



2016

W A T E R B L A S T

HAMMELMANN

Australia

HAMMELMANN AUSTRALIA

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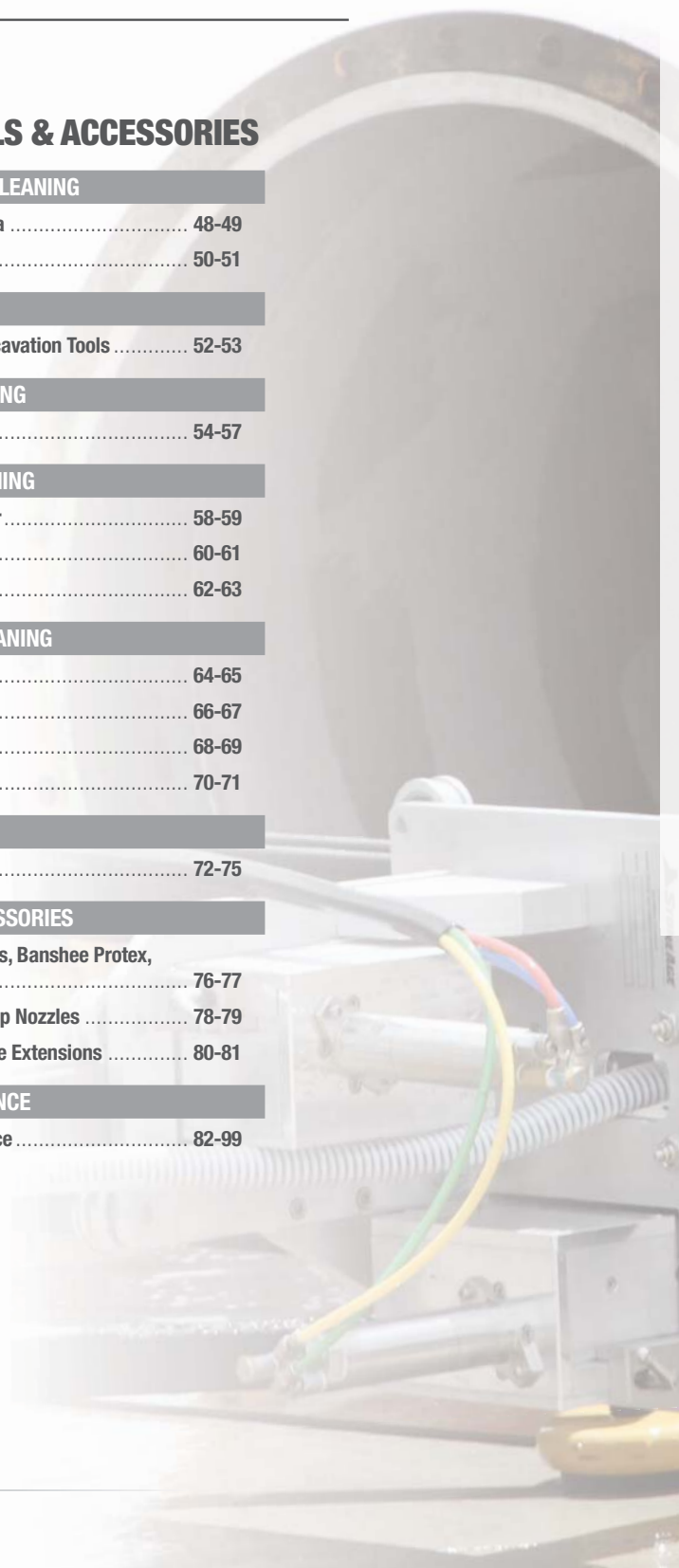
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EXCHANGER CLEANING

“ The ABX-2L is the most versatile and reliable flex lancing system we’ve ever used.

DOUG MCGEE
EVERGREEN INDUSTRIAL SERVICES

**NEW
UPGRADES IN 2016**

AUTOBOX® ABX-2L

The StoneAge AutoBox ABX-2L is an automated system for “hands-free” heat exchanger tube cleaning applications. It was designed with an emphasis on safety, ease of setup, portability and reliability. When paired with StoneAge Banshee rotary tube cleaning nozzles and lightweight positioner, the AutoBox ABX-2L is a turn-key solution for safe and efficient tube cleaning in the harshest environments.

NEW UPGRADES:

- Now designed to accommodate hose sizes from 3-8mm
- New Fin-Fan attachment is also available to adapt the ABX-2L to clean Fin-Fan exchangers
- Now uses the same lightweight control box as the ABX-500 making it easier to manage and maintain all Autobox equipment

FEATURES:

- Lightweight, modular design allows a single operator to move, set up, and run – reducing manpower costs
- Quick-swap rollers can be changed without tools to accommodate different hose sizes
- Remotely adjustable hose clamp pressure allows operator to adapt to changing conditions and minimize hose wear
- All components are high quality stainless steel, aluminum or plastic to withstand corrosive environments reducing the overall cost of ownership



Tool Model	Max Feed Rate	Pitch Adjustment	Hose Sizes	Weight
ABX-2L	3.0 ft/s 86 cm/s	0.625–2.5 in. 15.9–63.5 mm	3/2–8/4	42 lbs 19 kg

HOSE SPEED CONTROLS

Allow operator to independently adjust forward and reverse hose speeds for various applications.

