Change size by replacing skids
- Clamps around BJV
- Approx 5 lb



6-Wheel Collapsing Style

- **BJ 286-P12 3/4 npt, 15 Kpsi**
- **BJ 286-M12 3/4 MP, 20 Kpsi**



- Three sizes available:

Small	9-18" Ø	13 lb	5.9 kg
Medium	13-37" Ø	23 lb	10.4 kg
Large	20-60" Ø	34 lb	15.4 kg

- For straight pipe runs only
- Adjustable aluminum frame
- Easily convertible 15 Kpsi to 20 Kpsi
- With plastic wheels

8-Wheel Welded Frame Style

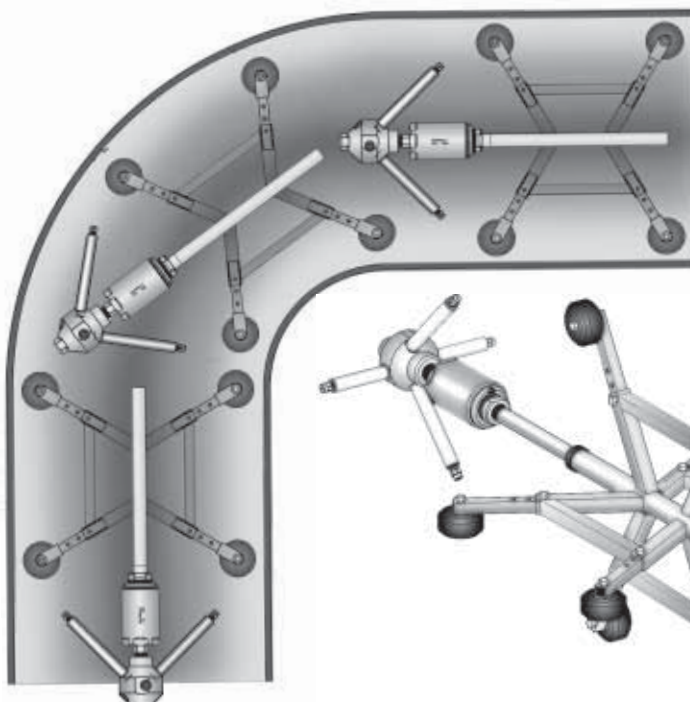
- **BJ 288-P12 3/4 npt, 15 Kpsi**
- **BJ 288-M12 3/4 MP, 20 Kpsi**

- Works well through elbows
- Adjustable steel frame
- Easily convertible 15 Kpsi to 20 Kpsi
- With plastic wheels

- Four sizes available:

Small	17-21" Ø	15 lb	6.8 kg
Medium	22-29" Ø	26 lb	11.8 kg
Large	30-37" Ø	31 lb	14.0 kg
* Extra Large	42-64" Ø	50 lb	22.7 kg

* BJ 289-XL Clamps to BJV, not illustrated

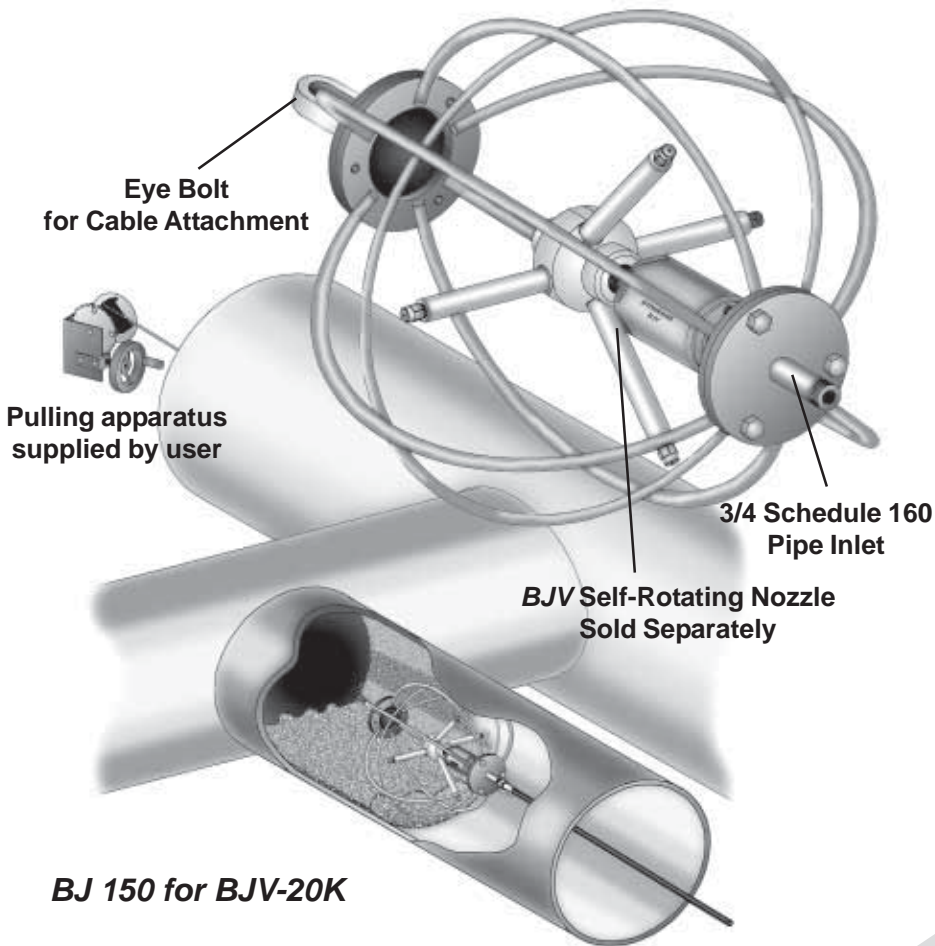


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Pipe Centralizers

Positioning devices are important to get the most out of your rotating nozzles!
Offers more uniform coverage. Allows use of extension nipples to create better jets and reduce standoff.
Call us for further information or applications advice.

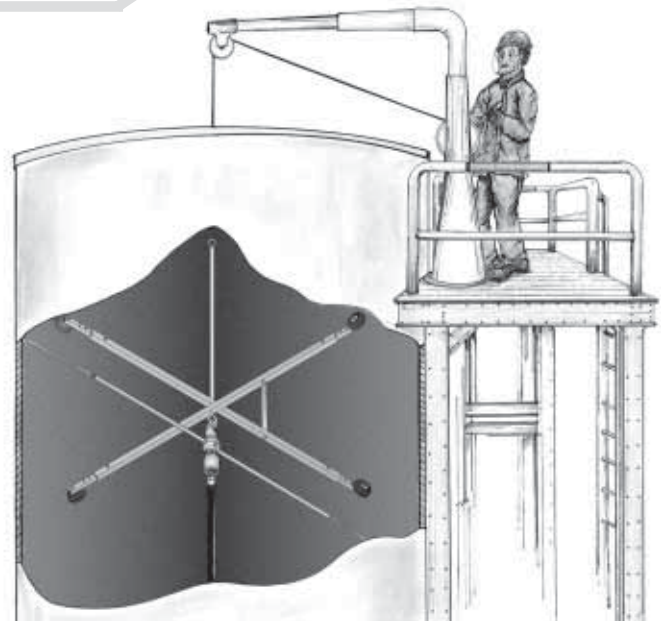


BJ 100-SS Ball Style

- Best to negotiate complex piping arrangements
- Handles built-up debris without stopping rotation
- Fixed 19.5" (49.5 cm) diameter
- Length 24.4" (61.9 cm)
- Maximum 6" extension nipple
- All stainless steel construction
- Weight 14 lb. (6.3 kg)

BJ 097 X Style

- For stacks, and vertical ducts
- Collapsable steel frame fits through manway
- Adjustable diameter
- Extra Large 7 ft to 12 ft Ø 34 lb
- Large 5 ft to 7 ft Ø 28 lb
- Small 3 ft to 5 ft Ø 21 lb
- With 4 in. Ø plastic wheels



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UH-80 40 Kpsi Large Pipe Cleaner

40 Kpsi Power Quickly Removes Hard Linings and Deposits

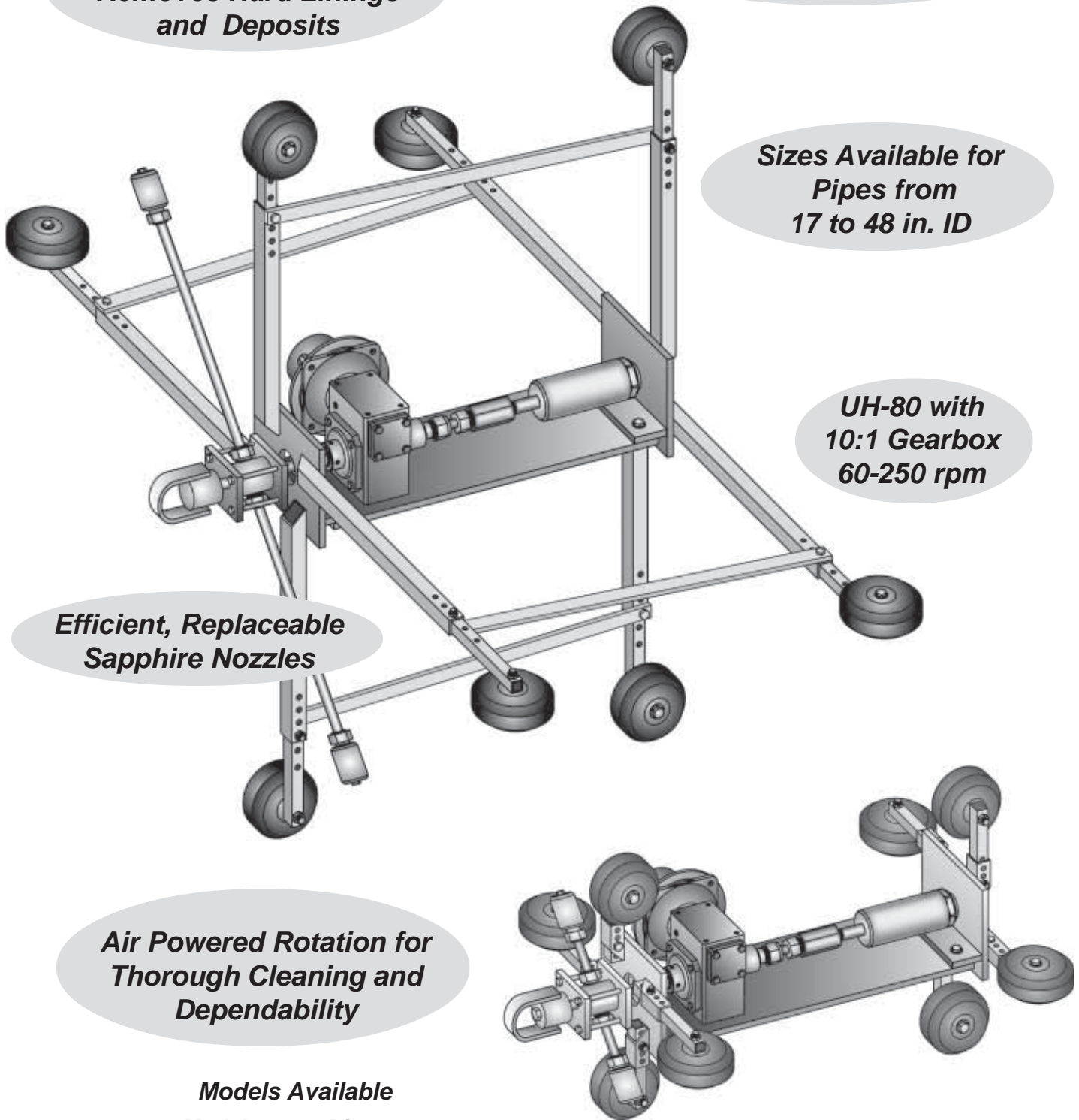
8-Wheel Design Goes Around Elbows

Sizes Available for Pipes from 17 to 48 in. ID

UH-80 with 10:1 Gearbox 60-250 rpm

Efficient, Replaceable Sapphire Nozzles

Air Powered Rotation for Thorough Cleaning and Dependability



Models Available

Model	Diameter
UH 080-XS	16.5 - 18.5 in.
UH 080-S	23 - 28 in.
UH 080-M	28 - 36 in.
UH 080-L	36 - 48 in.

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Line Mole Backout Preventers

Safe Line Mole Operations Require:

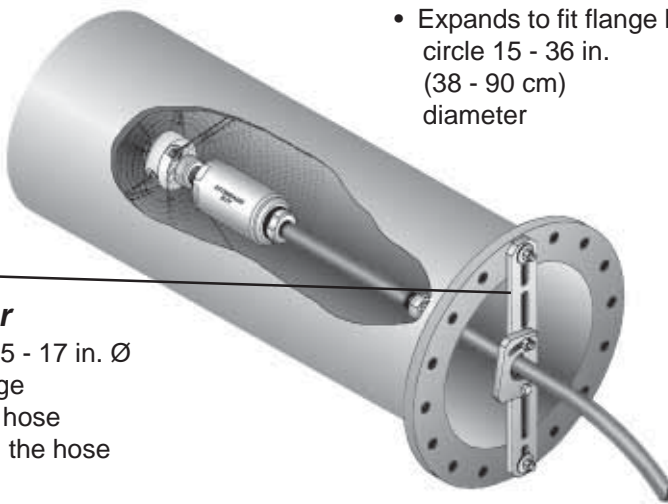
- **Safety Dump Valve** - Located as near the pipe entrance as possible, operated by the person inserting the mole.
- * **Rigid Pipe Stinger** - Sufficient length of rigid pipe to prevent mole from turning around inside pipe.
- **Mole Backout Preventer** - Prevents mole from backing out due to plugged jet, "hydraulic-ing", hose or mole failure.
- **Adequate Personal Protective Equipment**
- Follow "Recommended Practices" of Water Jet Technology Association for safe operation. Available from StoneAge.

Because....

- Jets can plug at any time, causing unbalanced forces, and unpredictable reactions.
- Long hoses store a great deal of energy, which can be released in an unpredictable manner when equipment fails.
- Personal protective equipment designed to protect against splash-back may not offer adequate protection from impact of a line mole and hose flying out-of-control.

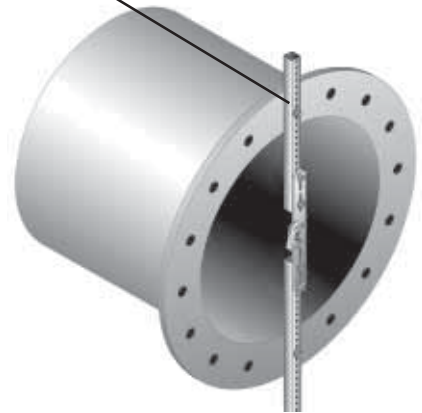
BJ 320 **Backout Preventer**

- Fits flange bolt circle 5 - 17 in. Ø
- Bolts securely to flange
- Accepts 1/4 - 1 in. ID hose
- Not intended to catch the hose



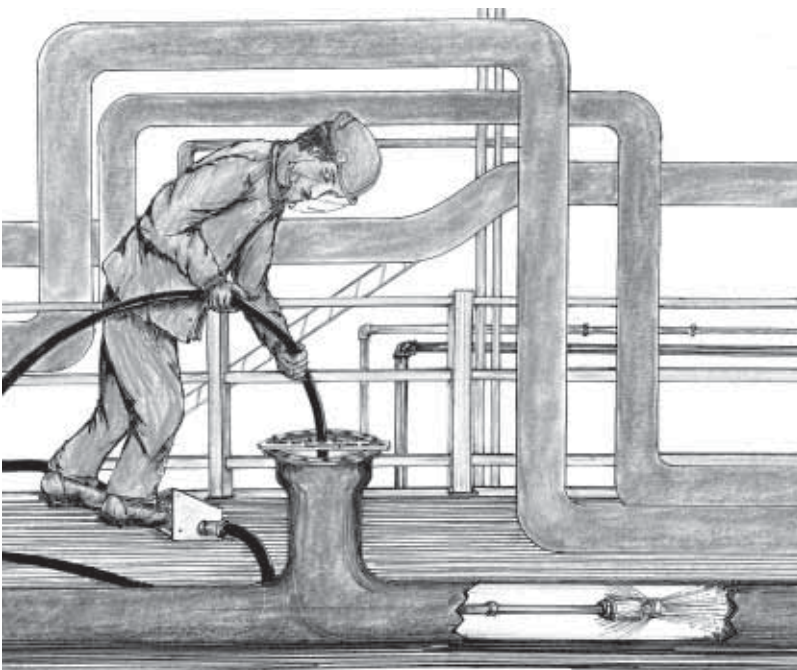
BJ 325 **Extension Kit**

- Expands to fit flange bolt circle 15 - 36 in. (38 - 90 cm) diameter



BJ 340 **No Flange Kit**

- Adapts BJ 320 for secure fit to pipes without flanges
- Fits pipes of 6 - 36 in. Ø



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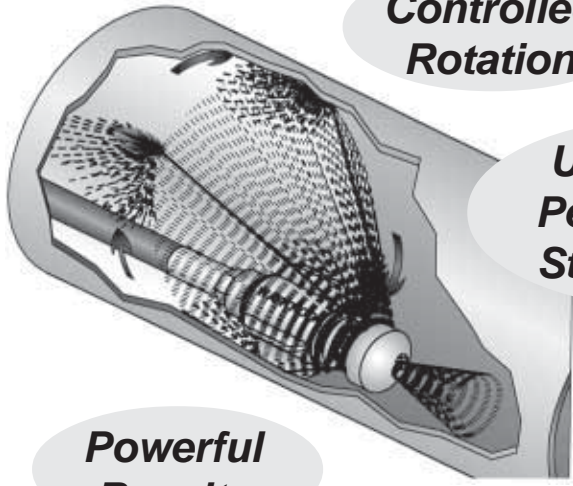
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WARTHOG™

Rotary Sewer Nozzles

Patent 5,964,414



**Controlled
Rotation**

**Unmatched
Performance
Still the Best**

**Powerful
Results**

Fewer, more powerful, rotating jets with off-center boring jet deliver more power to restore easy-draining to sewers.

Warthog power means faster cleaning, less water, less waste, and less-frequent jetting.

Effective on sand, silt, scale, soap deposits, grease, debris, and roots

Dependable performance by StoneAge, making self-rotating waterjet nozzles since 1986.

NEW



WT-3/8"
3 to 4 in. Ø Sewers

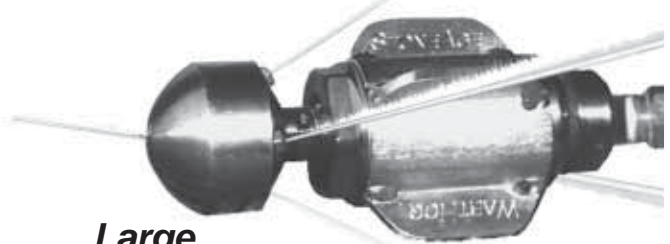
**Small
WS-1/2"-J**



**Small
WS-1/2"**
4 to 8 in. Ø Sewers



**Medium
WH-1/2" and WH-3/4"**
6 to 18 in. Ø Sewers



**Large
WG-1"**
8 to 36 in. Ø Sewers



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WARTHOG™ Sewer Nozzles

Patent 5,964,414

Four Sizes	WT-3/8"		Small WS-1/2" WS-1/2-J		Medium WH-1/2" WH-3/4"		Large WG-1"	
	US	Metric	US	Metric	US	Metric	US	Metric
Flow Range	4-12 gpm	15-45 lpm	7-20 gpm	27-75 lpm	11-40 gpm	42-150 lpm	50-80 gpm	190-300 lpm
Flow Rating		0.75 Cv		1.3 Cv		3.0 Cv		4.6 Cv
Max. Pressure, psi	4,000 psi	275 bar	4,000 psi	275 bar	8,000 psi	550 bar	3,000 psi	200 bar
Inlet Port	3/8 npt		1/2" npt		1/2" or 3/4" npt		1" npt	
Rotation Speed, rpm	300-500		200-500		150-300		150-300	
Length Overall	3.0 in.	7.6 cm	4.4 in.	11.2 cm	7.5 in.	19.1 cm	9.1 in.	23.1 cm
Centralizer Diameter	None		1.9 in.	4.8 cm	3.1 in.	7.9 cm	4.2 in.	10.7 cm
Body Diameter	None		1.8 in.	4.4 cm	1.8 in.	4.4 cm	2.6 in.	6.6 cm
Head Diameter	1.9 in.	4.8 cm	1.7 in.	4.3 cm	2.4 in.	6.1 cm	2.7 in.	6.9 cm
Weight	1.1 lb	.50 kg	2.8 lb	1.3 kg	4.7 lb	2.1 kg	10.9 lb	4.9 kg



FEWER, MORE POWERFUL JETS, ROTATED AT CONTROLLED SPEED FOR STREAK-FREE SEWER CLEANING, GREASE REMOVAL, AND ROOT CUTTING

The City of Durango crew stopped by to show us six 5 gallon buckets full of roots, rocks, and grease removed from the large sewers under Durango's Main Avenue. The only places they don't use their 1" Warthog™, is where they think it's too powerful!



Root Cutting

The Warthog™ cuts a hole in a pine 1x8 in less than a minute, when jetted for 14 gpm at 4,000 psi. So there is no doubt that a waterjet alone can cut roots. But in real sewers other factors are important - like nozzle positioning, technique, and sewer diameter. Do not expect to cut 2 in. diameter roots! The Warthog™ has cut roots up to 1/4 in. diameter, or masses of smaller roots at joints. Bigger roots require water pressures as much as 8,000 psi.



WS 084 Centralizer

The WS 084 Centralizer adds length to prevent the WS-1/2, or WS 1/2-J from reversing direction a serious safety problem - in sewers up to 8" diameter. It also holds the front jet far enough from a plug for best results from the front jet.



Super Centralizer

The Super Centralizer places the Warthog™ closer to the sewer centerline, for more powerful cleaning of the top wall. It also keeps the nozzle back from blockage, allowing the powerful front jet to do its work. The Super Centralizer bolts to the standard centralizer.



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Why Is The WARTHOG™ the Most Powerful Jetting Nozzle Available?



The **Warthog's™** rotating jets follow a helical path down the pipe wall, much like the threads on a bolt. So the entire surface can be cleaned with as few as two powerful jets. The result is streak-free cleaning that passes the most demanding inspection. With stationary jets, the only way to avoid streaks is to use more jets. The more jets in a nozzle; the less power is available for each.



Unlike other rotating jet sewer nozzles, the **Warthog's™** viscous fluid governor slows rotation to about 10 MPH along the wall, preserving jet quality and maximizing cleaning power. Un-governed rotating nozzles can spin as fast as 10,000 rpm. At that speed, the jets are moving nearly 360 MPH along the wall of a 12 inch diameter line. It's too fast, and destroys jet quality and hitting power.



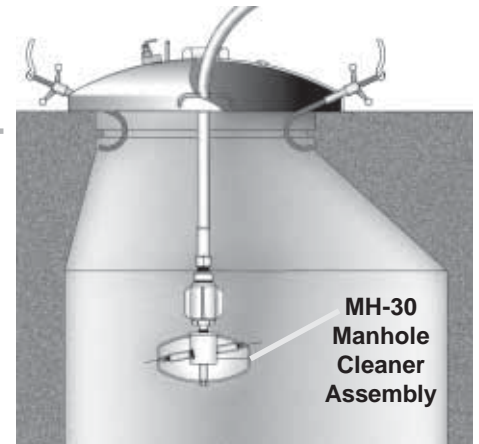
When water flows through a hose, pressure is lost due to friction. As a result most jetters lose 20% and 40% of their power due to hose pressure drop. The effect is easily demonstrated by pumping at maximum throttle, with the hose end restrained, and no nozzle. The pump discharge pressure will be between 400 and 1200 psi - a direct measure of how much pressure is lost due only to flow through your hose. Jet power is directly proportional to pressure.

Jetting of the sewer nozzle is very important for delivery of jet power, because its orifices control the flow and pressures at which the jetting pump will operate. When we jet a **Warthog™** nozzle, we run a computer analysis to be sure we're supplying the most powerful possible jetting.

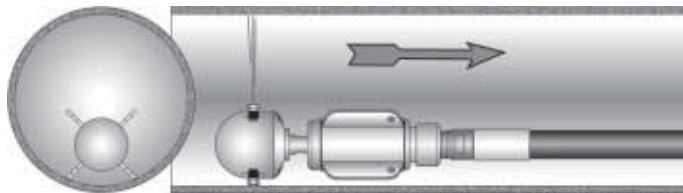
That's why we ask how much flow the customer's pump puts out, at what pressure, as well as hose diameter and length. The computer calculates pressure drop in the hose and in the **Warthog™** nozzle, then calculates jet sizes. With this information, you can be sure that the **Warthog™** will deliver the maximum possible jetting power.

Manhole Restoration

Infiltration of storm water into sewer systems overloads treatment facilities causing effluent flows to exceed permitted levels. Manholes are a major cause for the problem. The **Warthog™ Nozzle** can be used for manhole clean-up preparation for repair, coating, or lining. The nozzle head on the **Warthog™** is replaced with a special head with extension nipples that clean the vertical walls, bottom, and upper areas of the manhole. The hydraulic hose reel on the jetter is used to stroke the nozzle from top to bottom. A heavy steel guard protects the operator from hazardous jets in case the nozzle is moved too far up and out of the manhole.



Mineral or Corrosion Scale Removal



Warthog™ Model WH and **WG** heads at a nominal charge. Sometimes it is necessary to use higher pressure pumps than normal for sewer cleaning. The **Model WH**, operated at 8,000 psi pressure is frequently used for de-scaling.

Mineral deposits or corrosion scale present a particularly difficult cleaning challenge, requiring direct impingement of the waterjet on the sewer wall. The job is accomplished by jetting through the line to the next manhole, then changing the jetting. The usual jets are plugged and two at 90° are used while the hose is retracted. The extra 90° ports can be added to

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WATERJET TOOLS

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WARTHOG™ Trailer Jetter Kits

Get Maximum Versatility & Profit from Your Trailer Jetter with Warthog™ Kits

Warthog™ Residential & Light Commercial Kit

Model	For Trailer Jettors
WKRC-4K	4,000 psi 12 - 20 gpm
WKRC-2K	2,000 psi 25 - 40 gpm

Contents:

Warthog WT-3/8 *	3" & 4" Drains, Laterals
Warthog WH-1/2 or 3/4	6" to 8" Drains, Grease Traps
WT 600 Service Kit	HP Seal Replacement
	Fluid & Syringe for WT-3/8
WH 600 Service Kit	HP Seal Replacement
	Fluid for WH-1/2 or WH-3/4
100 ft 4,000 psi, 3/8" ID Hose, 1/2 npt Inlet Fitting	



Warthog™ Municipal & Industrial Kit

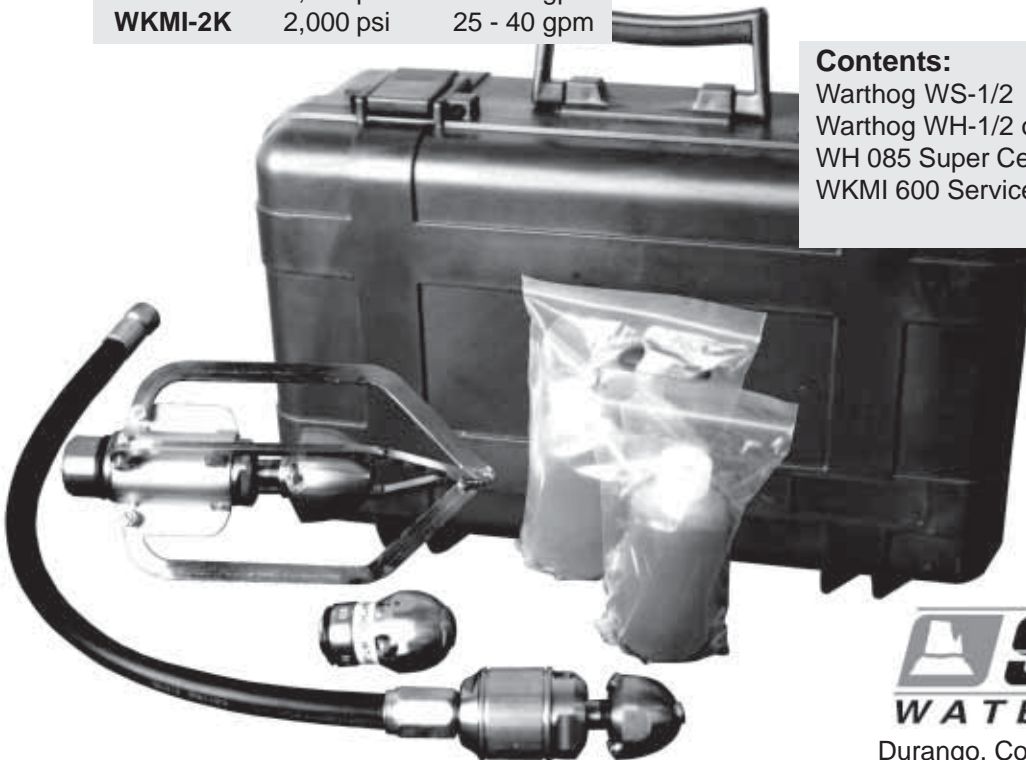
Model	For Trailer Jettors
WKMI-4K	4,000 psi 12 - 20 gpm
WKMI-2K	2,000 psi 25 - 40 gpm

Contents:

Warthog WS-1/2
 Warthog WH-1/2 or 3/4
 WH 085 Super Centralizer
 WKMI 600 Service Kit

For:

4" Drains, Grease Traps
 6" to 18" Drains
 HP Seal Replacement
 Fluid & Syringe



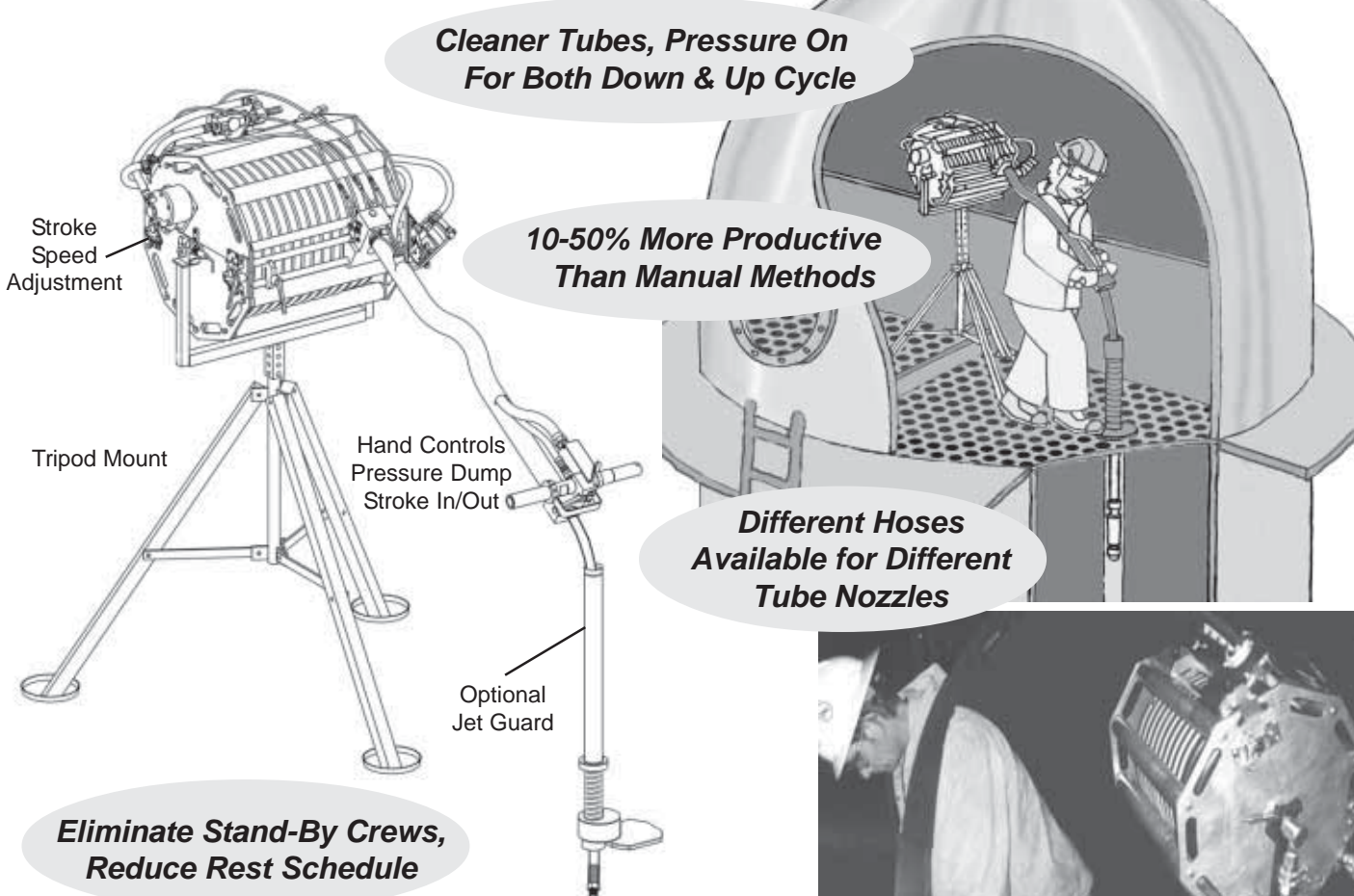
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HRS Air-Powered Hose Reel

The HRS ends struggling with hoses, especially in black liquor evaporators; for safer, more-productive tube cleaning!



Specifications

Max. Pressure	15 Kpsi	1000 bar
Inlet Port	1/2 npt	
Stroke Speed, Max.	3 ft/sec	0.9 m/sec
Air Supply Required	80 psi 30 CFM	5.5 bar 14 l/sec
Weight	175 lb	78 kg

Model	HRS-P8	HRS-P6	HRS-P6	HRS-P6
Hose Option	HRS 350	HRS 370	HRS 376	HRS 378
Min. Tube ID	1.50 in. 38 mm	1.10 in. 28 mm	1.10 in. 28 mm	0.75 in. 19 mm
Hose Connections With Tube Nozzle	1/2 npt MT-P8	3/8 npt MT-P8	1/4 npt FT-P4	1/4 npt EZ-P4
Stroke	45 ft. 21 m	70 ft. 33 m	70 ft. 33 m	70 ft. 33 m
Hose ID	.50 in. 12 mm	.40 in. 10 mm	.33 in. 8 mm	0.25 in. 6 mm
Hose OD	1.0 in. 25 mm	.72 in. 18 mm	.61 in. 16 mm	0.50 in. 12 mm
Flow Rating, Cv	0.70	0.48	0.28	0.16
Flow Capacity	27 gpm 102 lpm	20 gpm 76 lpm	12 gpm 45 lpm	8 gpm 30 lpm

Comes Apart to Fit Through 18 in Manway

Operates Using Compressed Air 30 CFM, 80 psi

Cleans 3/4 to 3 in. ID Tubes Using StoneAge Tube Nozzles*

* Tube Nozzle sold separately - see next page

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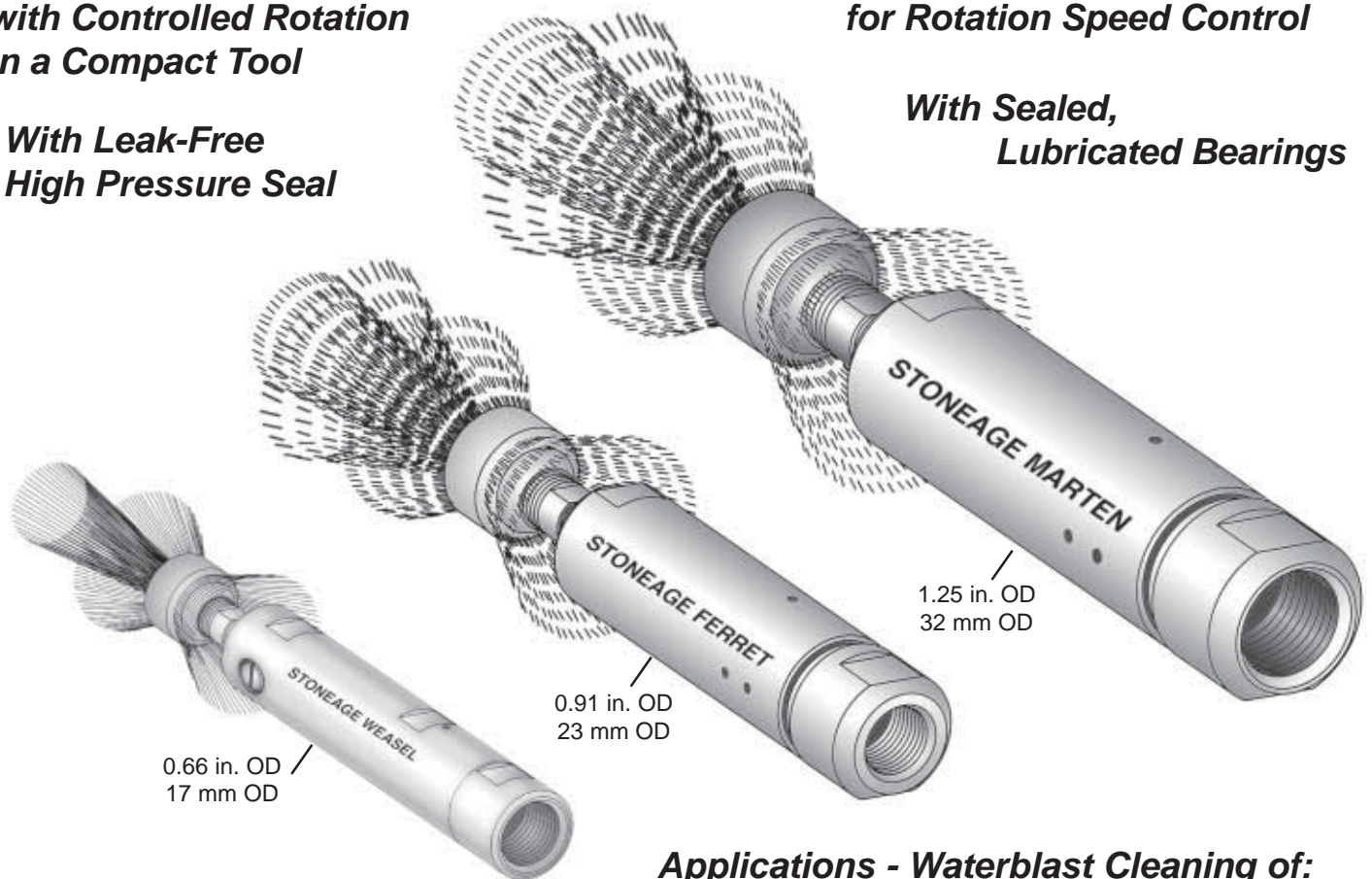
WEASEL, FERRET, & MARTEN Tube Nozzles Patent 5,964,414 & 6,059,202

**Concentrated Cleaning Power
with Controlled Rotation
in a Compact Tool**

**With Leak-Free
High Pressure Seal**

**With Viscous Fluid Governor
for Rotation Speed Control**

**With Sealed,
Lubricated Bearings**



Applications - Waterblast Cleaning of:

- Condenser Tubes • Evaporator Tubes • Reboiler Tubes
- Precipitator Tubes • Catalyst Injection Tubes • Small Diameter Pipelines • Filtrate Lines • Cyclone Separator Lines • Reformer Tubes
- Cooler Tubes • Process Sample Lines • Blowdown Lines • Fuel Lines • Furnace Tubes • Crystallizer Tubes • Lab Sewers • Centrifuge Feed Lines • Slurry Transfer Lines

Specifications	Weasel		Ferret		Marten	
• Tube Nozzle						
• Body Diameter	.66 in.	17 mm	0.91 in.	23 mm	1.25 in.	32 mm
• For Tube Diameters	.88-1.5 in.	22-38 mm	1.1-2.0 in.	29-51 mm	1.5-3.0 in.	38-76 mm
• Inlet Port	1/4 npt		1/4 npt		1/2 npt	
• Head Diameter	.625 in.	17 mm	.875 in.	22 mm	1.25 in.	32 mm
• Length Overall	4.60	120 mm	5.60 in.	140 mm	6.75 in.	171 mm
• Weight	0.7 lb	0.31 kg	1 lb	0.65 kg	1.5 lb	0.68 kg
• Max. Pressure	15,000 psi	1000 bar	15,000 psi	1000 bar	15,000 psi	1000 bar
• Flow Capacity	8 gpm	30 l/min	12 gpm	45 l/min	25 gpm	95 l/min
• Flow Rating	0.27 Cv		0.4 Cv		0.84 Cv	
• Rotation Speed	1,200 rpm		1,000 rpm		300-500 rpm	

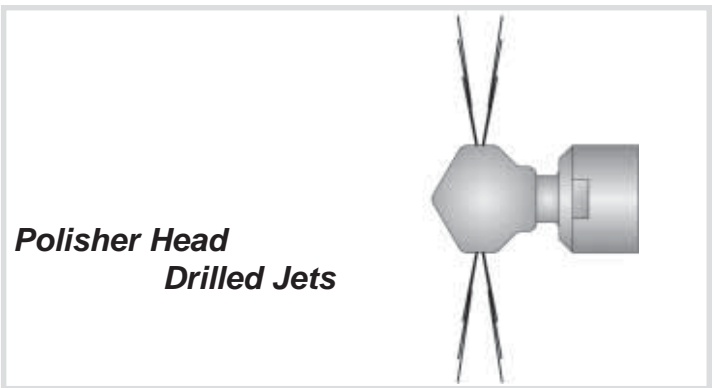
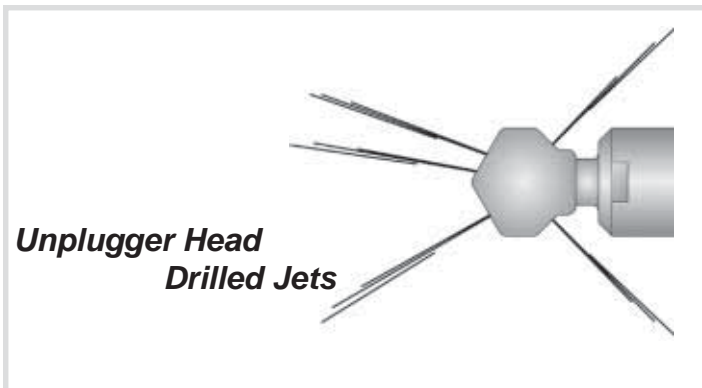
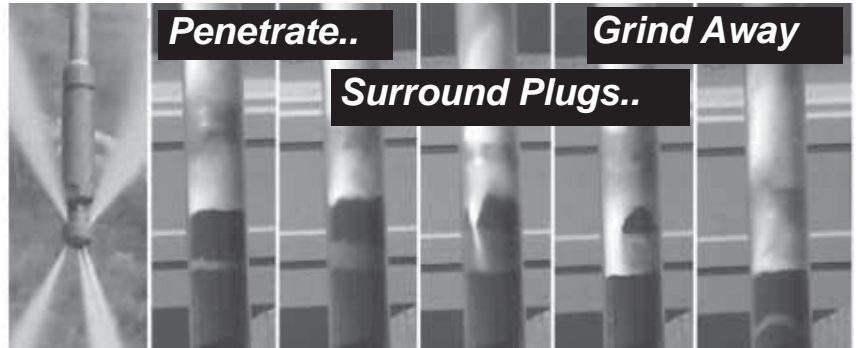
**Controlled rotation outperforms
high speed "spinners"**

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WEASEL, FERRET, & MARTEN Tube Nozzles

**Concentrated Cleaning Power
Controlled Rotation in a Compact Tool**



Weasel EZ 043 5/8 in. OD 17 mm OD	Ferret FT 043 7/8 in. OD 22 mm OD	Marten MT 045 1-1/4 in. OD 32 mm OD
Jetting Options	Jetting Options	Jetting Options
8 gpm - 10 Kpsi 30 lpm - 690 bar	10 gpm - 10 Kpsi 38 lpm - 690 bar	15 gpm - 10 kpsi 57 lpm @ 690 bar
8 gpm - 15 kpsi 30 lpm - 1000 bar	12 gpm - 10 kpsi 45 lpm - 690 bar	20 gpm - 10 kpsi 76 lpm - 690 bar
	10 gpm - 15 kpsi 38 lpm - 1000 bar	25 gpm - 10 kpsi 95 lpm - 690 bar
	12 gpm - 15 kpsi 45 lpm - 1000 bar	15 gpm - 15 kpsi 57 lpm - 1000 bar
Custom drilling available for other flow & pressure combinations		20 gpm - 15 kpsi 76 lpm - 1000 bar
Standard heads have balanced thrust, or slight pull.		25 gpm - 15 kpsi 95 lpm - 1000 bar