PITCH ADJUSTMENT

Quickly fine-tune the tube pitch for different heat exchangers.

EXCHANGEABLE DRIVE ROLLERS

Easily swap out rollers to accommodate hose sizes 3-8mm. No tools required.

QUICK-CONNECT HARDWARE

Allows operators to quickly and easily assemble/disassemble components without the use of tools.

SEE NEXT PAGE FOR ABX-2L ACCESSORIES >>

ABX-2L COMPLETE TUBE CLEANING SYSTEM

1 LWP-100
POSITIONER

ABX-2L AUTOBOX

NEW FOR 2016
2 AST-100
AUTOSTROKE

NEW FOR 2016
3 HCS-ABX
HOSE CONTAINMENT

CB-ABX CONTROL BOX

MAIN AIR SUPPLY

MAIN WATER SUPPLY

ABX-2L ACCESSORIES



1

LWP-100 POSITIONER

- With its multiple mounting options, the LWP-100 positioner can adapt to almost any heat exchanger.
- Two high-powered pneumatic motors provide fast, precise positioning.
- Entire unit can be set up and operated with a single operator and minimal hand tools.
- Anodized aluminum rails provide maximum chemical and corrosion resistance.



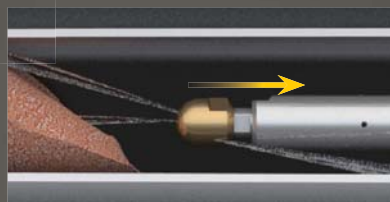
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NEW AST-100 AUTOSTROKE – AUTOMATIC BLOCKAGE SENSOR

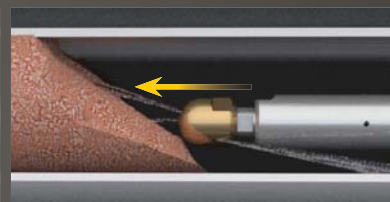
- Maximizes head life and cleaning efficiency by automatically detecting blockages and methodically working through the obstruction
- Easily installs in-line to your pneumatic lines.
- The perfect complement to your ABX-2L system.



HEAD CONTACTS BLOCKAGE AND STOPS ROTATING



AUTOSTROKE 'SENSES' BLOCKAGE AND PULLS HOSE BACK SLIGHTLY TO REGAIN HEAD ROTATION



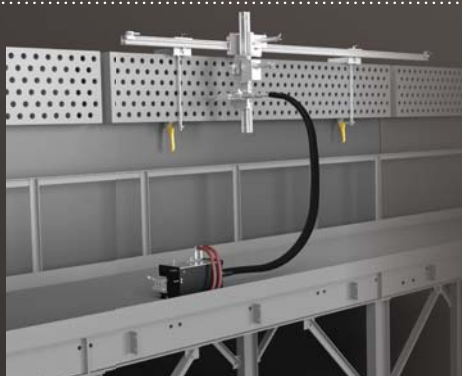
HEAD REGAINS NORMAL ROTATION AND HOSE FEED CONTINUES



3

NEW HCS-ABX – HOSE CONTAINMENT

- Holds up to 100 ft (30 m) of hose.
- Built-in backout prevention for improved jobsite safety.
- Keeps job site clear of trip hazards.
- Helps manage hoses for easy transport and storage.
- Greatly extends hose life.



NEW FIN-FAN ATTACHMENT

- Allows the ABX-2L to be operated in confined walkways to access Fin-Fan exchangers.
- Adjustable pitch.
- Customized lengths available.
- Scaffold attachment available.

SHELL SIDE CLEANING

“ This equipment operates in the most difficult conditions predominantly on petrochemical refineries running consecutive shift patterns on time driven critical projects and performs consistently to a high standard without failure.