Weasel EZ 042 5/8 in. OD 17 mm OD	Ferret FT 042 7/8 in. OD 22 mm OD	Marten MT 042 1 in. OD 25 mm OD
Jetting Options	Jetting Options	Jetting Options
8 gpm - 10 Kpsi 30 lpm - 690 bar	10 gpm - 10 kpsi 38 lpm - 690 bar	15 gpm - 10 kpsi 57 lpm - 690 bar
8 gpm - 15 kpsi 30 lpm - 1000 bar	12 gpm - 10 Kpsi 45 lpm - 690 bar	20 gpm - 10 kpsi 76 lpm - 690 bar
	10 gpm - 15 kpsi 38 lpm - 1000 bar	25 gpm - 10 kpsi 95 lpm - 690 bar
	12 gpm - 15 kpsi 45 lpm - 1000 bar	15 gpm - 15 kpsi 57 lpm - 1000 bar
Custom drilling available for other flow & pressure combinations		20 gpm - 15 kpsi 76 lpm - 1000 bar
Standard heads have balanced thrust, or slight pull.		25 gpm - 15 kpsi 95 lpm - 1000 bar

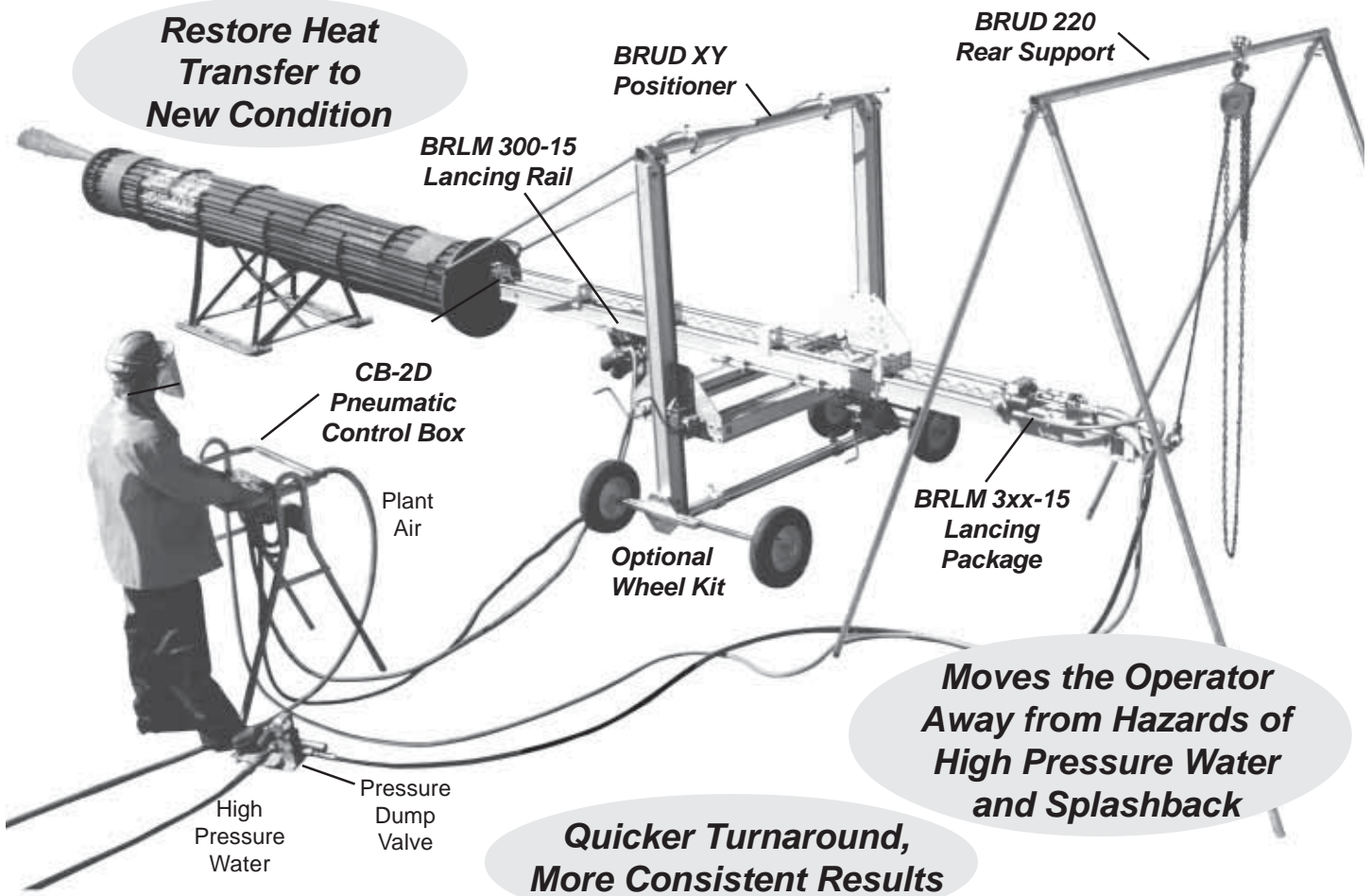
Maintenance Kits & Tools

- **EZ, FT, MT 600 Service Kit** - High pressure seal, seat, O-ring, port screw, syringe, and 6 oz. viscous fluid
- **EZ, FT, MT 602 Seal Kit** - High pressure seal, seat, O-ring
- **EZ, FT, MT 610 Overhaul Kit** - Bearings, shaft seals, high pressure seal and seat, seal holder, port screw, 6 oz. viscous fluid
- **EZ, FT, MT 612 Tool Kit** - Assembly tools, and tool to seat shaft seals



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Rigid Lancing Systems

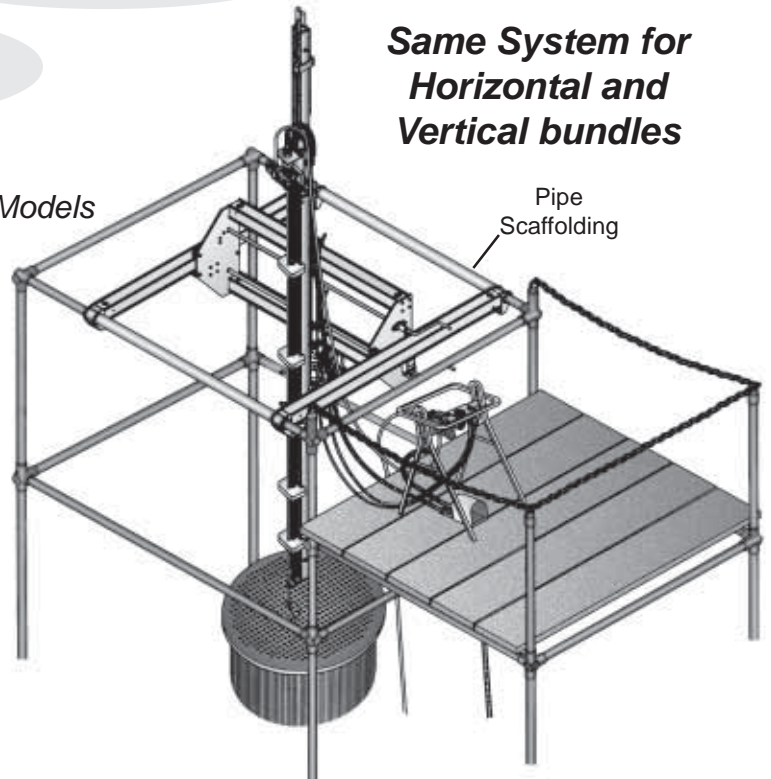


More Powerful, Reliable, and Productive than Manual Methods

Features

- Single, Dual Rotary, or 4 Lance Non-Rotary Models
- Manual or Powered XY Positioner
- 15, 20, or 40 Kpsi Pressure Rating
- Up to 2 ft/sec Travel, 400 lb Thrust
- Up to 60 ft Stroke with Extension Kits
- Lightweight, Corrosion-Resistant
- Air or Hydraulic Power
- Interchangeable Components
- Modular Design

Same System for Horizontal and Vertical bundles



StoneAge rigid Lancing Systems do not include pressure dump valves, air or water supply hoses.

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BRLM Lancing Machine

BOX RAIL & DRIVE

Includes rail, stroke drive, chain, gearbox, and rear lifting bail.

Model #	Rail Length	Stroke Length
BRLM 300-15	15 ft 4.6 m	12.0 ft 3.7 m

RAIL EXTENSION KITS

Model #	Rail Length	Additional Stroke
BRLM 080-05	5 ft 1.5 m	4.8 ft 1.5 m
BRLM 080-10	10 ft 3.1 m	9.5 ft 2.9 m
BRLM 080-15	15 ft 4.6 m	14.0 ft 4.3 m
BRLM 080-20	20 ft 6.1 m	19.0 ft 5.8 m
BRLM 080-25	25 ft 7.6 m	24.0 ft 7.3 m

Rail Extension Kits include rail extension, splice kit, chain, guide blocks, and coil.

LANCING PACKAGES

	Non-Rotary	Single Rotary	Dual Rotary	
Number Lances	Four	One	Two	
Max. Pressure	15 or 20 Kpsi	15, 20, or 40 Kpsi	15, 20, or 40 Kpsi	
Rail Length	1000 or 1380 bar	1000, 1380, or 2760 bar	1000, 1380, or 2760 bar	
Stroke	15 ft 4.6 m	15 ft 4.6 m	15 ft 4.6 m	
Weight	12 ft 3.7 m	12 ft 3.7 m	12 ft 3.7 m	
Lance Sizes	155 lb 70 kg	165 lb 75 kg	170 lb 77 kg	
	1/4 to 9/16 in. OD	1/4 to 9/16 in. OD	1/4 to 9/16 in. OD	
	6.3 to 14.3 mm OD	6.3 to 14.3 mm OD	6.3 to 14.3 mm OD	
15 Kpsi Models	BRLM 370-15	BRLM 310-15	BRLM 340-15	Compressed Air Requirement 80-100 psi, 60-90 cfm 4-Lance 80-100 psi, 80-130 cfm Rotary Hydraulic Option Available
20 Kpsi Models	BRLM 380-15	BRLM 320-15	BRLM 350-15	
40 Kpsi Models	Not Available	BRLM 330-15	BRLM 360-15	

Note: Lances and tips shown here for clarity, but are not included in these packages.

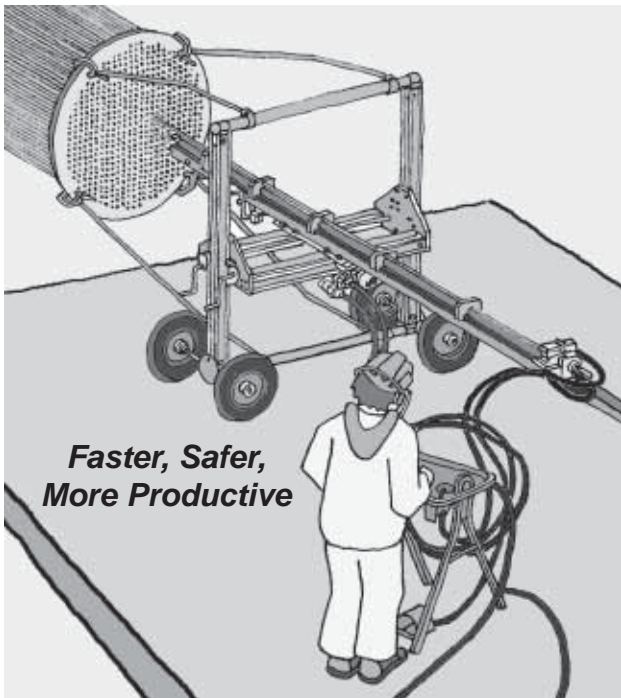
Here's What's Needed:

- BRLM 300-15 Box Rail & Drive
- BRLM 3xx-15 Lancing Package
- BRLM 080-xx Rail Extensions for necessary stroke
- BRUD XY Positioner
- CB-2D Control Box

StoneAge's Lancing Systems have been refined in design to provide dependability, versatility, and easy conversion from one operating pressure level to another. The system handles more waterjet power than a man holding a lance can. It handles waterjet-assisted drill bits for more unplugging power than a flexible lance. It is more consistent and more productive than any other lancing method. The rigid lancing system allows the unit to be returned to operation in less time, making the contractor's service more valuable.

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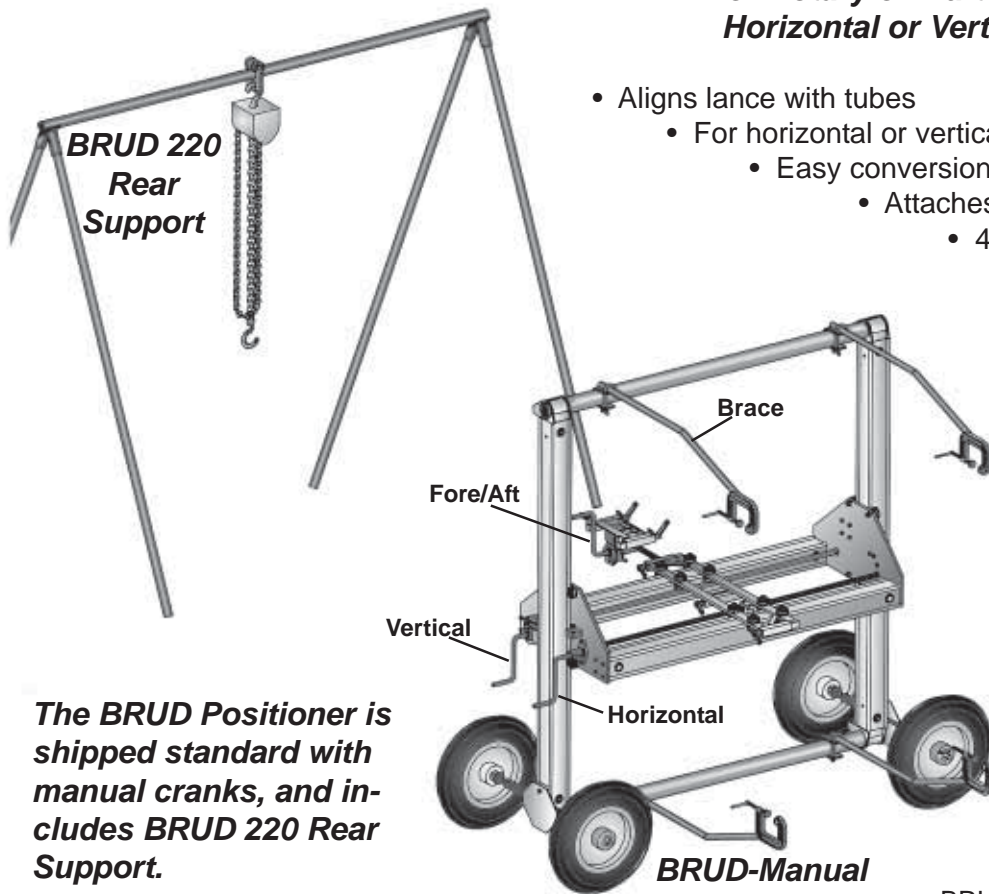
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BRUD Positioner & CB-2D Control Box

BRUD Lancing Machine Positioner

For Rotary or Multi Lancing Machines
Horizontal or Vertical Tube Bundles



- Aligns lance with tubes
 - For horizontal or vertical lancing
 - Easy conversion to air operation
 - Attaches to scaffolding for vertical lancing
 - 4.1 Foot square operating window

The BRUD Positioner is shipped standard with manual cranks, and includes BRUD 220 Rear Support.

Features

- Lightweight, strong tubular frame
- Easy mounting of Lancing Machine
- Easy conversion to air operation
- Corrosion-resistant materials and coatings

BRUD-Manual
with BRUD 200
Wheel Kit

Options

- BRUD 200 Wheel Kit
- BRUD 210 Air Power Kit
Air motors and gearboxes fit in place of hand cranks.
- Requires 30 to 50 cfm at 80 to 100 psi
- BRUD 220 used for Horizontal Lancing Only
- Hydraulic motors available, with no controls or power pack

Weights

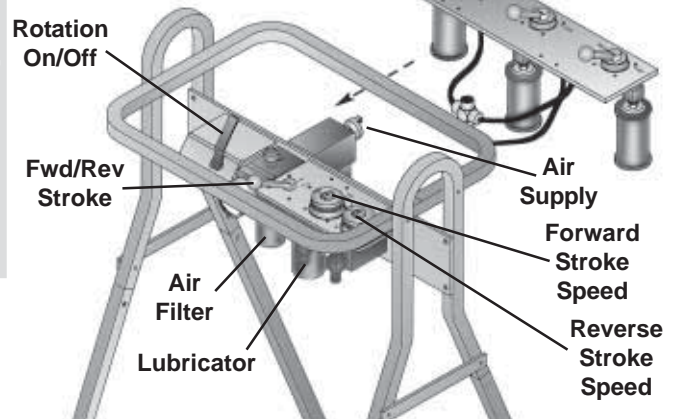
BRUD-Manual	140 lb	64 kg
BRUD-Air	180 lb	82 kg
BRUD 200 Wheel Kit	134 lb	61 kg
BRUD 210 Air Kit	40 lb	18 kg
BRUD 220 Rear Support	96 lb	44 kg
CB-2D (inc. Hoses)	51 lb	23 kg
CB 200 (inc. Hoses)	47 lb	21 kg

Pneumatic Control Systems for Lancing Machines

CB-2D Two-Function Assembly	CB 200 Kit 3 Function Upgrade Required with BRUD 210
Lance Rotation On/Off Forward Stroke Reverse Stroke Stroke Speed Forward Stroke Speed Back 25 ft Air Hoses (3)	BRUD Up/Down BRUD Left/Right Lancing Machine Fore/Aft Attachment Hardware and 25 ft Air Hoses (6)

CB-2D Control Box

CB 200 Kit

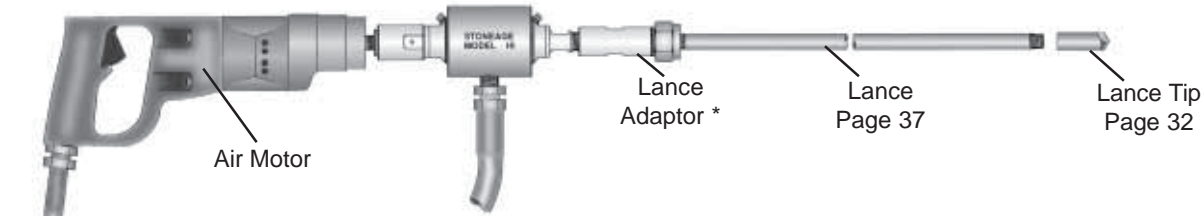


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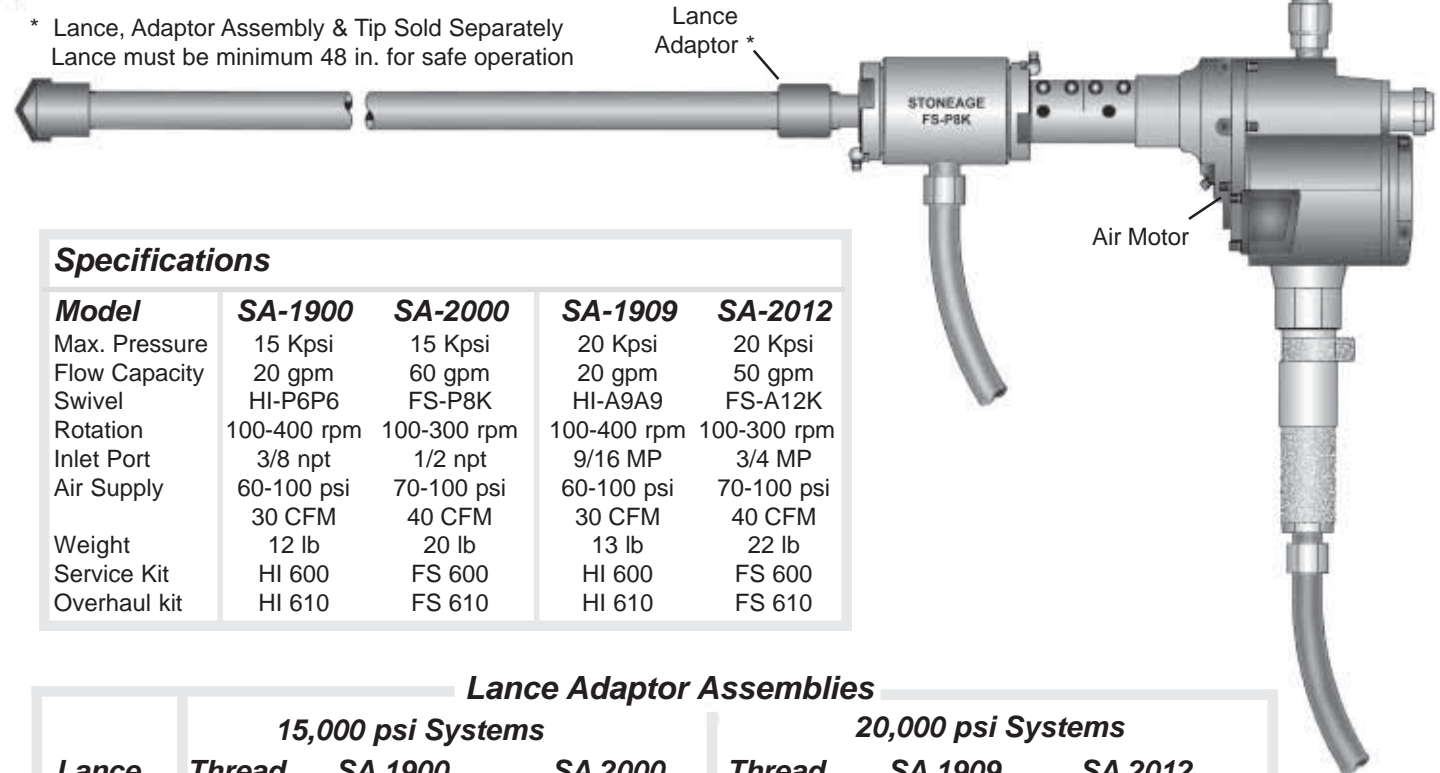
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Air-Powered Hand-Held Lancing Tools

SA-1900 & 1909 Air-Powered Rotary Tool - 20 gpm, 15 Kpsi & 20 Kpsi Models



SA-2000 & 2012 Heavy Duty Air-Powered Rotary Tool 60 gpm, 15 Kpsi & 20 Kpsi Models



* Lance, Adaptor Assembly & Tip Sold Separately
Lance must be minimum 48 in. for safe operation

Specifications

Model	SA-1900	SA-2000	SA-1909	SA-2012
Max. Pressure	15 Kpsi	15 Kpsi	20 Kpsi	20 Kpsi
Flow Capacity	20 gpm	60 gpm	20 gpm	50 gpm
Swivel	HI-P6P6	FS-P8K	HI-A9A9	FS-A12K
Rotation	100-400 rpm	100-300 rpm	100-400 rpm	100-300 rpm
Inlet Port	3/8 npt	1/2 npt	9/16 MP	3/4 MP
Air Supply	60-100 psi 30 CFM	70-100 psi 40 CFM	60-100 psi 30 CFM	70-100 psi 40 CFM
Weight	12 lb	20 lb	13 lb	22 lb
Service Kit	HI 600	FS 600	HI 600	FS 600
Overhaul kit	HI 610	FS 610	HI 610	FS 610

Lance Adaptor Assemblies













Lance	15,000 psi Systems			20,000 psi Systems		
	Thread	SA 1900	SA 2000	Thread	SA 1909	SA 2012
1/4" OD MP Tubing	1/4 x 28	SA 056-P6S4 GP 075-250, 076	NA	1/4 MP	AF 073-M4M9 AF 072-M4, 071-M4	NA
3/8" OD MP Tubing	1/8 npt	SA 056-P6P2 GP 075-375, 076	FS 025-KP2 GP 076-375, 076	3/8 MP	AF 073-M6M9 AF 072-M6, 071-M6	NA
9/16" OD MP Tubing	1/4 npt	SA 056-P6P4 GP 075-562, 076	FS 025-KP4 GP 075-562, 076	9/16 MP	AF 073-M9M9 AF 072-M9, 071-M9	FS 020-KA9 AF 072-M9, 071-M9
3/4" OD MP Tubing		NA	NA	3/4 MP	NA	FS 020-KA12 AF 072-M12, 071-M12
1" OD MP Tubing		NA	NA	1 MP	NA	FS 020-KA16 AF 072-M16, 071-M16
1/8 Sch 80 Pipe	1/8 npt	SA 056-P6P2 GP 075-405, 076	FS 025-KP2 GP 075-405, 076		NA	NA
1/4 Sch 80 Pipe	1/4 npt	SA 056-P6P4 GP 075-547, 076	FS 025-KP4 GP 075-547, 076			
3/8 Sch 160 Pipe	3/8 npt	GP 052-P6P8	FS 020-KP6			
1/2 Sch 160 Pipe	1/2 npt	GP 052-P6P8	FS 020-KP8			



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Lance Tips

Stainless Steel Body, Pipe Threads (15 Kpsi), or Cone & Thread Connection (20 & 40 Kpsi)

   <p>CD Lance Tip - 15 Kpsi & 20 Kpsi <i>For removal of hard plugs from heat exchanger tubes.</i> .31- 1.62 in. (8-41 mm) Diameter Drilled Jets, Recessed Carbide Cutter Jet Styles Available: • 1 @ 5°, 15°, 2 @ 135° • 1 @ 5° & 15°</p>	   <p>TD Lance Tip - 15 Kpsi <i>For economy and versatility.</i> .5- 1.0 in. (12-25 mm) Diameter Drilled Jets, No Carbide Cutter Jet Styles Available: • 1 @ 10°, 20°, & 30°, 2 @ 135° • 1 @ 10°, 20°, & 30° • 2 @ 45°, 2 @ 135° • 2 @ 60° • 2 @ 90°</p>
   <p>TC Lance Tip - 15 Kpsi & 20 Kpsi <i>For plugged tubes or heavy deposits, Maximum jet hitting power.</i> .5- 1.0 in. (12-25 mm) Diameter Single 8° Carbide Nozzle, No Carbide Cutter</p>	   <p>TD Lance Tip - 20 & 40 Kpsi <i>For economy and versatility.</i> .5 & .75 in. (12 & 19 mm) Diameter Drilled Jets, No Carbide Cutter Jet Styles Available: • 1 @ 10°, 20°, & 30°, 2 @ 135° • 1 @ 10°, 20°, & 30° • 2 @ 45°, 2 @ 135° • 2 @ 60° • 2 @ 90°</p>

Part Numbers, Dimensions & Connections

Body Diameter	3/8 in. 9.5 mm	7/16 in. 11.1 mm	1/2 in. 12.2 mm	5/8 in. 15.9 mm	3/4 in. 19.0 mm
Pressure, Max.	15,000 psi 1,000 bar				
	CD 006-S4 TD 006-S4	CD 007-S6 TD 007-S6	CD 008-P2 TD 008-P2 TC 008-P2	CD 010-P4 TD 010-P4 TC 010-P4	CD 012-P4
Lance Threads	1/4" OD 1/4x28	3/8" LP 3/8x24	3/8" LP 1/8 npt	9/16" LP 1/4 npt	9/16" LP 1/4 npt
Pressure, Max.	20,000 psi 1,380 bar Right-Hand MP Threads				
	CD 006-S4 TD 006-S4	CD 007-M6 TD 007-M6	CD 008-M6 TD 008-M6 TC 008-M6		CD 012-M9 TD 012-M9 TC 012-M9
Lance Threads	1/4" MP 1/4x28	3/8" MP 3/8x24	3/8" MP 3/8x24		9/16" MP 9/16x18
Pressure, Max.	40,000 psi 2,760 bar Right-Hand HP Threads				
			TD 008-H6		TD 012-H9
Lance Threads			3/8" HP 3/8x24		9/16" HP 9/16x18

Maximum Power - Jet for flows (gpm) no greater than:

Lance	1/4 HP	3/8 HP	9/16 HP	1/4 MP	3/8 MP	9/16 MP	1/8 Sch 80	1/4 SCH 80
15 ft.	3.1	9.0	24	4.4	20	60	20	50
25 ft.	2.4	6.8	18	3.4	16	45	16	35
35 ft.	2.1	5.8	16	2.9	14	40	14	30



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Equip your Lancing System with dependable, high quality lances

StoneAge offers a limited selection of rigid lances, in the most popular sizes for users of Lancing Systems. These lances are type 304 stainless steel in the 1/8 hard condition, which we recommend for its stiffness and resistance to damage in use. Lances over 25 ft long must be shipped from locations other than Durango. Lances are an expendable item, making it advantageous for users to develop dependable local sources.

Lance Selection, Specify Length

Description	StoneAge Part #	Rating, Kpsi	Thread Connection	OD, in.	ID, in.	Material
3/8 in. OD Tubing	SA 535-P2P2	15	1/8 npt	.375	.245	304 SS 1/8 Hard
9/16 in. MP Tubing	SA 567-P4P4	15	1/4 npt	.563	.312	304 SS 1/8 Hard
3/8 in MP Tubing	SA 537-M6M6	20	3/8 MP LH/RH	.375	.203	304 SS 1/8 Hard
9/16 in. MP Tubing	SA 567-M9M9	20	9/16 MP LH/RH	.563	.312	304 SS 1/8 Hard
3/8 in. HP Tubing	SA 539-H6H6	40	3/8 HP LH/RH	.375	.125	304 SS 1/8 Hard
9/16 in. HP Tubing	SA 569-H9H9	40	9/16 HP LH/RH	.563	.188	304 SS 1/8 Hard

npt - National Pipe Thread MP - Cone & Thread Connection HP - Cone & Thread Connection

Lance Pressure Drop, psi / 25 ft. Length

Lance	MAWP**	OD	ID	Cv	2 gpm	4 gpm	6 gpm	8 gpm	10 gpm	15 gpm	20 gpm
1/8" Sch 80 Pipe	15 Kpsi	.405	.215	0.23	77	310	700	1200	1900	4400	7700
3/8" OD Tubing	15 Kpsi	.375	.245	0.32	40	160	360	650	1000	2300	4000
1/4" Sch 80 Pipe	15 Kpsi	.540	.300	0.52	15	59	130	230	370	820	1500
9/16" Ø MP Tubing	15 Kpsi	.563	.312	0.58	12	48	110	190	300	680	1200
1/2" Sch 160 Pipe	15 Kpsi	.840	.464	1.56	2	7	15	26	41	93	170
1/4" Ø MP Tubing	20 Kpsi	.250	.109	0.04	2300	*	*	*	*	*	*
3/8" Ø MP Tubing	20 Kpsi	.375	.203	0.20	100	410	930	1700	2600	5800	*
9/16" Ø MP Tubing	20 Kpsi	.563	.312	0.58	12	48	110	190	300	680	1200
1/4" Ø MP Tubing	40 Kpsi	.250	.083	0.02	9000	*	*	*	*	*	*
3/8" Ø HP Tubing	40 Kpsi	.375	.125	0.06	1200	4700	*	*	*	*	*
9/16" Ø HP Tubing	40 Kpsi	.563	.188	0.16	150	610	1400	2400	3800	8500	*

**** Pressure ratings depend on materials of construction. * Pressure drop 9000 psi or greater.**

Ordering Notes

- Order the same length lance as the rail length of your StoneAge Lancing System
- For MP and HP connections, anti-vibe glands are recommended where the lance connects to the swivel.
- Consider pressure drop when selecting operating pressures, lances, and lance tips. Jet power deteriorates rapidly if lance pressure drop exceeds 1/3 of pump discharge pressure.



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3D Vessel Cleaning - Freedom From Vessel Entry! _____

OSHA Regulation Title 29 CFR 1910.146 Confined Space Entry Precautions

This regulation protects workers who enter confined spaces from asphyxiation, and other hazards of an environment not normally safe for people to work in. Similar regulations have been adopted by other countries. These common sense rules require that all sources of hazardous materials, powered equipment, and inert blankets be isolated from the vessel. Adequate ventilation must be provided, with backup provisions. Furthermore, rescue personnel and equipment are required in case the workers do become overcome by hazardous materials, or inadequate breathing air. Training of personnel must be completed and documented. These precautions save lives, and are really important for contractors who must do this type work.

These precautions are costly though, making it wise to avoid vessel entry whenever possible. Use of 3D waterblast nozzles can often eliminate the need for vessel entry, allow more thorough cleaning than possible with men inside the vessel, and completion of the job more quickly. Downtime costing \$ 15,000 per hour in lost sales is not unusual for a process plant, making the service more valuable for the contractor who can turn the cleaned vessel back for production in the least downtime. That's what the **Hurricane™** and **CyClean™** 3D Nozzles are designed to do!

Never Put a Man Where a 3D Self-Rotating Nozzle Can Go!



Two 3D Nozzles

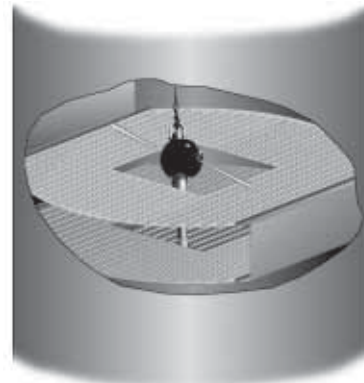
Hurricane™
80 gpm, 12 Kpsi

CyClean™
40 gpm, 20 Kpsi

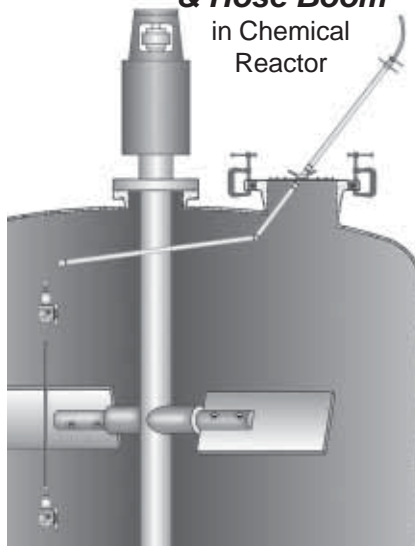


Hurricane™ & Simple Boom
in Cyclone Separator

CyClean™
in Distillation Tower



Hurricane™ & Hose Boom
in Chemical Reactor



CyClean™
in Piping



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Two 3D Nozzles

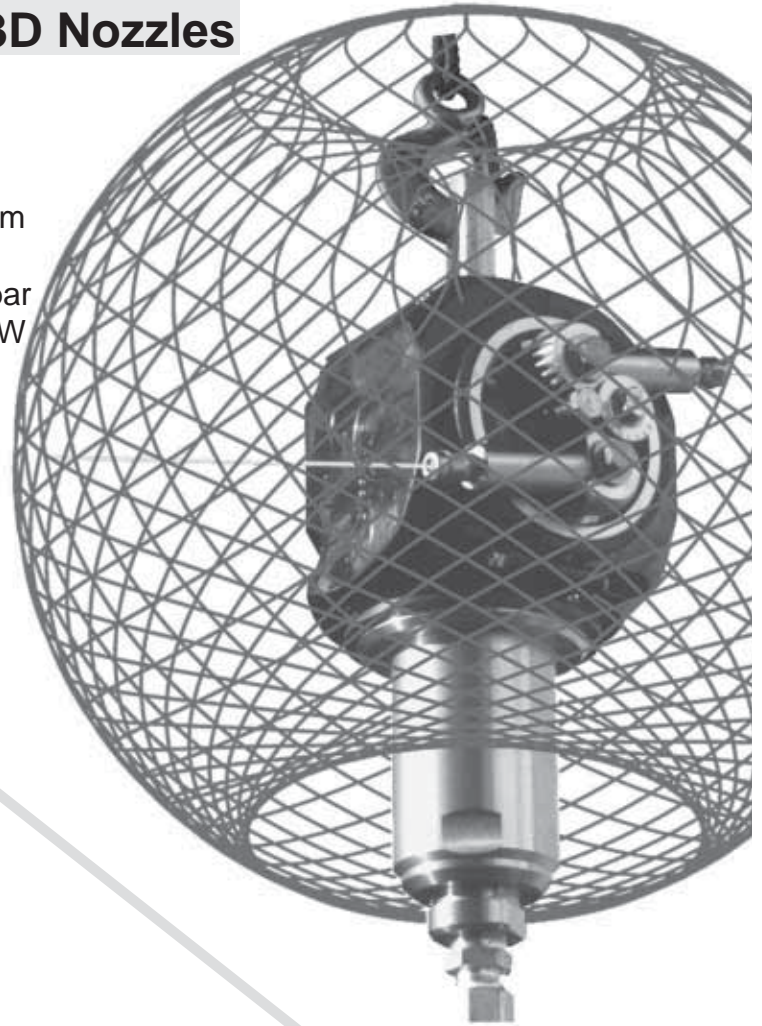
Hurricane™ 3D

High Flow for Large Diameter Vessels

Flow	15 - 80 gpm	55 - 300 lpm
Flow Rating	2.5 Cv	2.5 Cv
Pressure	2,000 - 12,000 psi	140 - 800 bar
Power	18 - 560 HP	13 - 420 KW
Weight	29 lb	13.2 kg
Length	11.3 in.	29 cm
Inlet Connection	3/4 npt	
Cycle Time	2 - 10 min	

Patent 5,947,387

12,000 psi (800 bar) MAWP
80 GPM (300 lpm) Max.
Fits Through 8 in (20.3 cm) ID



CyClean™ 3D

High Pressure for Hard Deposits

Flow	10 - 40 gpm	38 - 150 lpm
Flow Rating	.74 Cv	.74 Cv
Pressure	4,000 - 20,000 psi	275 - 1380 bar
Power	23 - 465 HP	17 - 350 KW
Weight	23 lb	10.4 kg
Length	11.9 in.	30.2 cm
Inlet Connection	3/4 MP Cone & Thread	
Cycle Time	2 - 10 min	

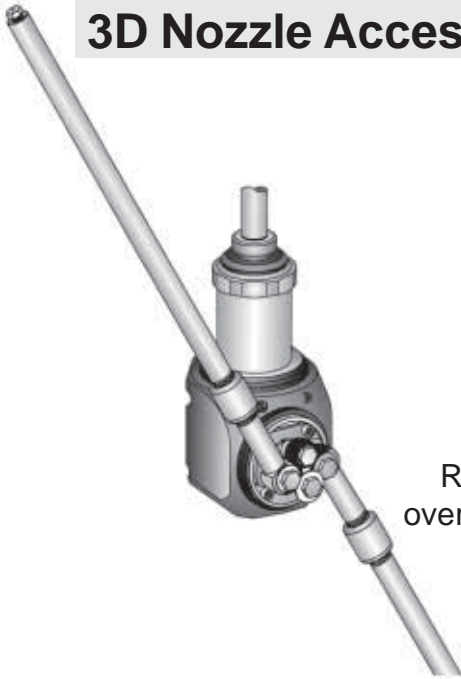
Patents 5,947,387 & 6,059,202

20,000 psi (1380 bar) MAWP
40 GPM (150 lpm) Max.
Fits Through 7 in (17.8 cm) ID

STONEAGE®
WATERJET TOOLS

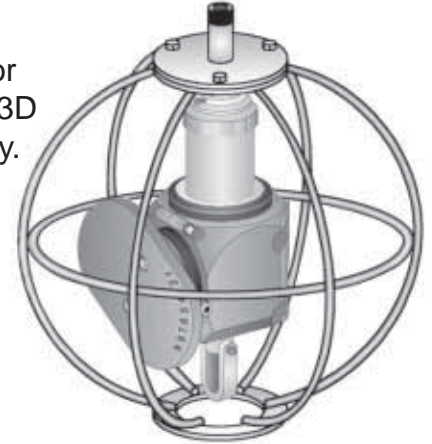
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3D Nozzle Accessories



HC 100 SS Cage

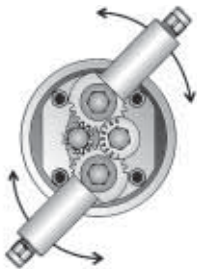
For applications where debris or internal structures might disrupt 3D operation. For *Hurricane*[™] only.



HC 088

Extension Kit

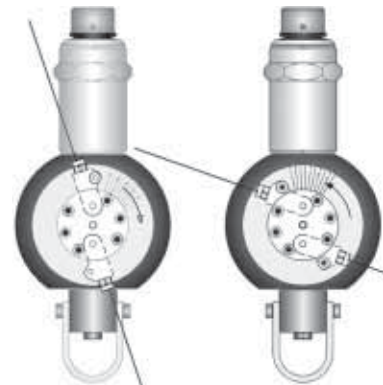
Recommended for vessels over 12 ft diameter. 18 or 36 in. For *Hurricane*[™] only.



Hurricane[™]

Adjustable Arms

Allow StoneAge 3D Nozzles to handle different pumps without expensive replacement parts. Just re-jet, reset, and go to work!



CyClean[™]



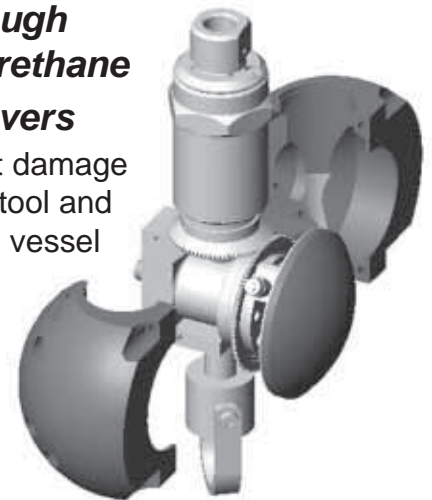
Maintenance Parts, Videos

Service Kits, Factory Assistance

Readily available from US manufacturer

Tough Polyurethane Covers

Prevent damage to the tool and to the vessel

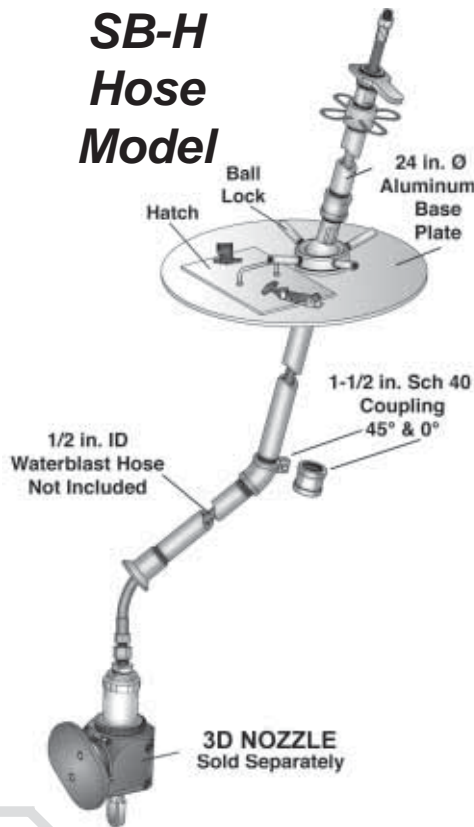
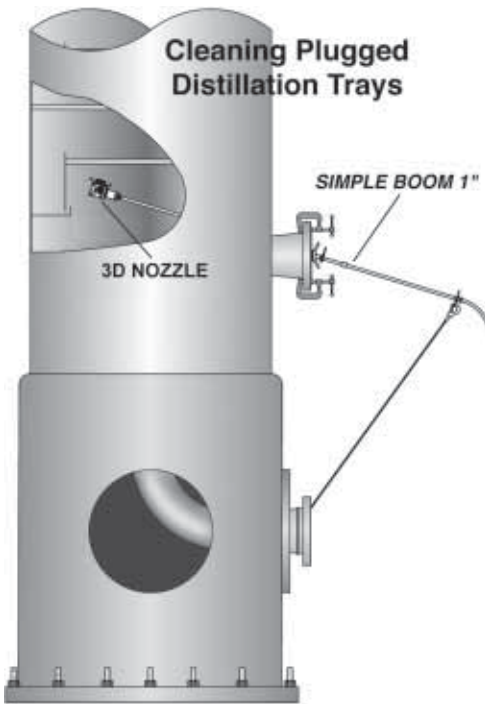


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Positioning Tools

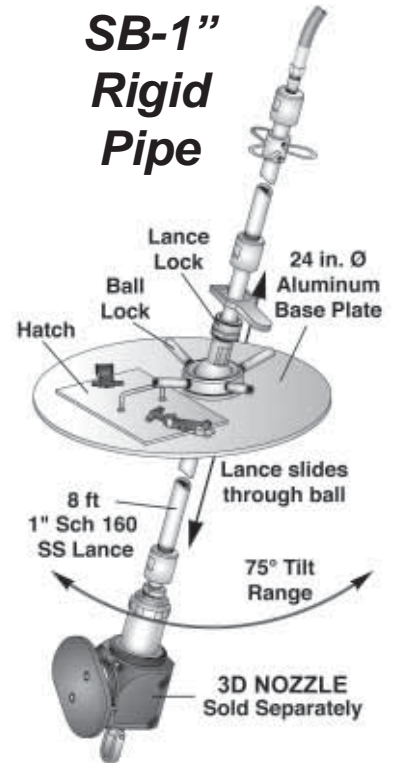
SB-H Hose Model



Simple Boom

Inexpensive and versatile
Hose or Rigid Pipe Model

SB-1" Rigid Pipe



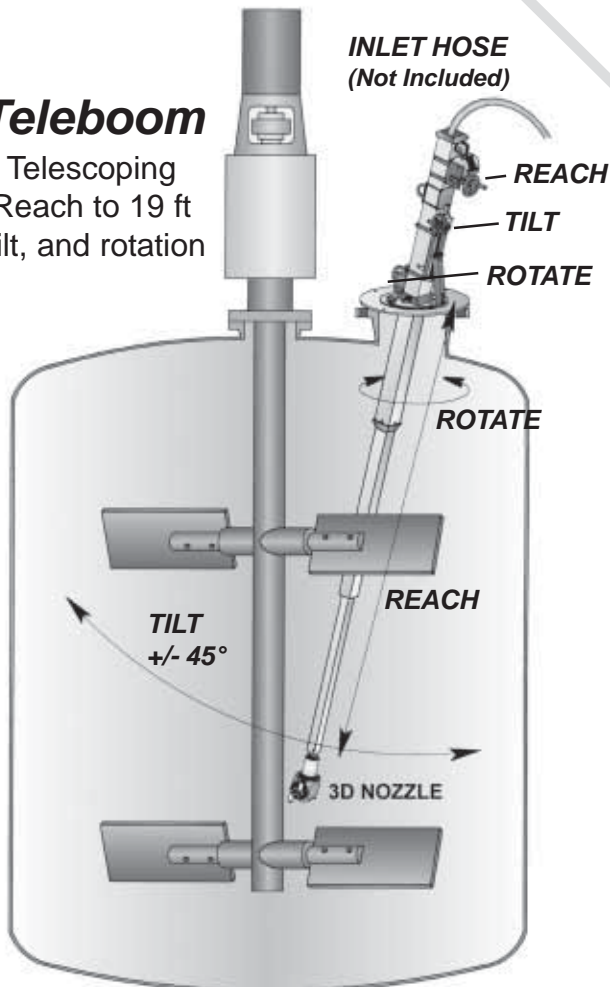
SB 200 Conversion Kit

Uses same Base Plate and Ball Assembly as SB-1". This kit converts SB-1" to SB-Hose, and includes:

- Couplings, hardware
- 1-1/2" Sch 40 Pipe
2, 4, & 8 foot lengths

Teleboom

Telescoping
Reach to 19 ft
Tilt, and rotation



Teleboom	TB-6		TB-8	
Reach, Max.	13.0 ft	4.0 m	19.0 ft	5.8 m
Overall Length				
Collapsed	6.5 ft	2.0 m	8.5 ft	2.6 m
Extended	16.0 ft	4.9 m	22.0 ft	6.7 m
Weight	120 lb	54 kg	130 lb	59 kg
Hose Connection	3/4 npt	3/4 npt		
Capacity	100 gpm	380 lpm	100 gpm	380 lpm
Max. Hose ID	3/4 in.	19 mm	3/4 in.	19 mm
Max. Pressure	15 Kpsi	1,000 bar	15 Kpsi	1,000 bar
	Depends on hose		Depends on hose	

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Boiler, Furnace, Big Tank Cleaning

Big Spaces.....Difficult Manual Access.....Need Lots of Waterjet Power

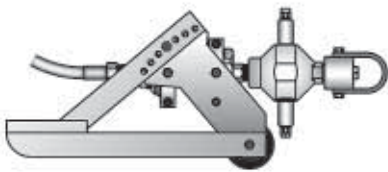
Power plants rely on steam generation to drive generating turbines, with coal fueled boilers commonly experiencing fouling from fly ash. Steam generation is also common in garbage incineration, waste fuel incineration, cogeneration, and waste heat recovery in refineries and chemical process plants. Deposits resulting from waste fuels are frequently a problem that creates an opportunity for waterblast contractors. In pulp plants, black liquor incineration is an example of waste fuels which make troublesome deposits in the boiler.