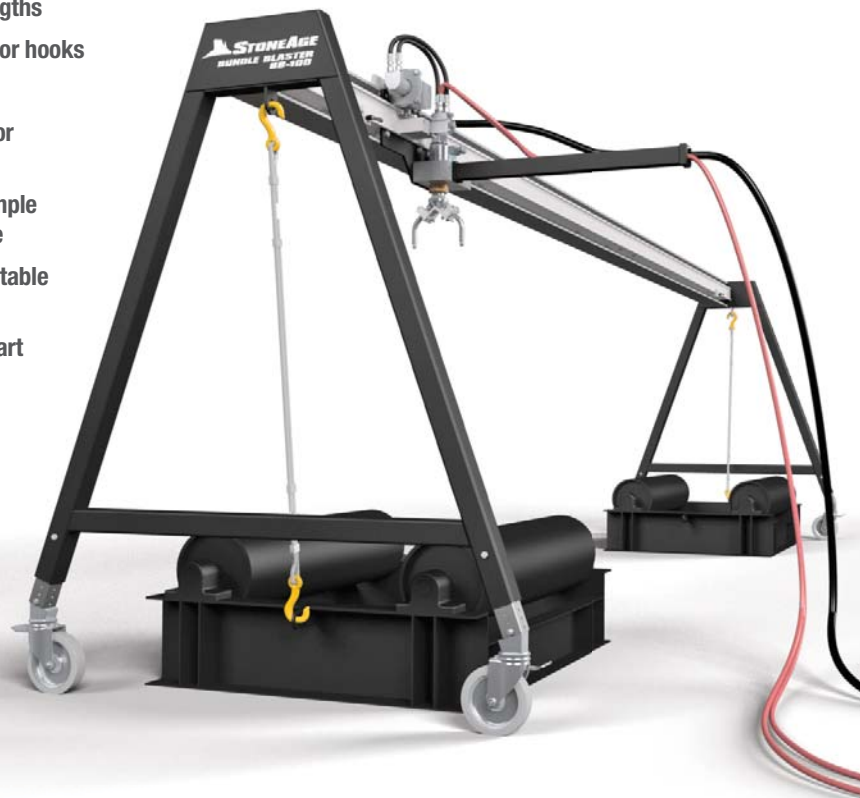
ANDREW DOBSON
VEOLIA

BUNDLE BLASTER™


The StoneAge Bundle Blaster is a powerful and affordable automated solution for external or “shell side” cleaning of heat exchangers and tube bundles. This system is ideal for contractors and plants interested in low maintenance, portable and easy to use equipment. Significantly lower cost of ownership than large cab-type bundle cleaning equipment.

FEATURES:

- Available in standard 24 ft (7.3m) and 36 ft (11m) lengths
- Adjustable “A” frames with locking wheels and anchor hooks
- Pneumatic or hydraulic packages available
- Can be adapted to a variety of pressures and flows for highest level of cleaning efficiency
- Match the stroke length to each tube bundle with simple auto-stops for efficient cleaning with no wasted time
- Rotation and traverse speed are independently adjustable using remote control panel
- The entire assembly is modular and can be taken apart with simple hand tools for transportation
- Easy and cost-effective to maintain



Tool Model	Pressure Range	Flow Range	Rotation Speed	Linear Speed	Power Supply	Rail Length
BB-100	Up to 40k psi 2800 bar	Up to 110gpm 416 l/m	50–1000 rpm	7–40 ft/min 2.1–12 m/min	Air or Hydraulic	24 ft and 36 ft 7.3 m and 11 m



Durable I-beam construction easily handles 500 lbs of thrust with minimal deflection

ADJUSTABLE FRAME HEIGHT

"A" frame height is adjustable between 5-9 ft (1.5-2.7m) to achieve optimal jet stand-off for different size tube bundles

SEVERAL HEAD OPTIONS AVAILABLE

Maximize the Bundle Blaster's cleaning capabilities for different applications

5-9 ft
(1.5-2.7m)



OPTIONAL ROLLERS

Rotate the tube bundle for maximum penetration and coverage



**OPERATING WATERBLASTING EQUIPMENT
CAN BE POTENTIALLY HAZARDOUS.
SEE PAGE 97 FOR IMPORTANT SAFETY INFORMATION**

EXCHANGER CLEANING

RIGID LANCE MACHINE

StoneAge Rigid Lance Machines are the industry standard for both horizontal and vertical rotary lance cleaning of heat exchangers. These systems provide more forward jet power than flex-lancing and increase safety by removing the operator from the splash-back area.

FEATURES:

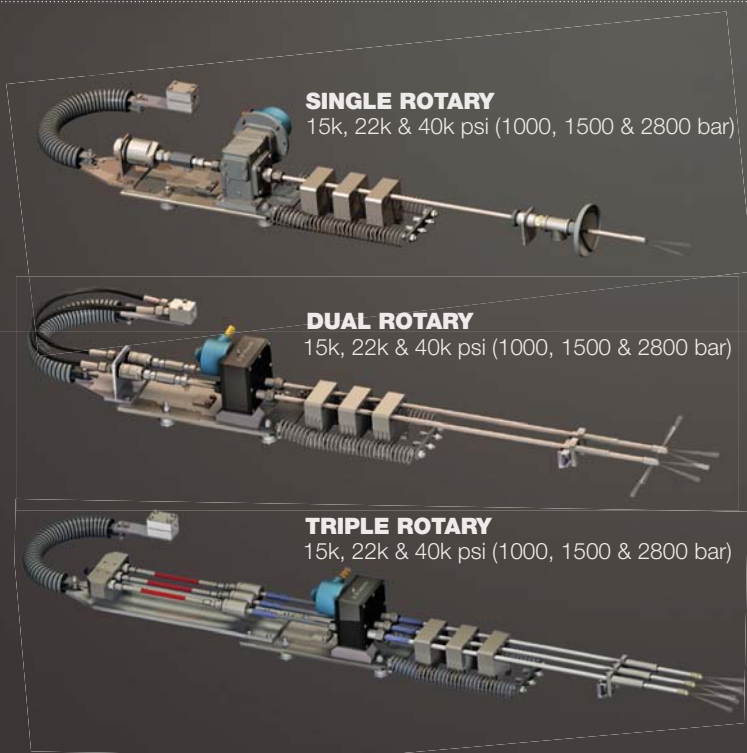
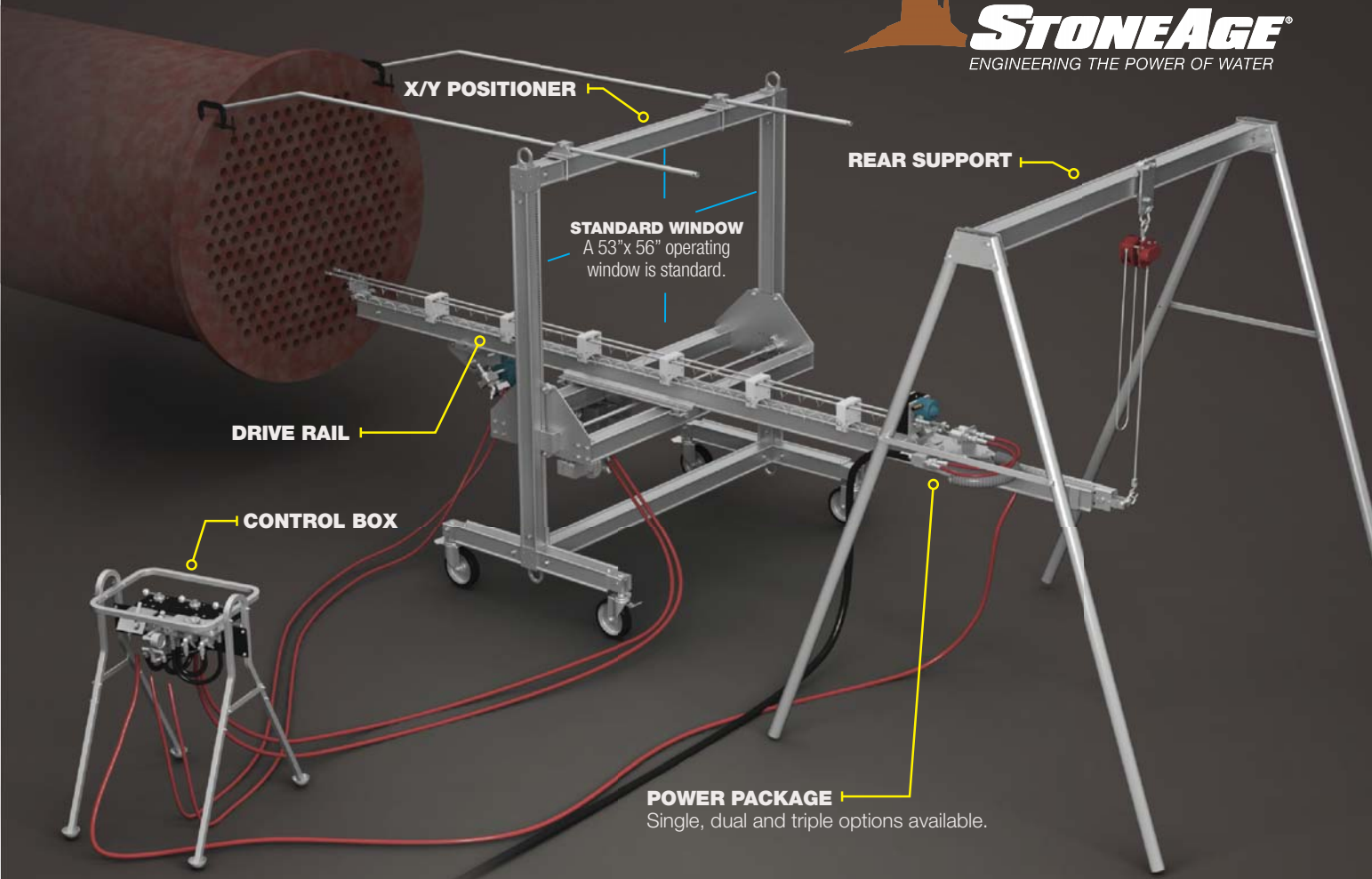
- 1, 2, or 3 rotary lances
- Adapts to any size bundle and can be configured to horizontal or vertical operations to maximize flexibility
- Operator is removed up to 25 ft (7.6m) away from the splashback area for increased safety
- Dual coil springs increase safety and stability of guide block
- Swivel wheels, jack stands, and rear supports provide extra stability and support in key points of the system
- Air or hydraulic powered

IDEAL FOR:

- Clearing and unplugging vertical and horizontal bundles
- Cleaning and polishing evaporator tubes
- Removing thin, hard scale, carbons, coke, and polymers



Tool Model	Pressure Range	Flow Range	Max Rail Length	Feed Rate
BRLM	Up to 40k psi 2800 bar	Up to 60 gpm 227 l/min	60 ft 18 m	0.3-1.2 ft/s 0.1-0.37 m/min



SWIVEL WHEELS & JACK STANDS
There are several wheel kit and jack stand options available. Heavy-duty, locking swivel casters are standard equipment. Wheel kit options are not required for vertical lancing applications.

“ The maneuverability and portability of the Striker is a vast improvement in the evolution of automation for shotgunning applications.