As deposits build on the steam generating tubes, heat transfer is reduced, allowing increasing energy loss out the stack. Cleaning is commonly done on an annual, or bi-annual basis to restore energy efficiency. If it is necessary to physically enter the furnace, then several days cool-down time is required. Then restart requires another slow cycle to prevent thermal shock damage to refractory and tubed sections. Where the cleaning job can be done without entry, these slow thermal cycles can be minimized, allowing the unit to return to revenue-generating operation sooner. Smart waterblast contractors use StoneAge equipment to replace men-in-the-furnace, making their services more valuable.

Selected Tools for Power Plant Maintenance For 10,000 psi Pumps - 80 - 200 gpm

BJ 120 De-Slag Skid

Cleans horizontal tubes in Super-heater and Economizer sections



BJV-H, BJ 070 Line Mole Skid

Cleans piping
6 - 16 in. ID



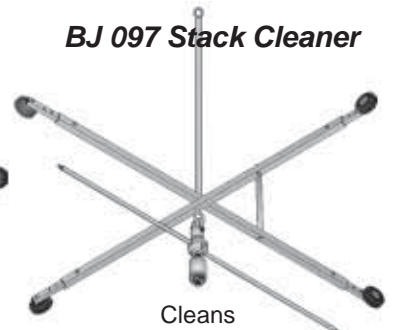
BJ 088 Centralizer

Cleans piping
18 - 40 in. ID



BJ 097 Stack Cleaner

Cleans
7 - 12 ft ID
Stacks



CST Cable Swivel Tool

Cleans Backpass sections
Pendant Tubes and Cyclones



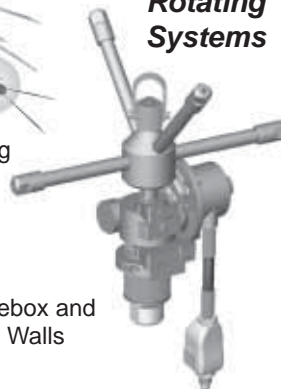
Barracuda Hand Held Gun Nozzle

For miscellaneous cleaning



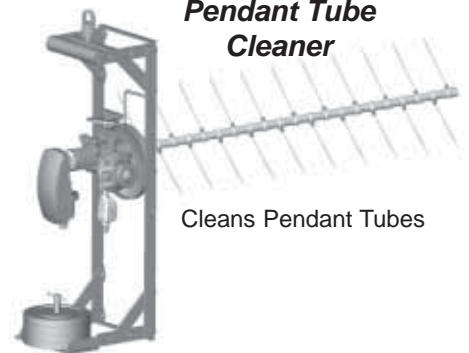
SM-Air & SM-2D Rotating Systems

For firebox and
Water Walls



SM-200 Pendant Tube Cleaner

Cleans Pendant Tubes

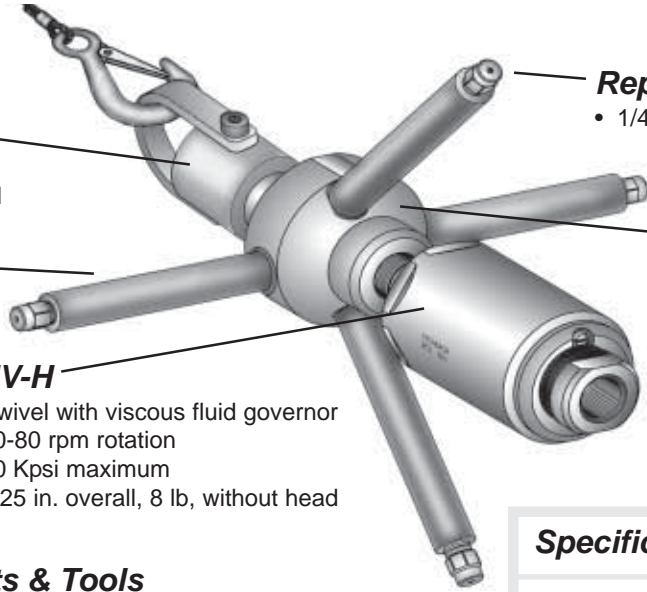


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BJV-H 2D Self-Rotating Nozzle

Up to 200 GPM Flow Capacity for Boilers, Furnaces, Vessels, Tanks, Cokers
Handles up to 1,000 HP of Pumping Capacity for the REALLY BIG JOBS



HC 090 Pulling Ring
• Heavy duty model

SA 256-P8P4 Extension Nipple
• Improves jet quality, see Pg. 43

BJV-H
• Swivel with viscous fluid governor
• 30-80 rpm rotation
• 10 Kpsi maximum
• 7.25 in. overall, 8 lb, without head

Replaceable Nozzle Tips
• 1/4 npt thread - Pg. 44 - 45

BJ 041-P8 Nozzle Head
• 3-1/2 in. OD - Accepts 1/2 npt extension nipples
• Operates with 2,4, or 6 nozzles in balance
• 2 ports at 45°
• 2 ports at 90°
• 2 ports at 135°

Maintenance Kits & Tools

- **BJ 600-H-S Service Kit** - High pressure seal, seat, and 6 oz. viscous fluid
- **BJ 610-H-S Overhaul Kit** - Bearings, shaft seals, high pressure seal, 6 oz. viscous fluid
- **BJ 612 Tool Kit** - Assembly tools to seat shaft seals, and fill tube

Specifications	BJV-H	
Maximum Pressure	10 Kpsi	690 bar
Rotation Speed	30-80 rpm	
Flow Capacity	200 gpm	760 l/min
Flow Rating, Cv	7.5	
Inlet Port	1 npt	

Big Flow Waterblaster

We don't know what to call it! Originally built as a Boiler Floor Washer, to enter a pulp plant waste boiler at the smelt spouts, contractors have found many other uses for this system. It's used to clean anything big with limited access.

Clean Boiler Radiant Section

Clean Large Vessels with Restricted Access

Clean Pulp Plant Boiler Enter Smelt Spouts

Clean Coke from Refinery Vessels

**Up to 300 gpm
10 Kpsi MAWP
with SM-P20 Swivel**



Specifications	BFW	
Maximum Pressure	10 Kpsi	690 bar
Rotation Speed	10-50 rpm	
Stroke	14.2 ft	4.3 m
Flow Capacity	8-35 ft/min	2.4-10.7 m/min
Flow Rating, Cv	300 gpm	1140 l/min
Inlet Port	10	1-1/4 npt

Adjustable Up/Down Both Ends of Cart

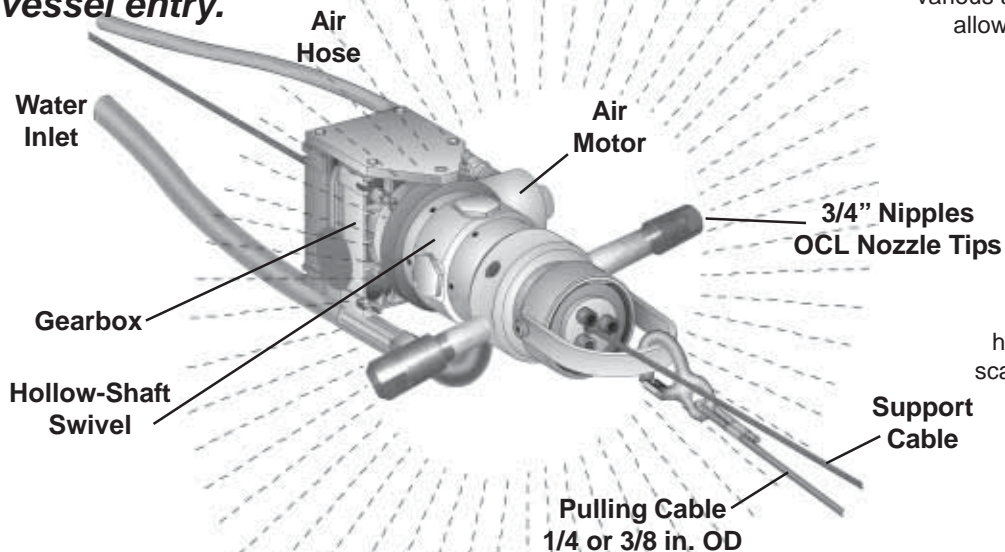
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CST Cable Swivel Tool

Patent 6,085,994

A hollow shaft allows the CST to slide on a stretched cable through restricted spaces without vessel entry.



The CST slides on a stretched cable by jet reaction force or by use of a pulling cable. Rotation is powered by an air motor. With a versatile 6-port head, ports can be selected at various angles, with one option that allows the tool to pull itself. The extension nipples improve jet quality for hard-hitting power at relatively long jet standoff distances.

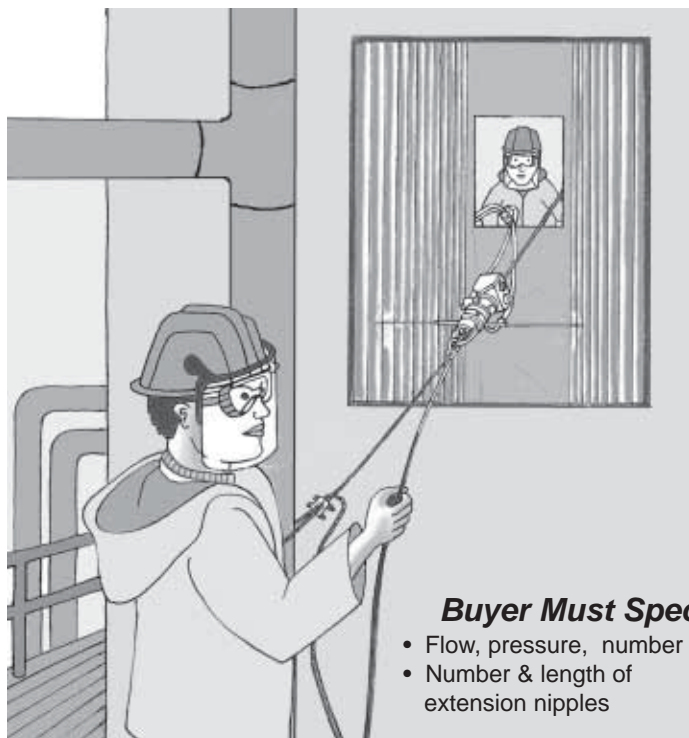
The CST can be used in boilers and furnaces, replacing slow, dangerous hand-held guns operated on scaffolding inside the furnace.

Applications

- Boilers
- Furnaces
- Reformers
- Cokers
- Precipitators
- Tanks
- Ducts
- Stacks

Oscillating Rotation Option

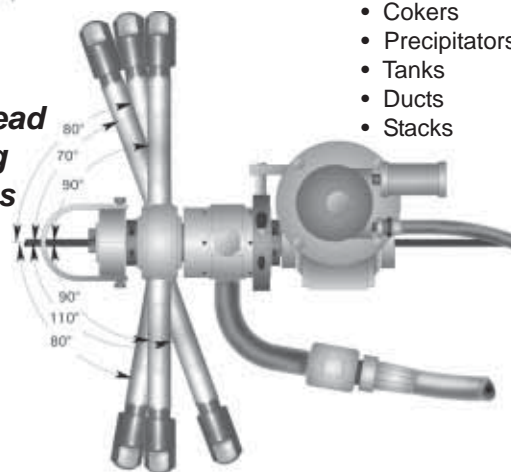
Add-on controls increase productivity by keeping jets aimed at parallel vertical targets, like vertical tube banks - see below



Buyer Must Specify

- Flow, pressure, number of jets
- Number & length of extension nipples

6-Port Head Jetting Options



Specifications

CST-Air

Max. Pressure	10 Kpsi 690 bar
Rotation Speed	5-60 rpm
Inlet Ports (2)	1 npt
Outlet Ports	3/4 npt
	2 @ 90°, 2 @ 80°
	1 @ 70° & 1 @ 110°
Flow Capacity	170 gpm 640 l/min
Flow Rating	5.2 Cv
Weight	46 lb 21 kg
Length Overall	21 in. 53 cm
Fits Through, Ø *	16.5 in. 42 cm

* Depends on extension nipple length

Maintenance Kits & Tools

- **CST 600 Service Kit** - One set high pressure seals, o-rings, and backup rings for swivel
- **CST 610 Overhaul Kit** - Bearings, high pressure seals, backup and face rings, and shaft seals for swivel

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SM High Flow Rotating Nozzles

For Cleaning Boilers, Furnaces, Large Tanks and Vessels!

SM-Air

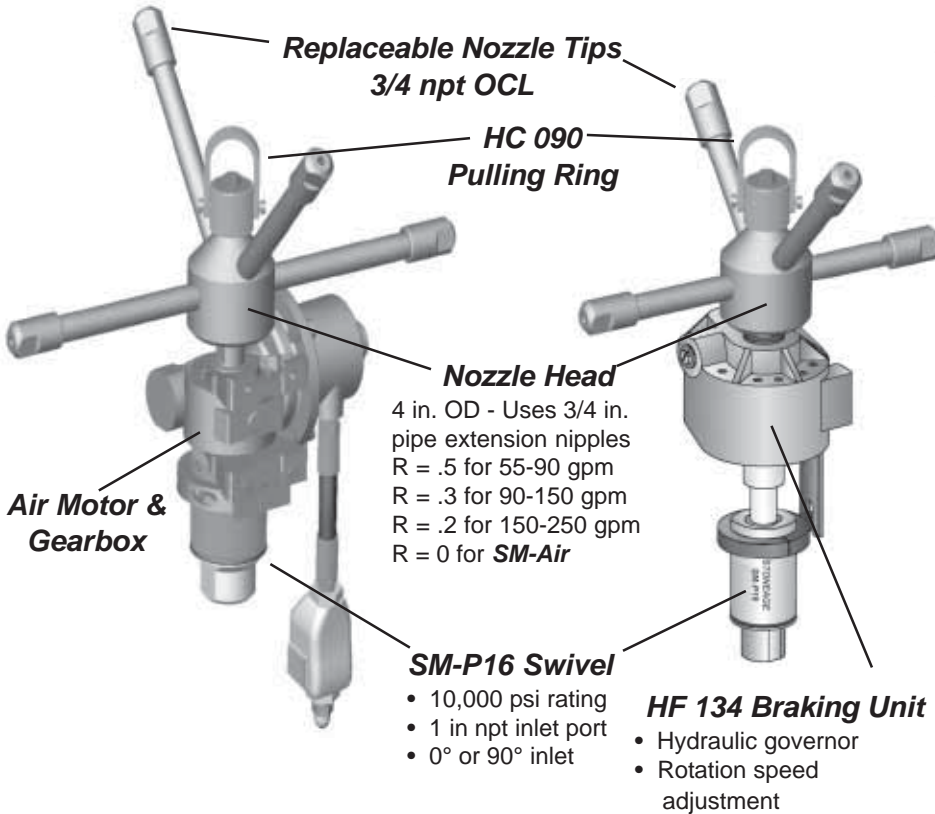
SM-P16 Swivel with Gearbox & 1-1/2 HP Air Motor

SM-2D

SM-P16 Swivel with Hydraulic Governor

300 gpm - 10 Kpsi

The 300 gpm SM-P16 Swivel offers big power in a rotating jet tool for boilers, furnaces, or big tanks. Whether you choose the self-rotating SM-2D, or air powered SM-Air, these tools can handle the big flows required to project waterjet power over a long distance.



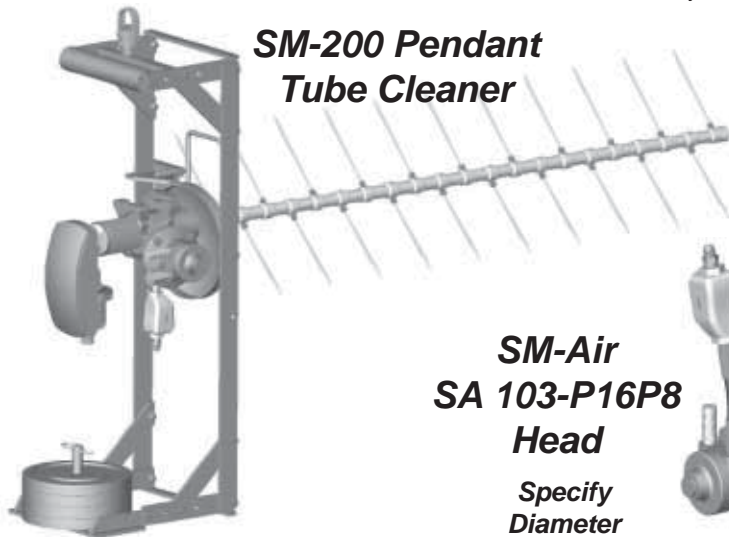
4 in. OD - Uses 3/4 in. pipe extension nipples
 R = .5 for 55-90 gpm
 R = .3 for 90-150 gpm
 R = .2 for 150-250 gpm
 R = 0 for SM-Air

- 10,000 psi rating
- 1 in npt inlet port
- 0° or 90° inlet

- Hydraulic governor
- Rotation speed adjustment

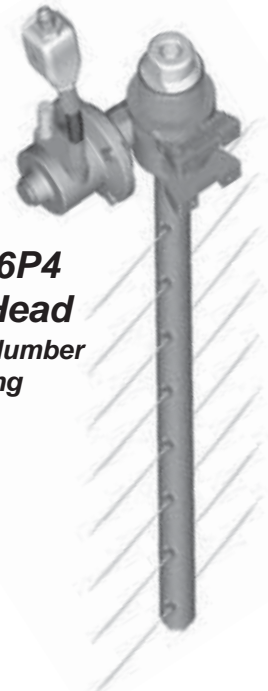
Specifications	SM-Air	SM-2D
Maximum Pressure	10,000 psi	690 bar
Rotation Speed	10-50 rpm	
Flow Capacity	300 gpm	1140 l/min
Flow Rating	13 Cv	
Inlet Port, female	1 npt	
Extension Nipples	0° or 90°	
	1/2 Pipe	
	6 in.	15.2 cm
Nozzle Ports	1/4 npt	
Pressure Drop at 200 gpm	240 psi	17 bar
Length Overall	25 in.	64 cm
Weight - SM-Air	78 lb	35.4 kg
Weight - SM-2D	90 lb	40.8 kg

SM-200 Pendant Tube Cleaner



SM-Air
 SA 103-P16P8
 Head
 Specify Diameter of Jet Path

SM-Air
 SA 104-x P16P4
 Stinger Bar Head
 Specify Length x, Number of Jets, Spacing



Maintenance Kits & Tools

- SM 600-P16 Service Kit - HP seal, seat, and O-rings for SM-P16 Swivel
- SM 610-P16 Overhaul Kit - Bearings, shaft seals, high pressure seal, seat for SM-P16 Swivel
- SM 612 Tool Kit - Assembly tool to seat shaft seals

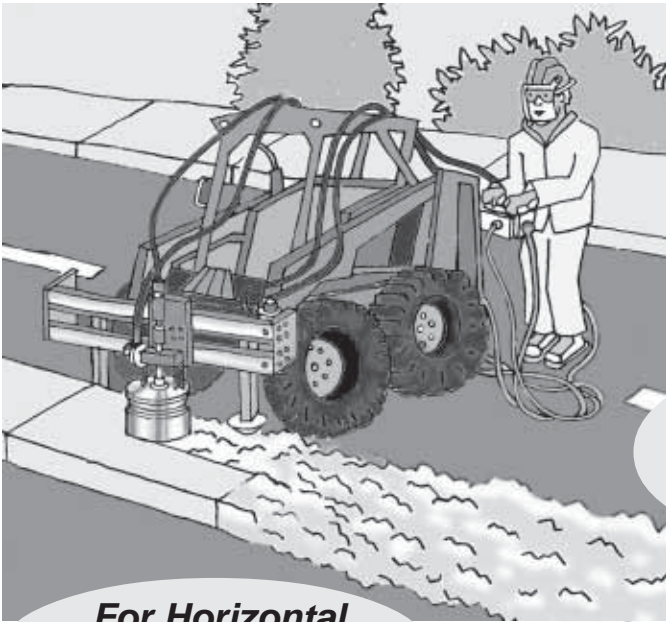


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CDA Concrete Demolition Attachment

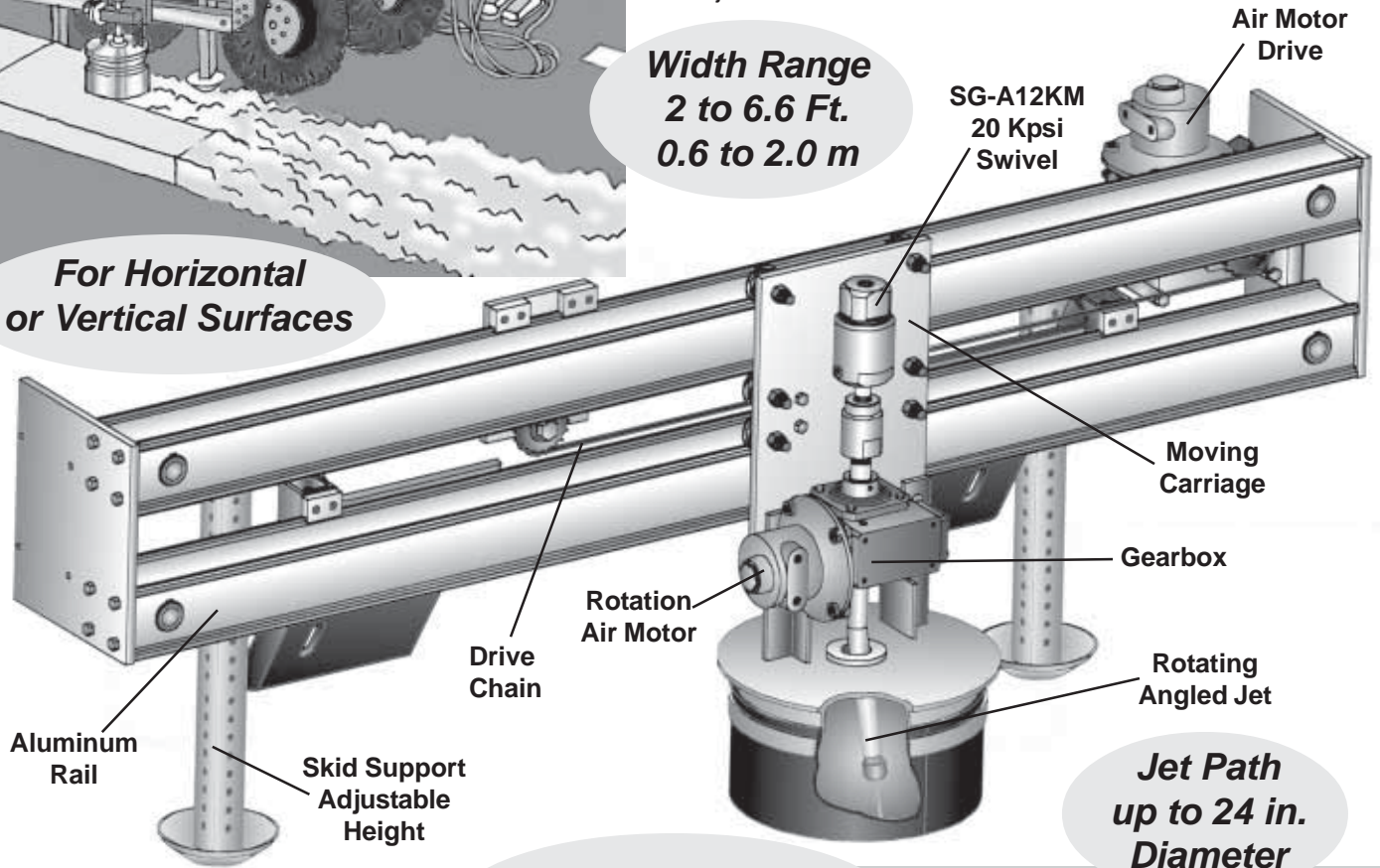
An Attachment for Skid-Steer Loader For Convenient & Economical Concrete Demolition

Hydro-demolition does much less damage to sound concrete than jack hammers; due to reduced vibration, and the selective waterjet attack on concrete with reduced tensile strength. Rebar exposed by hydro-demolition is clean and ready for a new pour. Finally, hydro-demolition can be mechanized, putting distance between operating personnel and the hazards of the job.



Width Range
2 to 6.6 Ft.
0.6 to 2.0 m

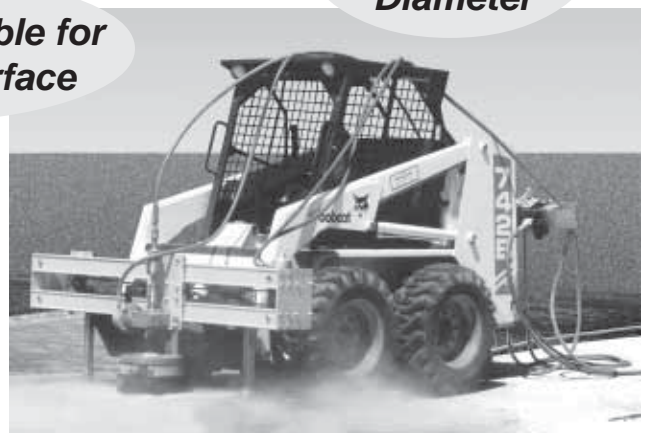
**For Horizontal
or Vertical Surfaces**



**Jet Path
up to 24 in.
Diameter**

Options Available for Scarifying Surface

Specifications	CDA	
Rotation Speed	120-600 rpm	
Flow Capacity	50 gpm	190 lpm
Max. Pressure	20 Kpsi	1380 bar
Stroke Speed	2-7 in./sec	5-18 cm/sec
Width	2 - 6.6 ft	0.6 - 2.0 m
Weight	250 lb	113 kg
Air Supply	80-100 psi	100 CFM
Hydraulic Option	1500 psi	10 gpm



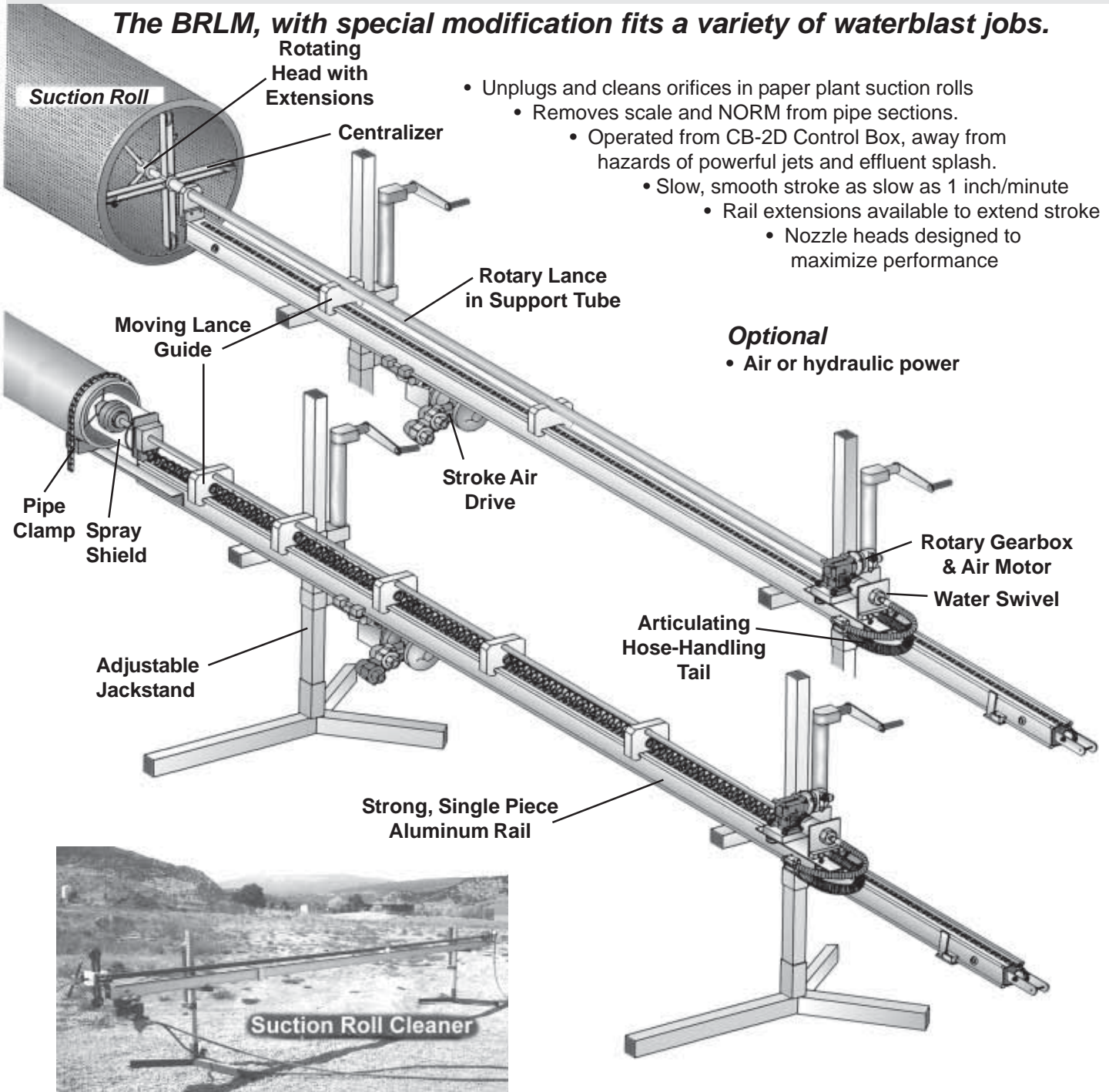
Powered by air or hydraulic motors, the strong single jet rotates and oscillates to dig a path up to 2 meters wide. The single jet is angled to allow concrete removal below the rebar. Durable components like the **SG** swivel, single extrusion box rail beam, and worm gearbox make the **CDA** as tough as the job requires! The **CDA** can be mounted on a variety of vehicles, and skids.



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Custom Lancing Machines

The BRLM, with special modification fits a variety of waterblast jobs.



- Unplugs and cleans orifices in paper plant suction rolls
- Removes scale and NORM from pipe sections.
- Operated from CB-2D Control Box, away from hazards of powerful jets and effluent splash.
- Slow, smooth stroke as slow as 1 inch/minute
- Rail extensions available to extend stroke
- Nozzle heads designed to maximize performance

Optional

- Air or hydraulic power

Specifications	Suction Roll Cleaner	Pipe Section Cleaner
Rotation Speed	10-50 rpm	50-300 rpm
Max. Pressure	10 Kpsi 690 bar	15 or 20 Kpsi 1000 or 1380 bar
Stroke Speed	.05-.2 ft/sec 1.5-6 cm/sec	.5-2 ft/sec 15-60 cm/sec
Rail Length *	25 ft 7.6 m	25 ft 7.6 m
Stroke *	22 ft 6.7 m	22 ft 6.7 m
Weight *	270 lb 95 kg	350 lb 160 kg

* Length custom-designed for customer's requirements.

Buyer Must Specify

- Which model machine
- Flow and pressure
- Stroke Length
- Inside diameter to be cleaned



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Swivel Selection Guide

The broadest range of high pressure swivels, or water couplings on the market to connect:

- Hose to rotating tools
- Hose to lancing machines
- Hose to hose reels
- Mounting rotating tools
- Hose to surface cleaners
- Hose to hose

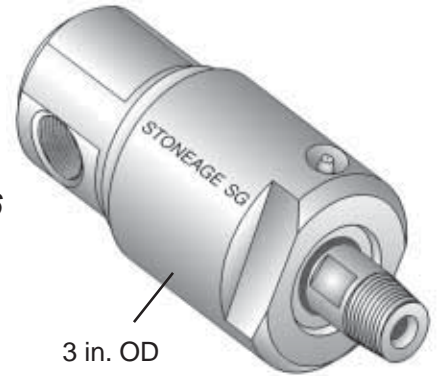
SL Swivels - Page 45

- 15 & 20 Kpsi models
1,000 & 1,380 bar
- 25 & 35 gpm models
95 & 130 l/min
- To 1,000 rpm



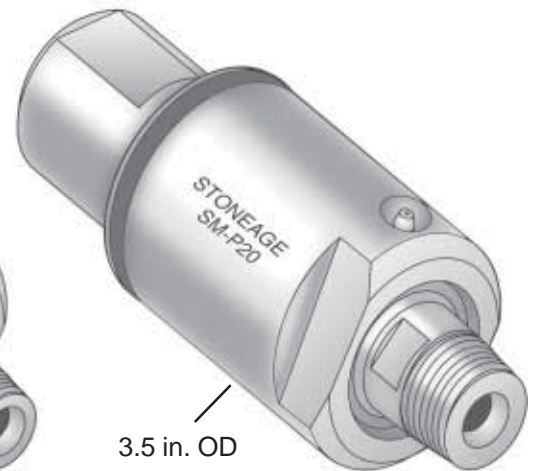
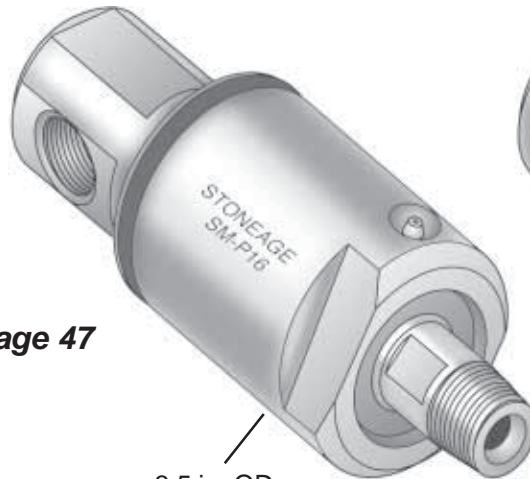
SG Swivels - Page 46

- 15 & 20 Kpsi models
1,000 & 1,380 bar
- 50 & 110 gpm models
190 & 420 l/min
- 400 & 2,000 rpm models



SM Swivels - Page 47

- To 10 Kpsi, 690 bar
- Up to 600 gpm, 2,300 l/min
- To 300 rpm



UH-H9H6 Swivel - Page 48

- 40 Kpsi Maximum, 2,760 bar
- 20 gpm, 76 l/min
- To 1,500 rpm



SH Swivels - Page 47

- Compact and lightweight for shot guns, hose handling, hose reels
- 15 Kpsi Maximum, 1,000 bar
- 50 gpm, 190 l/min
- To 300 rpm



Swivels are not designed to control rotation rate, and therefore cannot be used as self-rotating 2D nozzles. Swivels are used where rotation rate is controlled by air motor, other powered rotation mechanism, or where over speed is not possible. See pages 11-18 for 2D self-rotating nozzles with rotation speed control for pipe cleaning.

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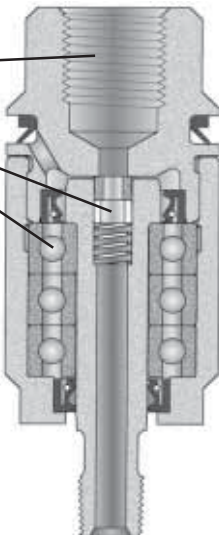
A Versatile, Compact Rotary Swivel

Features

- 0° or 90° inlet port
- Easily maintained seal
- Three heavy duty ball bearings
- Stainless steel construction
- Flow capacity of 25 - 35 gpm (95 - 130 l/min) possible
- Low torque, easy to rotate
- Operating pressure to 20 Kpsi, 1380 bar

Buyer Must Specify

- Model
- Operating flow and pressure
- Inlet port 0° or 90°

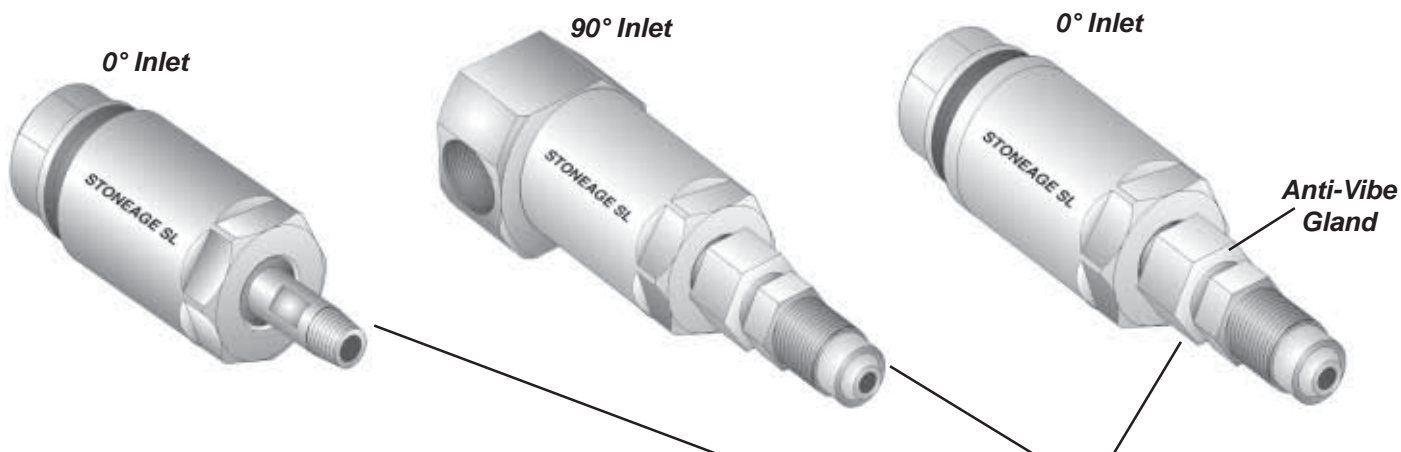


Applications

- Swivel joints
- Waterblast equipment
- High pressure hose reels
- Twist-free hose coupling

Maintenance Kits & Tools

- **SL 600-P Service Kit** - High pressure seal, spring, seat - for SL-P8P4
- **SL 600-K Service Kit** - High pressure seal, spring, seat - for SL-A9AV9
- **SL 610-P Overhaul Kit** - Bearings, shaft seals, high pressure seal and seat - for SL-P8P4
- **SL 610-K Overhaul Kit** - Bearings, shaft seals, high pressure seal and seat - for SL-A9AV9
- **SL 612 Tool Kit** - Assembly tools to seat shaft seals



SPECIFICATIONS	SL-P8P4		SL-A9AV9	
Max. Pressure	15 Kpsi	1000 bar	20 Kpsi	1380 bar
Rotation Speed, Max.	1000 rpm		800 rpm	
Shaft Connection	1/4 npt		9/16 MP **	
Inlet Port	1/2 npt		9/16 MP *	
Flow Rating	1.6 Cv		1.1 Cv	
Flow Capacity	35 gpm	130 l/min	25 gpm	95 l/min
Pressure Drop at 10 gpm	40 psi	2.8 bar	80 psi	5.5 bar
Pressure Drop at 20 gpm	156 psi	11 bar	330 psi	23 bar
Torque at 10 Kpsi	5 in-lb	0.5 N-m	4 in-lb	0.4 N-m
Length Overall	4.6 in.	12 cm	5.9 in.	13 cm
Weight	1.63 lb	0.74 kg	2.00 lb	0.89 kg

* Medium pressure cone & thread** Medium pressure with anti-vibe gland



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SG Swivel

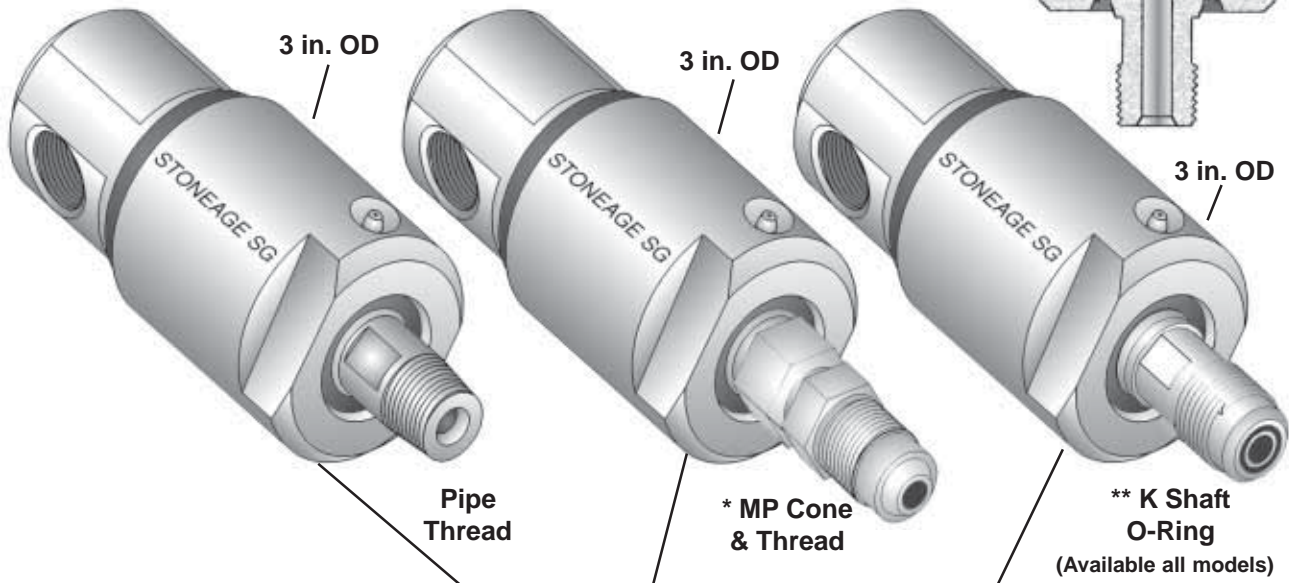
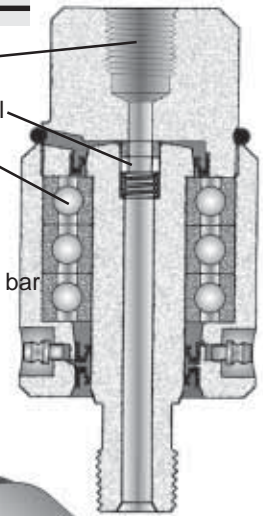
A Rugged, Versatile Rotary Swivel

Applications

- Tube lancing machines
- Waterblast equipment
- Floor and surface cleaners
- High pressure hose reels
- Hydro-demolition
- Rotary nozzles