JAMES SHAFER
DEBUSK SERVICES GROUP

SURFACE **PREPARATION**

NEW FOR 2016

STRIKER™

The Striker SKR-100 is the industry's first commercially available portable remote shotgun system. Designed for hands-free shotgun applications, the Striker emphasizes safety, usability, and ease of assembly.

This modular system combines a rotary shotgun arm and positioning system to provide a powerful alternative to manual shotgun cleaning and surface preparation.

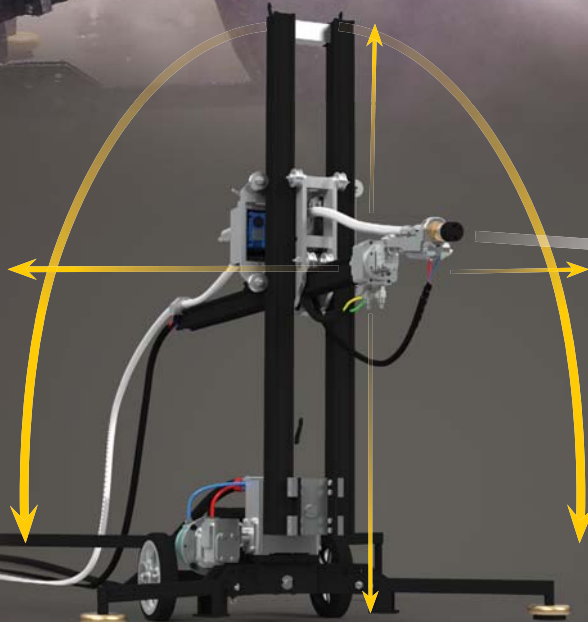
FEATURES:

- Modular system designed for portability and easy assembly
- Removes the operator away from cleaning surface
- Lightweight components for single operator setup and use
- Wheeled base for easy maneuverability
- Ergonomic control box offers intuitive remote operation
- Affordable alternative to complicated robotic systems
- Higher productivity over time

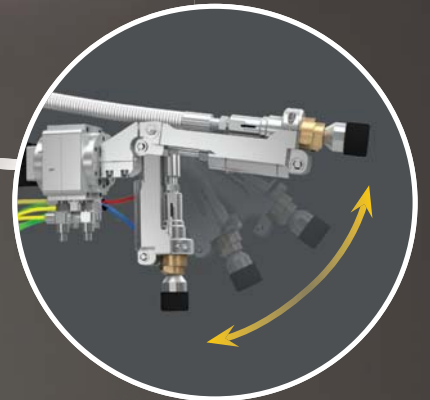
**Rotary nozzle and feed hose sold separately*



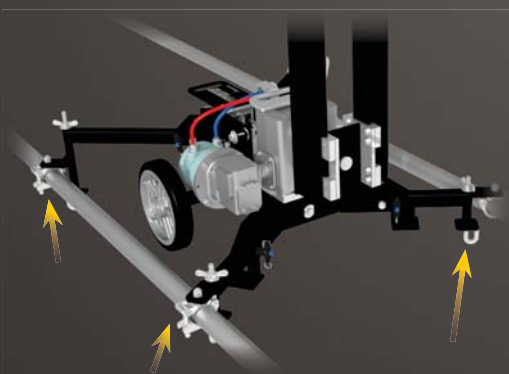
Tool Model	Pressure Range	Jet Reaction Force	Weight
SKR-100	Up to 40k psi 2800 bar	Up to 70 lb 32 kg	260 lbs 118 kg



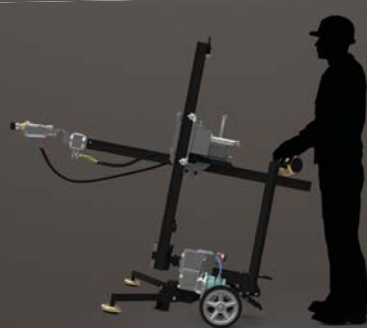
CLEANING WINDOW OPERATES ON THE X, Y AND Z AXIS
52 in. (132 cm) deep, 52 in. (132 cm) high, 84 in. (213 cm) wide



FULL WRIST ARTICULATION
Allows the "wrist" of the Striker to both flex 80 degrees and rotate up to 270 degrees.



OPTIONAL SCAFFOLD & J-HOOK MOUNTS
Can be mounted to scaffolding or grating.



MODULAR SYSTEM
Designed for portability and easy assembly.



WIRELESS CONTROL & TRACK BASE
Reposition Striker and maintain line of sight from outside the blast zone.

**COMING
2016**



**OPERATING WATERBLASTING EQUIPMENT
CAN BE POTENTIALLY HAZARDOUS.
SEE PAGE 97 FOR IMPORTANT SAFETY INFORMATION**

AUTOMATED FLOOR CLEANING

FLOOR CLEANERS

Self-Rotary Surface Cleaning

Floor Cleaners perform a wide range of functions including cleaning paint markings and degreasing surfaces, as well as removing coatings, contaminants, and membranes. They are also powerful enough to scarify concrete.