Features

- 0° or 90° inlet port
- Easily maintained high pressure seal
- Three heavy duty ball bearings
- Stainless steel construction
- Flow capacity of 50 - 110 gpm (190 - 420 l/min) possible
- Low torque, easy to rotate
- Operating pressure to 20 Kpsi, 1380 bar



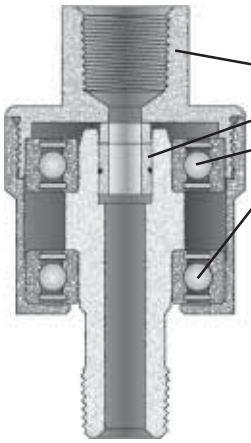
SPECIFICATIONS	SG P8P8	SG P12P12-M	SG A12AV12	SG A16A16	SG CCN P12K	SG CCN A12K
Max. Pressure	15 Kpsi 1000 bar	15 Kpsi 1000 bar	20 Kpsi 690 bar	20 Kpsi 1380 bar	15 Kpsi 1000 bar	20 Kpsi 1380 bar
Rotation Speed, Max.	600 rpm	500 rpm	600 rpm	500 rpm	2,000 rpm	2,000 rpm
Flow Rating	2.3 Cv	5.0 Cv	2.0 Cv	5.0 Cv	2.3 Cv	2.0 Cv
Flow Capacity	50 gpm 190 l/min	110 gpm 420 l/min	50 gpm 190 l/min	110 gpm 420 l/min	50 gpm 190 l/min	50 gpm 190 l/min
Inlet Port	1/2 npt	3.4 npt	3/4 MP*	1 MP*	3/4 npt	3/4 MP*
Shaft Connection	1/2 npt	3/4 npt	3/4 MP*	1 MP*	K **	K **
Length Overall	6.6 in. 17 cm	6.6 in. 17 cm	7.9 in. 20 cm	9.0 in. 23 cm	7.0 in. 17 cm	7.0 in. 20 cm
Weight	8.4 lb 3.8 kg	8.4 lb 3.8 kg	8.8 lb 4.0 kg	8.8 lb 4.0 kg	8.4 lb 3.8 kg	8.4 lb 4.0 kg
Seal Type	1/2 in. OD Plastic	5/8 in. OD Plastic	1/2 in. OD Plastic	5/8 in. OD Plastic	Carbide	Carbide

Maintenance Kits & Tools

- SG 600 Service Kit - SG-P8P8 & SG-A12AV12
- SG 600-M Service Kit - SG-P12P12-M & SG-A16A16
- SG 600-H - SG-P16P12-H
- SG 600-CCN Service Kit - SG-CCN models
- SG 610 Overhaul Kit - SG-P8P8 & SG-A12AV12
- SG 610-M Overhaul Kit - SG-P12P12-M & SG-A16A16
- SG 610-H Service Kit - SG-P16P12-H
- SG 610-CCN Overhaul Kit - SG-CCN models



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Features

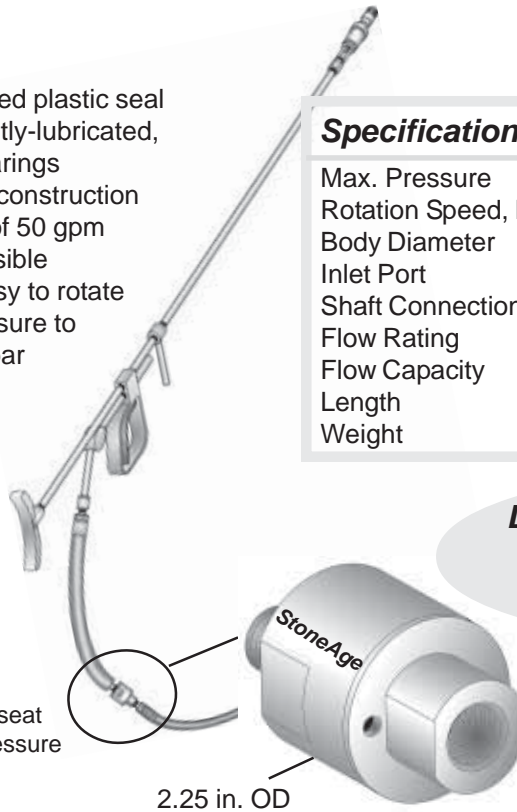
- 0° inlet port
- Easily maintained plastic seal
- Two permanently-lubricated, sealed ball bearings
- Stainless steel construction
- Flow capacity of 50 gpm (190 l/min) possible
- Low torque, easy to rotate
- Operating pressure to 15 Kpsi, 1000 bar

Applications

- Hose-to-hose connections
- Inlet hand-held shotguns
- Waterblast equipment
- High pressure hose reels
- Rotary nozzles

Maintenance Kits & Tools

- **SH 600 Service Kit** - High pressure seal, seat
- **SH 610 Overhaul Kit** - Bearings, high pressure seal and seat



Specifications	Model SH -P8P8	
Max. Pressure	15 Kpsi	1,000 bar
Rotation Speed, Max.	250 rpm	
Body Diameter	2.25 in.	57 mm
Inlet Port	1/2 npt	
Shaft Connection	1/2 npt	
Flow Rating	2.3 Cv	
Flow Capacity	50 gpm	190 l/min
Length	4-1/8 in.	10.5 cm
Weight	1.9 lb	0.9 kg

**Don't Fight Hose Twist!
SH Hose Swivel
Eases Hose Handling**

SM Swivel

Specifications	SM-P16	SM-P20
Max. Pressure	10 Kpsi 690 bar	10 Kpsi 690 bar
Rotation Rate, Max.	300 rpm	300 rpm
Inlet Port	1 npt	1-1/4 npt
Outlet Shaft	1 npt	1-1/4 npt
Flow Capacity	300 gpm 1100 l/min	600 gpm 2270 l/min
Flow Rating	13 Cv	18 Cv
Pressure Drop @ Flow	240 psi @ 200 gpm	490 psi @ 400 gpm
Length Overall - 0°	7.3 in. 19 cm	7.3 in. 19 cm
Length Overall - 90°	7.9 in. 20 cm	7.9 in. 20 cm
Body Diameter	3.5 in. 8.9 cm	3.5 in. 8.9 cm
Weight	13 lb 6 kg	13 lb 6 kg



The biggest capacity swivels available for continuous rotation at high pressure. For use in equipment to clean boilers, furnaces, tube bundles, large tanks, and vessels

Maintenance Kits & Tools

- **SM 600-P16 Service Kit** - High pressure seal, seat, and O-ring replacement - for SM-P16
- **SM 610-P16 Overhaul Kit** - Bearings, shaft seals, high pressure seal, and seat - for SM-P16
- **SM 600-P20 Service Kit** - High pressure seal, seat, and O-ring replacement - for SM-P20
- **SM 610-P20 Service Kit** - Bearings, shaft seals, high pressure seal, and seat - for SM-P20
- **SM 612 Tool Kit** - Assembly tool for seating shaft seals



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UH-H9H6 Swivel

Rugged Dependability in an Ultra-High Pressure Swivel



Applications

Rotary Lancing Machines
Pipe liner and scale removal
Surface cleaning equipment
Rotary hose devices

**Available with 0°
or 90° Inlet Port**

**Handles up to
450 HP Pumps**

Specifications

UH-H9H6

Max. Pressure	40 Kpsi	2,760 bar
Rotation Speed, Max.	1,000 rpm *	
Body Diameter	2.5 in.	64 mm
Inlet Port	9/16 HP	
Shaft Connection	3/8 HP	
Flow Rating	0.64 Cv	
Flow Capacity	20 gpm	76 l/min
Length	8.75 in.	22.2 cm
Weight	7.5 lb	3.4 kg

* Break-in new seals for 1/2 hr. at 500 rpm max.

Waterblast Hose Reels

Stop fighting heavy hose sections with StoneAge hose reels. They are perfect for long pipe runs, or where the waterblast unit cannot be parked near the equipment to be cleaned. These rugged hose reels are fitted with the SM, SG or UH-H9H6 Swivel, depending on pressure rating and hose specifications. Allow 3 weeks lead time for these custom built units.

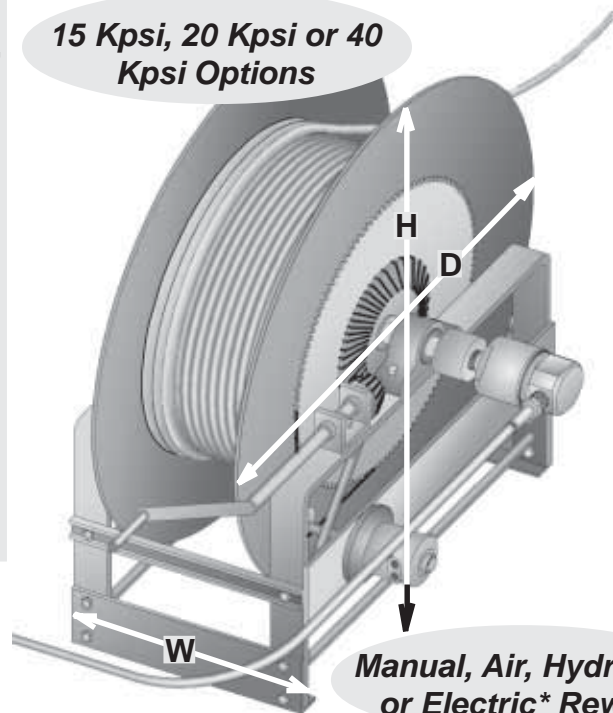
Specifications

HWB-S

HWB-M

Hose Bend Radius	10 in. 25.4 cm	10 in. 25.4 cm
Hose OD	Max. Length	Max. Length
0.4-0.7 in. 10-18 mm	500 ft 153 m	
0.8 in. 20 mm		550 ft 168 m
1.0 in. 25 mm		550 ft 168 m
1.2 in. 30 mm		400 ft 122 m
1.4 in. 36 mm		265 ft 81 m
1.6 in. 41 mm		220 ft 67 m
Reel OD, "D"	32 in. 81 cm	39 in. 99 cm
Height, "H"	34 in. 86 cm	40 in. 102 cm
Base Width, "W"	18 in. 46 cm	18 in. 46 cm
Weight		
Manual Rewind	145 lb 66 kg	175 lb 80 kg
Air/Hydraulic	170 lb 77 kg	200 lb 91 kg
Electric	185 lb 84 kg	215 lb 98 kg

**15 Kpsi, 20 Kpsi or 40
Kpsi Options**



**Manual, Air, Hydraulic,
or Electric* Rewind**

STONEAGE
WATERJET TOOLS

Durango, Colorado Phone 970-259-2869
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* 12 VDC Non-Explosion Proof Motor

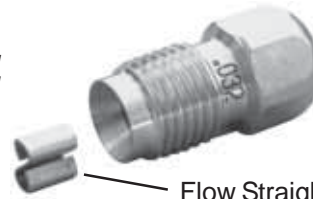
**Longer-Lasting
More Powerful
Performance**

**Attack - AP2
1/8 npt**



3/8 in. Hex
Length 0.584 in.
(14.8 mm)

**Attack - AP4
1/4 npt**



9/16 in. Hex
Length 1.04 in.
(26.4 mm)

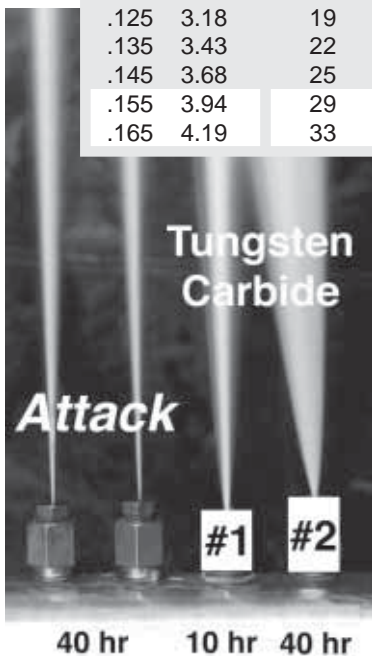
Flow Straightener

Orifice Flow Chart, gpm

Pressure, psi
Pressure, bar

Orifice, ID in. mm	Pressure, psi Pressure, bar											Flow Rating
	2,000 138	4,000 276	6,000 414	8,000 552	10,000 690	12,000 827	14,000 966	16,000 1103	18,000 1241	20,000 1380		
.018 0.46	0.39	0.55	0.68	0.78	0.87	0.96	1.0	1.1	1.2	1.2	1.2	0.6
.020 0.51	0.48	0.68	0.83	0.96	1.1	1.2	1.3	1.4	1.5	1.5	1.5	0.7
.022 0.56	0.58	0.82	1.0	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.8	0.8
.024 0.61	0.69	0.98	1.2	1.4	1.6	1.7	1.8	2.0	2.1	2.2	2.2	1.0
.026 0.66	0.81	1.2	1.4	1.6	1.8	2.0	2.1	2.3	2.4	2.6	2.6	1.1
.029 0.74	1.0	1.4	1.7	2.0	2.3	2.5	2.7	2.9	3.0	3.2	3.2	1.4
.032 0.81	1.2	1.7	2.1	2.5	2.8	3.0	3.3	3.5	3.7	3.9	3.9	1.7
.035 0.89	1.5	2.1	2.6	3.0	3.3	3.6	3.9	4.2	4.4	4.7	4.7	2.1
.038 0.97	1.7	2.5	3.0	3.5	3.9	4.3	4.6	4.9	5.2	5.5	5.5	2.5
.042 1.07	2.1	3.0	3.7	4.2	4.7	5.2	5.6	6.0	6.4	6.7	6.7	3.0
.047 1.19	2.7	3.8	4.6	5.3	5.9	6.5	7.0	7.5	8.0	8.4	8.4	3.8
.052 1.32	3.3	4.6	5.6	6.5	7.3	8.0	8.6	9.2	9.8	10	10	4.6
.057 1.45	3.9	5.5	6.8	7.8	8.7	9.6	10	11	12	12	12	5.5
.063 1.60	4.8	6.8	8.3	9.6	11	12	13	14	14	15	15	6.8
.069 1.78	5.7	8.1	9.9	12	13	14	15	16	17	18	18	8.1
.075 1.91	6.8	9.6	12	13	15	17	18	19	20	21	21	9.6
.082 2.08	8.1	12	14	16	18	20	21	23	24	26	26	12
.090 2.29	9.8	14	17	20	22	24	26	28	29	31	31	14
.098 2.49	12	16	20	23	26	28	31	33	35	37	37	16
.106 2.69	14	19	23	27	30	33	36	38	41	43	43	19
.115 2.92	16	23	28	32	36	39	42	45	48	50	50	23
.125 3.18	19	27	33	38	42	46	50	53	56	60	60	27
.135 3.43	22	31	38	44	49	54	58	62	66	69	69	31
.145 3.68	25	36	44	51	57	62	67	72	76	80	80	36
.155 3.94	29	41	50	58	65	71	77	82	87	92	92	41
.165 4.19	33	46	57	66	73	80	87	93	98	100	100	46

Orifice size can vary +/- .001 in. from stated size, or +/- .002 in. for sizes .062 in. and larger.



Hardened and Polished Stainless Steel Nozzle With Flow Straightener - 1/8 or 1/4 npt

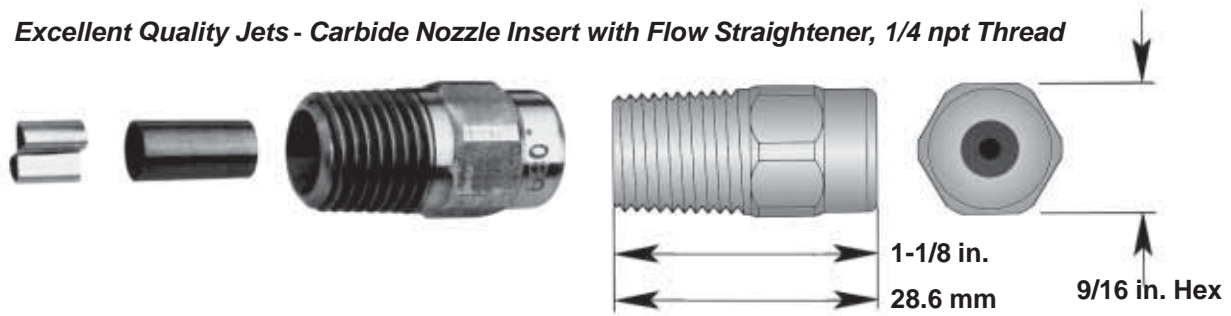
Thanks to high efficiency nozzle design and StoneAge's unique 7-step manufacturing process, the **Attack Tips** are the best quality, longest lasting tips we have found. The flow straightener corrects power-robbing turbulence, insuring excellent jet quality. StoneAge tests show that the **Attack** outlasts tungsten carbide jets. The difference in life is especially dramatic in small orifice sizes.



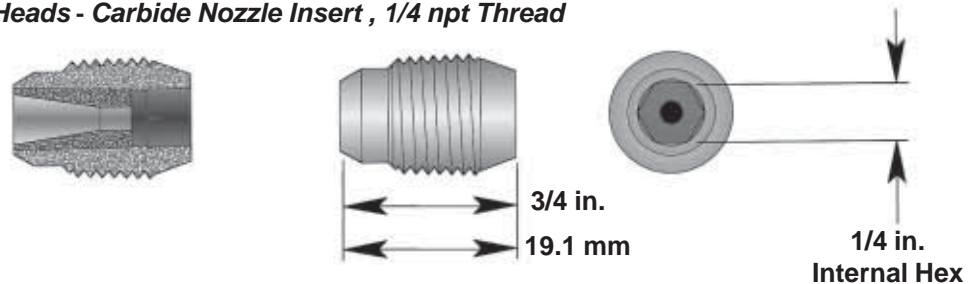
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OC Tungsten Carbide Tips

OCV *Excellent Quality Jets - Carbide Nozzle Insert with Flow Straightener, 1/4 npt Thread*



OCIH *Fits Flush in Compact Heads - Carbide Nozzle Insert, 1/4 npt Thread*



Orifice Flow Chart, gpm

Orifice, ID in. mm	Pressure, psi Pressure, bar										Flow Rating
	2,000 138	4,000 276	6,000 414	8,000 552	10,000 690	12,000 827	14,000 966	16,000 1103	18,000 1241	20,000 1380	
.024 0.61	0.69	0.98	1.2	1.4	1.6	1.7	1.8	2.0	2.1	2.2	1.0
.028 0.71	0.94	1.3	1.6	1.9	2.1	2.3	2.5	2.7	2.8	3.0	1.3
.031 0.79	1.2	1.6	2.0	2.3	2.6	2.8	3.1	3.3	3.5	3.7	1.6
.036 0.91	1.7	2.4	3.0	3.4	3.8	4.2	4.5	4.8	5.1	5.4	2.4
.039 0.99	1.8	2.6	3.2	3.7	4.1	4.5	4.9	5.2	5.5	5.8	2.6
.043 1.09	2.2	3.2	3.9	4.5	5.0	5.5	5.9	6.3	6.7	7.0	3.2
.047 1.19	2.7	3.8	4.6	5.3	6.0	6.5	7.0	7.5	8.0	8.4	3.8
.055 1.40	3.6	5.2	6.3	7.3	8.1	8.9	9.6	10	11	12	5.2
.062 1.57	4.6	6.5	8.0	9.3	10	11	12	13	14	15	6.5
.067 1.70	5.4	7.6	9.4	11	12	13	14	15	16	17	7.6
.073 1.85	6.4	9.1	11	13	14	16	17	18	19	20	9.1
.078 1.98	7.3	10	13	15	16	18	19	21	22	23	10
.089 2.26	9.5	14	16	19	21	23	25	27	29	30	14
.093 2.36	10	15	18	21	23	26	28	30	31	33	15
.106 2.69	14	19	23	27	30	33	36	38	41	43	19
.125 3.18	19	27	33	38	42	46	50	53	56	60	27
.140 3.56	24	33	41	47	53	58	62	67	71	75	33
.156 3.96	29	41	51	59	66	72	78	83	88	93	41

Orifice size can vary +/- .001 in. from stated size, or +/- .002 in. for sizes .062 in. and larger.



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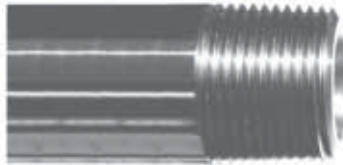
Precision-Machined Nipples to Place Nozzle Tips Close to the Work

StoneAge extension nipples are machined to close tolerances so that threads are straight, and aligned with ports to which they are attached. Several different materials and sizes are available. Standard stock items are indicated by the asterisks. Others are available by special order. Radiused bends are available as well.

Description	StoneAge Part #	Rating K psi	Threads	OD inch	ID inch	Material
9/16 in. MP Tubing	SA 567-P4P2 *	15	1/4 npt / 1/8 nptf	0.563	0.312	304 SS 1/8 Hard
9/16 in. MP Tubing	SA 567-M9M9	20	9/16 MP	0.563	0.312	304 SS 1/8 Hard
1/2 Sch. 160 Pipe	SA 356-P8P4 **	15	1/2 npt / 1/4 nptf	0.840	0.470	304 SS
1/2 Sch. 160 Pipe	SA 356-P8P8	15	1/2 npt	0.840	0.470	304 SS
3/4 Sch. 160 Pipe	SA 366-P12P12	15	3/4 npt	1.050	0.610	304 SS
3/4 in. MP Tubing	SA 577-M12M12	20	3/4 MP LH / LH	0.750	0.438	304 SS 1/8 Hard
3/4 in. MP Tubing	SA 577-M12P4 **	20	3/4 MP LH / 1/4 nptf	0.750	0.438	304 SS 1/8 Hard
3/4 in. MP Tubing	SA 577-G12P4	20	3/4 G12 / 1/4 nptf	0.750	0.438	304 SS 1/8 Hard

npt - National Pipe Thread MP - Cone & Thread Connection G12 - For BJV-20K
 * Standard Lengths - 2, 3, 4, 8 in. (51, 76, 101, 203 mm)
 ** Standard Lengths - 3, 4, 6, 8, 10, 12 in. (76, 101, 152, 203, 254, 305 mm)

Pressure to 15,000 psi



NPT - Pipe Threads - National Tapered Pipe threads make both pressure seal and mechanical connection. Thread sealant and anti-seize are required. Rated to 15,000 psi in sizes up to 3/4" pipe.