FEATURES:

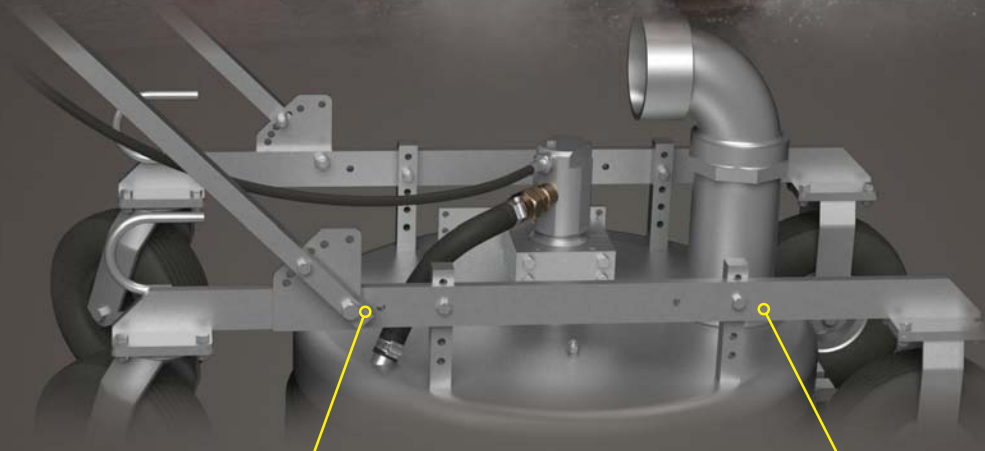
- Adjustable rotation speeds – longer dwell time for heavier deposits or shorter for lighter deposits
- Easy height adjustment adapts standoff distance to surface conditions
- Wide jet path cleans large areas quickly
- Optional vacuum system recovers water and material from work area

IDEAL FOR:

- Cleaning garages, parking lots, and other flat surfaces effectively and safely
- Removing coatings, contaminants, and membranes
- Cleaning tank and pit floors
- Concrete scarification



Tool Model	Pressure Range	Flow Range	Rotation Speed	Jet Path	Height Range	Weight
FCSV	Up to 20k psi 1380 bar	Up to 28gpm 106 l/m	300–1000 rpm	18–24 in. 356–610 mm	1–5 in. 26–127 mm	255 lbs 116 kg



EASY HEIGHT ADJUSTMENT

Allows standoff distance to be adjusted to surface conditions



SELF-ROTATING ARMS

No additional resources needed to power rotation.
Jet paths from 18–24 in. (356–610 mm).



OPTIONAL VACUUM PORT

Recovers water and waste material from work area.

AUTOMATED SURFACE CLEANING ACCESSORIES

POWERED ROTATION

Air or Hydraulic Powered Swivel

Powered Rotation units control head rotation speeds and allow the use of a wide variety of head configurations for diverse cleaning applications. These units can be specified for up to 40k psi and various rotation speeds.

FEATURES:

- Slow rotation speed increases dwell time for difficult deposits
- Fast rotation speed cuts through deposits quickly with less stripping or effect on the surface
- Adaptable head configurations can be customized for a large range of applications



FAST ROTATION SPECIFICATIONS

Tool Model	Pressure Range	Flow Range	Inlet Connection	Rotation Speed	Power Mode	Weight
SG-40	15–22k psi 1000–1500 bar	50 gpm 190 l/min	3/4 NPT 3/4 MP	300–1000 rpm	Air: 60 cfm @ 80 psi 100 m ³ /hr @ 5.5 bar	26 lb 12 kg
SG-50	15–22k psi 1000–1500 bar	50 gpm 190 l/min	3/4 NPT 3/4 MP	100–950 rpm	Hydraulic: 4.2 gpm @ 1500 psi 16 l/min @ 100 bar	26 lb 12 kg

SLOW ROTATION SPECIFICATIONS

Tool Model	Pressure Range	Flow Range	Inlet Connection	Rotation Speed	Power Mode	Weight
SG-E60	15–22k psi 1000–1500 bar	110 gpm 420 l/min	3/4 NPT 3/4 MP	10–50 or 120–600 rpm	Air: 60 cfm @ 80 psi 100 m ³ /hr @ 5.5 bar	26 lb 12 kg
SG-E70	15–22k psi 1000–1500 bar	110 gpm 420 l/min	3/4 NPT 3/4 MP	5–30 or 40–400 rpm	Hydraulic: 4.2 gpm @ 1500 psi 16 l/min @ 100 bar	26 lb 12 kg

40K SPECIFICATIONS

Tool Model	Pressure Range	Flow Range	Inlet Connection	Rotation Speed	Power Mode	Weight
UH-40	Up to 44k psi 3000 bar	20 gpm 76 l/min	9/16 HP	250–1000 rpm	Air: 60 cfm @ 80 psi 100 m ³ /hr @ 5.5 bar	26 lb 12 kg
UH-50	Up to 44k psi 3000 bar	20 gpm 76 l/min	9/16 HP	250–1000 rpm	Hydraulic: 4.2 gpm @ 1500 psi 16 l/min @ 100 bar	26 lb 12 kg

AUTOMATED SURFACE CLEANING ACCESSORIES

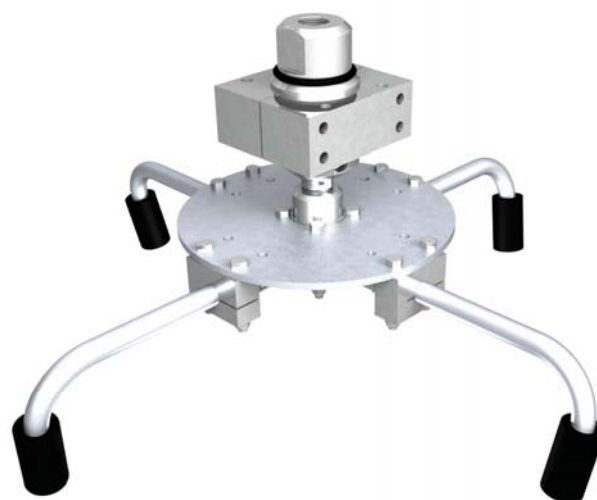
SELF ROTATING

Self-Rotary Cleaning Heads

SG-30 Free Spinner tools provide cost-effective and simple self-rotating surface cleaning and preparation solutions.

FEATURES:

- Water propelled rotation eliminates the need for expensive air drives
- Radiused arms produce powerful and effective jets
- Adjustable rotation speeds means that dwell time can be made longer for heavier deposits or shorter for lighter deposits
- Protective nozzle guards help keep nozzles protected from splashback
- Replaceable nozzle tips maximize jet quality
- Optional 18 or 24 in. (45.7 or 61.0 cm) jet paths



IDEAL FOR:

- Conveyor belt cleaning
- Airport runway rubber removal
- Belts, screens and coatings
- Degreasing and decontaminating concrete
- Use this unit for manufacturing floor cleaners

Tool Model	Pressure Range	Flow Range	Inlet Connection	Rotation Speed	Weight
SG-30-P12	Up to 15k psi 1000 bar	50 gpm 76 l/min	3/4 NPT	300–1000 rpm	25 lb 11 kg
SG-30-M12	Up to 22k psi 1500 bar	50 gpm 76 l/min	3/4 MP	300–1000 rpm	26 lb 11 kg

“ StoneAge helped us get our equipment fleet 100% automated.

MARK BLANCHARD
WATERWORKS INDUSTRIAL

AUTOMATED PIPE CLEANING

**NEW
UPGRADES IN 2016**



**OPERATING WATERBLASTING EQUIPMENT
CAN BE POTENTIALLY HAZARDOUS.**
SEE PAGE 97 FOR IMPORTANT SAFETY INFORMATION

AUTOBOX® ABX-500

The ABX-500 is a portable, air powered hose control device. The hose feed rate can be adjusted to meet the demands of each pipe cleaning job. The unit can pass hose couplings for continuous operation.

Traditional methods require the operator to hand feed a hose, which can cause streaking, fatigue and increased safety concerns.

NEW UPGRADES:

- Now uses the same lightweight control box as the ABX-2L making it easier to manage and maintain all Autobox equipment
- Features enhanced system controls for smoother hose deployment at slow speeds

FEATURES:

- Remote operation from outside of the blast zone reduces risk of injuries
- Hands-free cleaning minimizes operator fatigue and reduces downtime
- Controllable feed rates allow for consistent cleaning
- Passes hoses and couplings up to 1.75 in. (44.5 mm) O.D.
- Several mounting options available
- CE Certified



Tool Model	Pulling Force	Feed Rate	Hose Size	Weight
ABX-500	Up to 200 lbs 90.7 kg	1–30 ft/min 0.3–9.1 m/min	0.56–1.75 in. 13–44 mm	90 lbs 41 kg

DURABLE STAINLESS STEEL & HARD ANODIZED ALUMINUM

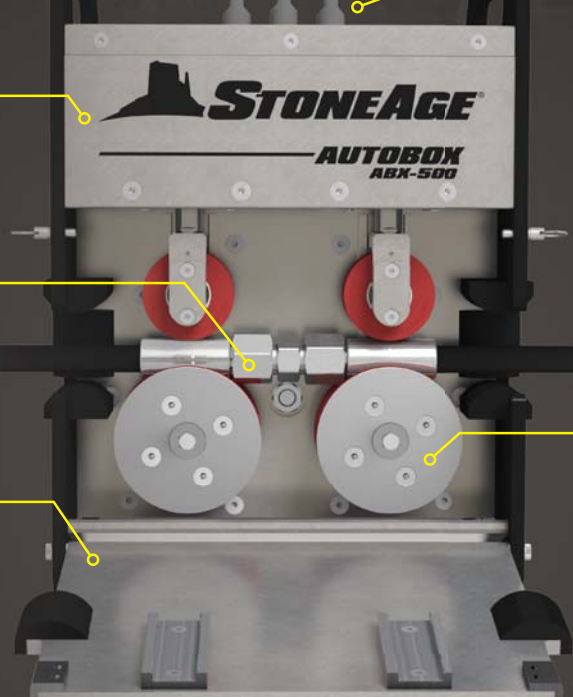
Built for the harshest environments. Resists corrosive chemicals for years of trouble free use.

UNINTERRUPTED OPERATION

Passes couplings up to 1.75 in. (44 mm) OD.

EASY ACCESS

Hoses load easily from the front using the pivoting door.