Pressure to 20,000 psi (MP) or 40 Kpsi (HP)



Anti-Vibe Gland



Gland Collar



Tubing Cone & LH Threads

Medium Pressure or High Pressure Cone & Thread - Tubing is prepared with 60° cone which makes metal-to-metal seal, and left hand threads to accept a compression collar. A gland nut secures the collar. An anti-vibration gland is used in place of the standard gland in applications where vibration or potential bending might over-stress or fatigue the tubing threads. When the gland is loosened, any residual pressure is relieved through a port hole drilled near the cone seal. "MP" connections are available in 1/4", 3/8", 9/16", 3/4", and 1" OD tubing sizes; "HP" connections in 1/4", 3/8", and 9/16" OD tubing sizes. Right-hand threads are sometimes used to connect lance tips without the collar or gland.



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Pipe Fittings & Adaptors



GP 052 Couplings



GP 025-xx Plugs

GP 026-xx Plugs

Pipe Size	Part ID	MAWP
1/8 npt	GP 025-P2	20 Kpsi
1/8 npt	GP 026-P2	20 Kpsi
1/4 npt	GP 025-P4	20 Kpsi
3/8 npt	GP 025-P6	15 Kpsi
1/2 npt	GP 025-P8	15 Kpsi
3/4 npt	GP 025-P12	12 Kpsi
3/4 npt	GP 026-P12	12 Kpsi
1 npt	GP 026-P16	10 Kpsi

Pipe Couplings

Pipe Size	Part ID	MAWP	Pipe Size	Part ID	MAWP	Pipe Size	Part ID	MAWP
1/8 npt x 1/2 npt	GP 052-P2P8	15 Kpsi	1/4 npt x 1/2 npt	GP 052-P4P8	15 Kpsi	1/2 npt x 3/4 npt	GP 052-P8P12	12 Kpsi
1/4 npt x 1/8 npt	GP 052-P2P4	15 Kpsi	3/8 npt x 3/8 npt	GP 052-P6P6	15 Kpsi	3/4 npt x 3/4 npt	GP 052-P12P12	12 Kpsi
1/4 npt x 1/4 npt	GP 052-P4P4	15 Kpsi	3/8 npt x 1/2 npt	GP 052-P6P8	15 Kpsi	3/4 npt x 1 npt	GP 052-P12P16	10 Kpsi
1/4 npt x 3/8 npt	GP 052-P4P6	15 Kpsi	1/2 npt x 1/2 npt	GP 052-P8P8	15 Kpsi	1 npt x 1 npt	GP 052-P16P16	10 Kpsi



GP 050 Elbows



GP 051 Bushings



GP 055 Nipples

Pipe Elbows

Pipe Size	Part ID	MAWP
1/2 npt x 1/2 npt	GP 050-P8P8	15 Kpsi
3/4 npt x 3/4 npt	GP 050-P12P12	12 Kpsi
1 npt x 1 npt	GP 050-P16P16	10 Kpsi

Pipe Bushings

Pipe Size	Part ID	MAWP
1/4 npt x 1/2 npt	GP 051-P4P8	15 Kpsi
1/4 npt x 3/4 npt	GP 051-P6P6	12 Kpsi
3/8 npt x 1/2 npt	GP 051-P6P8	15 Kpsi
1/2 npt x 3/4 npt	GP 051-P8P8	12 Kpsi
3/4 npt x 1 npt	GP 051-P12P16	10 Kpsi

Pipe Nipples

Pipe Size	Part ID	MAWP
1/2 npt x 1/2 npt	GP 055-P8P8	15 Kpsi
3/4 npt x 3/4 npt	GP 055-P12P12	12 Kpsi
3/4 npt x 1 npt	GP 055-P12P16	10 Kpsi
1 npt x 1 npt	GP 055-P16P16	10 Kpsi



GP 056 Quick Disconnect

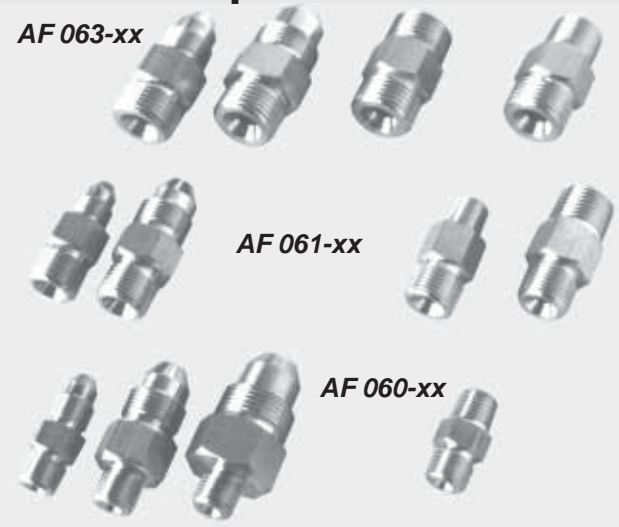
1/2 npt x 1/2 npt - 10 Kpsi MAWP



GP 059-P6P8 Adaptor

1/2 npt x 3/8 npt 15 Kpsi MAWP

Hose Adaptors



AF 063-xx

AF 061-xx

AF 060-xx

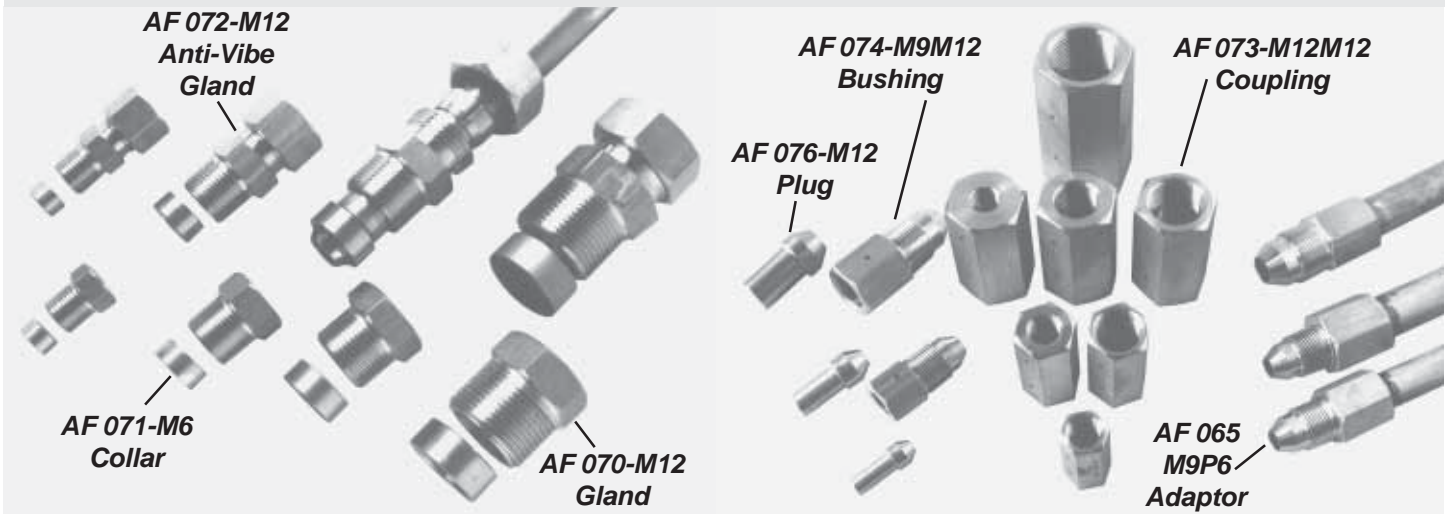
Connection	Part ID	Connection	Part ID
9/16-18 "M" x 1/4 npt	AF 060-P4	3/4-16 "M" x 1/4 npt	AF 061-P4
9/16-18 "M" x 1/2 npt	AF 060-P8	3/4-16 "M" x 1/2 npt	AF 061-P8
9/16-18 "M" x 3/8 MP	AF 060-M6	3/4-16 "M" x 3/8 MP	AF 061-M6
9/16-18 "M" x 9/16 MP	AF 060-M9	3/4-16 "M" x 9/16 MP	AF 061-M9
9/16-18 "M" x 3/4 MP	AF 060-M12	1-12 "M" x 9/16 MP	AF 063-M9
9/16-18 "M" x 1/4 HP	AF 060-H4	1-12 "M" x 3/4 MP	AF 063-M12
9/16-18 "M" x 3/8 HP	AF 060-H6	1-12 "M" x 1-12 "M"	FC 192-M
9/16-18 "M" x 9/16 HP	AF 060-H9		

Pressure Rating Depends on Hose



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20 Kpsi MP Fittings & Adaptors



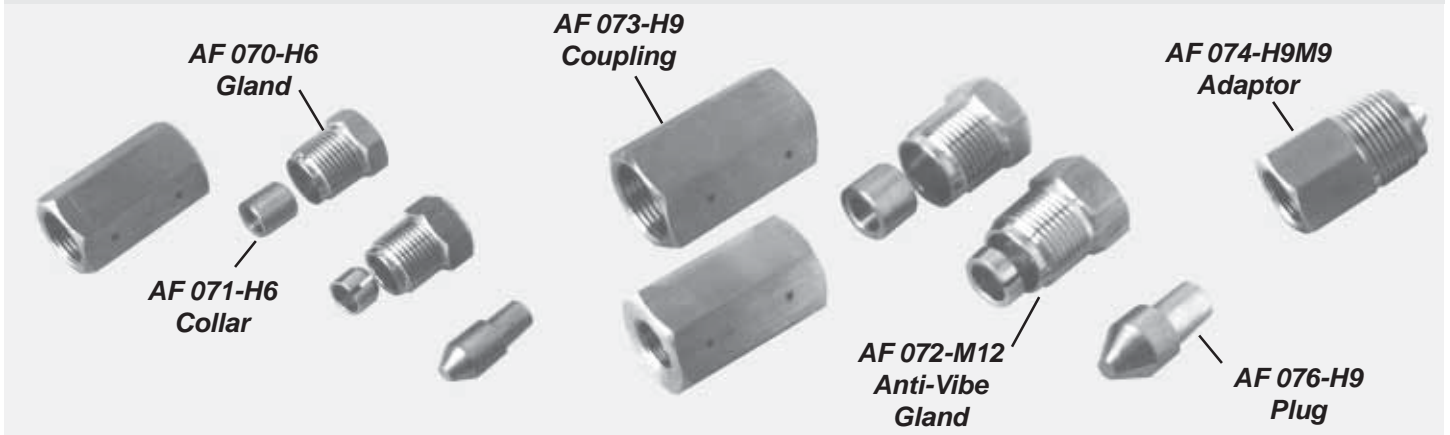
Collars		Glands	AV Glands	Plugs	Couplings		Bushings	
Tubing OD	Part ID	Part ID	Part ID	Part ID	Tubing OD	Part ID	Tubing OD	Part ID
1/4 in.	AF 071-M4	AF 070-M4	AF 072-M4		1/4 x 3/4	AF 073-M4M12	1/4f x 3/8m	AF 074-M4M6
3/8 in.	AF 071-M6	AF 070-M6	AF 072-M6	AF 076-M6	1/4 x 9/16	AF 073-M4M9	1/4f x 9/16m	AF 074-M4M9
9/16 in.	AF 071-M9	AF 070-M9	AF 072-M9	AF 076-M9	3/8 x 3/8	AF 073-M6	3/8f x 9/16m	AF 074-M6M9
3/4 in.	AF 071-M12	AF 070-M12	AF 072-M12	AF 076-M12	3/8 x 9/16	AF 073-M6M9	9/16f x 3/4 m	AF 074-M9M12
1 in.	AF 071-M16	AF 070-M16	AF 072-M16		3/8 x 3/4	AF 073-M6M12		
					9/16 x 9/16	AF 073-M9		
					9/16 x 3/4	AF 073-M9M12		
					3/4 x 3/4	AF 073-M12		
					1 x 1	AF 073-M16		

Pipe Adaptors *

Connection	Part ID
3/8 nptf x 9/16 MPm	AF 065-M9P6
1/2 nptf x 9/16 MPm	AF 065-M9P8
1/2 nptf x 3/4 MPm	AF 065-M12P8

* 15 Kpsi MAWP

40 Kpsi HP Fittings & Adaptors



Collars		Glands	AV Glands	Plugs	Couplings		MP-HP Adaptor **	
Tubing OD	Part ID	Part ID	Part ID	Part ID	Tubing OD	Part ID	Connection	Part ID
1/4 in.	AF 071-H4	AF 070-H4	AF 072-H4		1/4 x 3/8	AF 073-H4H6	9/16 MPm x 9/16 HPf	AF 074-H9M9
3/8 in.	AF 071-H6	AF 070-H6	AF 072-H6	AF 076-H6	3/8 x 3/8	AF 073-H6		** 20 Kpsi MAWP
9/16 in.	AF 071-H9	AF 070-H9	AF 072-H9	AF 076-H9	3/8 x 9/16	AF 073-H6H9		
					9/16 x 9/16	AF 073-H9		



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Availability of Fittings & Adaptors

Parts listed here are normally in-stock. BSP and European sizes are not available from StoneAge. Please call for referral to other companies who stock a wider variety of fittings and adaptors.

Maintenance Supplies

Operator's Manual - The manual is free, and is shipped with each new tool. It includes a parts list and drawing, seal replacement, dis-assembly and assembly procedures, and troubleshooting. Call for a copy if yours is mis-placed.

Service Kits - Everything needed for routine operation. This is a single service kit including high pressure seal, critical o-rings, a seat for the high pressure seal (in some cases), 6 oz. of viscous fluid for the rotation speed control governor (where applicable), fill tube or syringe needed to service the tool. Call for specific kit content.

Seal Kits - Identical to Service Kit, but excludes viscous fluid, fill tube, and syringe. For customers who already have these items.

Overhaul Kits - Everything that normally wears out. Includes a single high pressure seal and seat, shaft seals, bearings, 6 oz. viscous fluid (where applicable). Call for specific kit content.

Tool Kits - Different for every StoneAge tool, special tools for seating shaft seals, adjustments, etc.

Lubricants - These are available in their manufacturers' packaging, for customers' convenience.

STONEAGE TOOL MODEL	SERVICE KIT	SEAL KIT	OVERHAUL KIT	TOOL KIT	LUBRICANT
Barracuda	BC 600	BC 602	BC 610	BC 612	GP 042
CyClean 3D	CY 600	CY 602	CY 610	CY 612	BJ 048-S
Hurricane 3D	HC 600	HC 602	HC 610	HC 612	BJ 048-S
BJV (Obsolete)	BJ 600-X	BJ 602	BJ 610-X	BJ 612	BJ 048-X
BJV-M	BJ 600-M-X	BJ 602-M	BJ 610-M-X	BJ 612	BJ 048-X
BJV-20K	AR 600-X	AR 602	AR 610-X	AR 612	BJ 048-X
RJV	RJ 600-X	RJ 602	RJ 610-X	RJ 612	BJ 048-X
RJV3 (Obsolete)	RJ 600-K	RJ 602-K	RJ 610-K	RJ 612	RJ 048-VF
Gopher	GO 600	GO 602	GO 610	GO 612	GP 044
Badger	BA 600	BA 602	BA 610	BA 612	BJ 048-F
Marten	MT 600	MT 602	MT 610	MT 612	BJ 048-S
Ferret	FT 600	FT 602	FT 610	FT 612	BJ 048-S
Weasel	EZ 600	EZ 602	EZ 610	EZ 612	BJ 048-S
Warthog WS-1/2	WS 600	WS 602	WS 610	WS 612	BJ 048-F
Warthog WH-1/2 & 3/4	WH 600	WH 602	WH 610	WH 612	BJ 048-F
Warthog WG-1	WG 600	WG 602	WG 610	WG 612	BJ 048-F
BJV-H	BJ 600-H-X	BJ 602-H	BJ 610-H-X	BJ 612	BJ 048-X
CST	CST 600		CST 610		GP 048
SA 1900, 1909	HI 600		HI 610		GP 048
SA 2000, 2012	FS 600	FS 602	FS 610	FS 612	GP 048
SL-P8P4	SL 600-P		SL 610-P	SL 612	GP 048
SL-A9AV9	SL 600-K		SL 610-K	SL 612	GP 048
SG-P8P8 & SG-A12AV12	SG 600		SG 610	SG 612	GP 048
SG-P12P12-M & SG-A16A16	SG 600-M		SG 610-M	SG 612	GP 048
SG-CCN	SG 600-CCN		SG 610-CCN	SG 612	GP 048
SH-P8P8	SH 600		SH 610		GP 048
SM-P16	SM 600-P16		SM 610-P16	SM 612-P16	GP 048
SM-P20	SM 600-P20		SM 610-P20	SM 612-P20	GP 048
HI	HI 600		HI 610		GP 048
FS	FS 600	FS 602	FS 610	FS 612	GP 048
HF	HF 600		HF 610		GP 048
HF-2D	HF 600		HF 610		HF 042
OQ	FS 600		OQ 610		GP 048

Note: "X" indicates "Fast" or "Slow" rotation speed range, please specify.

LUBRICANTS	STONEAGE PART #	QUANTITY	SOURCE	SPECIFICATION
Viscous Fluid	BJ 048-X, RJ 048-VF	6 oz.	StoneAge	Synthetic silicone lubricant
Air Motor Oil	GP 041	32 oz.	Mobil	Almo 525 Air Tool Oil - ISO Grade 46, SAE 10
Hydraulic Oil	HF 042	1 Gal (US)	Texaco	Rando HD 68, ISO VG 68
Auto Transmission Fluid	GP 042	32 oz.	NAPA	Mercon/Dexron ATF
Motor Oil	GP 044	32 oz.	NAPA	10W40 Motor Oil
Gearbox Lube	GP 046	32 oz.	NAPA	Premium Gear Oil 80W-85W-90
Thread Sealant	GP 047	4 oz.	Parker	Thread Mate
Grease	GP 048	14 oz.	Mobil	Synthetic Lubricating Grease SHC 100



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FLUID FLOW

Q = Flow in gpm	$Q = 29.92 \times d^2 \times P^{1/2} \times Cd$
V = Velocity in ft/sec	$V = 12.186 \times P^{1/2} = Cd \times .4085 \times Q / d^2$
P = Pressure in psi	$P = .00112 \times Q^2 / (d^4 \times Cd^2)$
Hp = Power in horsepower	$Hp = .0174 \times d^2 \times P^{3/2} \times Cd = P \times Q / 1714$
Cv = Flow Coefficient	$Cv = Q / \Delta P^{1/2} \approx 53 \times (D^{2.5} / L^{1/2})$
ΔP = Pressure Drop in psi	$\Delta P = (Q / Cv)^2$
F = Thrust Force in pounds	$F = \pi / 2 \times d^2 \times P \times Cd = .0522 \times P^{1/2} \times Q \approx 0018 \times (Q / D)^2 \times Cd$
ΔT = Temperature Rise in °F	$\Delta T = \Delta P / 337.6$

L = Tube length in feet
D = Tube inside diameter in inches
d = Orifice diameter in inches

Cd = Discharge Coefficient:
Cd = 0.95 for long cone orifice
Cd = 0.80 for short cone orifice
Cd = 0.65 for drilled steel orifice

PRESSURE CONVERSION CHART

		CONVERT FROM					
		psi	kg/cm ²	bar	MPa	ft H ₂ O	m H ₂ O
CONVERT TO	psi	1	14.223	14.5	145	0.434	1.422
	kg/cm ²	.0703	1	1.0197	10.2	0.305	0.100
	bar	0.0689	0.9807	1	10	0.030	0.098
	MPa	0.0069	0.098	0.100	1	0.0034	0.0098
	ft H ₂ O	2.307	32.81	33.49	335	1	3.281
	m H ₂ O	0.703	10.0	10.2	102	0.305	1

MECHANICAL FACTS

Distance	1 meter = 39.37 inches 1 inch = 25.4 mm
Mass	1 kg = 2.205 pounds
Volume	1 liter = .220 Imp. gal = .264 US gal
Force	1 newton = .225 pounds
Power	1 horsepower = 550 ft-lb/sec 1 horsepower = .746 kw
Torque	1 ft-lb Force = 5252 x HP/rpm



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Orders & Information

StoneAge is Ready to Help with Your Order **8:00 AM to 5:00 PM Mountain Time Zone , Monday - Friday**

Customer Service

We want our customers to be successful with StoneAge tools and equipment. Here are a few of the ways we are accustomed to helping:

- **Quotes** are always available to help detail specifications and consider options while a customer is planning a job. After review, such quotes can be converted into an accurate order. Quotes are valid for a stated period, making price temporarily immune from potential increases.
- **Serial Number Database** is maintained on all equipment sold. If a customer knows the serial number when ordering parts, we can check to see that the "right" parts are specified.
- **Operator's Manual** for all equipment is shipped with the order, explaining safe and productive operation. It illustrates and identifies parts, and details maintenance and rebuild procedures. Additional copies of the manual, repair videos and CD's are available at a nominal charge.
- **Repair & Maintenance Service** is available in our shop, by the same technicians who build and test new tools. We try to complete repairs and test every tool within two days of receipt. Call first so we can record all the information necessary to begin work as soon as the tool arrives. We'll issue an RGA number to identify your tool and document your instructions. Minimum labor charge is one hour. Send tool to:
StoneAge, Inc. - Attention Repairs
54 Girard Street
Durango, CO 81303
- **Technical Help** is available by phone for customers who are unsure how best to use StoneAge equipment, or how to approach an unusual task. On-site assistance is available for a fee.
- **Service Bulletins** are issued whenever product upgrades, design changes, or maintenance changes are made.

Lead Time

- Parts and service kits are available to ship same day as ordered. Standard tools can usually be shipped the next day. Custom porting of heads usually requires at least 3 days to schedule through the factory.
- More complicated systems like Lancing Machines are built when ordered, which can take several weeks depending on factory backlog. Check availability and place orders early enough to avoid disappointment.

Rentals

- Not available from StoneAge. Check our website, or inside the back cover of this catalog for a list of our customers who rent equipment.

Terms of Sale

- All sales are FOB Durango, Colorado in US dollars.
- The purchaser agrees to hold StoneAge, Inc. harmless for any and all claims arising from the misuse of StoneAge equipment.
- 6-Month limited material and workmanship warranty applies to all products manufactured by StoneAge.
- Minimum restocking charge of 10% applies to standard items returned.

Ordering

- Call or FAX your order to a distributor or to the factory, with Purchase Order #, addresses for shipping and billing, and delivery date needed.
- Check datasheet to be sure specifications are complete. Advise whether we should hold shipment until all items are available.

Shipping

- Shipping is prepaid, and invoiced with order, but may be charged directly to the customer's account with selected courier by special instruction.
- Most orders are shipped via UPS, DHL, or Fed Ex couriers, specify a preference if you wish.
- Lancing Systems, Floor Cleaners, Telebooms, and other large equipment must be shipped by truck or air freight. We or the customer may make the arrangements.
- Airline counter-to-counter delivery is not reliable from our mountain location.

Payment

- Payment by major credit card or bank transfer is accepted.
- Allow 10 days to set up a new account, call for account application.
- 50% Prepayment required to ship custom equipment or orders which exceed credit limits.



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