HOSE SPEED CONTROL

Independent controls allows operator to precisely adjust hose speeds for specific applications.

INTERCHANGEABLE ROLLERS

Accommodates hoses from 0.56-1.75 in. (13-44 mm) O.D.

VERTICAL APPLICATIONS

Can be used in vertical applications such as cleaning tanks, vessels and pipes.

COMPLETE SYSTEM AVAILABLE

Designed to be paired with StoneAge's CB-ABX Control Box.





**OPERATING WATERBLASTING EQUIPMENT
CAN BE POTENTIALLY HAZARDOUS.
SEE PAGE 97 FOR IMPORTANT SAFETY INFORMATION**

AUTOMATED PIPE CLEANING

**NEW
COMING IN 2016**

NAVIGATOR

Automated Rotary Pipe Cleaning

The StoneAge Navigator is a portable Rotary Hose Device (RHD) designed to clean small pipes with bends.

The hose rotation enables access through multiple elbows and makes the Navigator ideal for cleaning process piping, drain lines, and other small ID pipes with bends.

FEATURES:

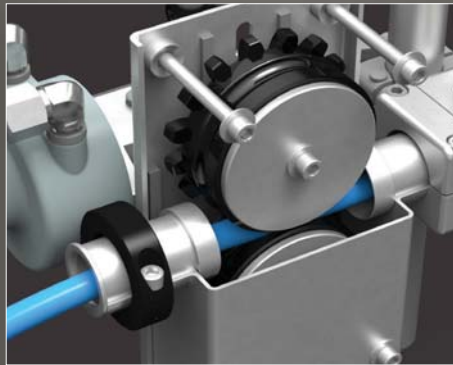
- Continuous rotation of the hose allows the nozzle to pass up to 8 pipe bends in small pipe
- Can hold 100 ft (30 m) of hose for approximately 90 ft (27 m) of reach
- Accommodates hose sizes 4/4, 5/4 and 6/4
- Adjustable feed speed to customize dwell time
- Snout simplifies attaching the system to the pipe and increases safety
- Lightweight, modular design allows a single operator to move, set-up and run
- Compatible with StoneAge Badger™ pipe cleaning tools, and Banshee™ Beetle tube cleaning tools



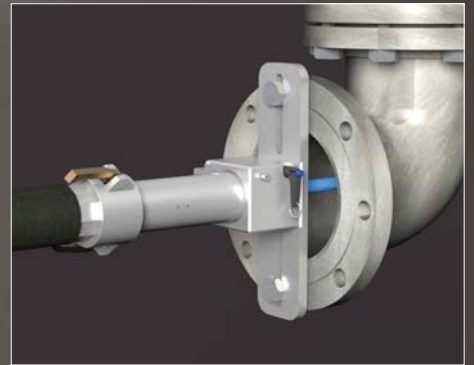
Tool Model	Max Pressure	Max. Feed Rate	Min. Feed Rate	Hose Size	Usable Hose Length	Complete Weight
NAVIGATOR	20k psi 1400 bar	2.0 ft./sec 609 mm/sec	0.2 ft./sec 61 mm/sec	4/4, 5/4 and 6/4	90ft 90 m	100 lbs 45 kg



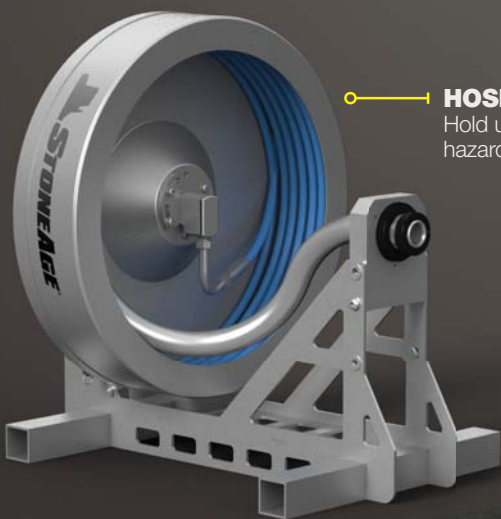
ERGONOMIC CONTROL BOX
Offers intuitive operation.



ACCOMMODATES SEVERAL HOSE SIZES
Designed to work with 4/4, 5/4, and 6/4 hoses.



FLANGE MOUNT
Versatile mount with cam-lock attachment for quick setup.

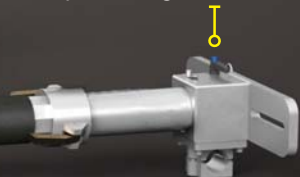


HOSE DRUM
Hold up to 100 ft (30 m) of hose. Keeps job site clear of trip hazards. Also protects the hose during transport and storage.



DRIVE
Simple hose drive is lightweight and easy to maintain.

SNOUT
Allows quick, easy setup and increases safety with integrated backout preventer.



“When we needed light, versatile, automated equipment for challenging pipe cleaning jobs like elevated areas and pipe rack cleaning, the ProDrive fit the bill perfectly.

**BRADLEY COBLE
PSC FAST DIRECTOR**

AUTOMATED PIPE CLEANING

**NEW
COMING IN 2016**



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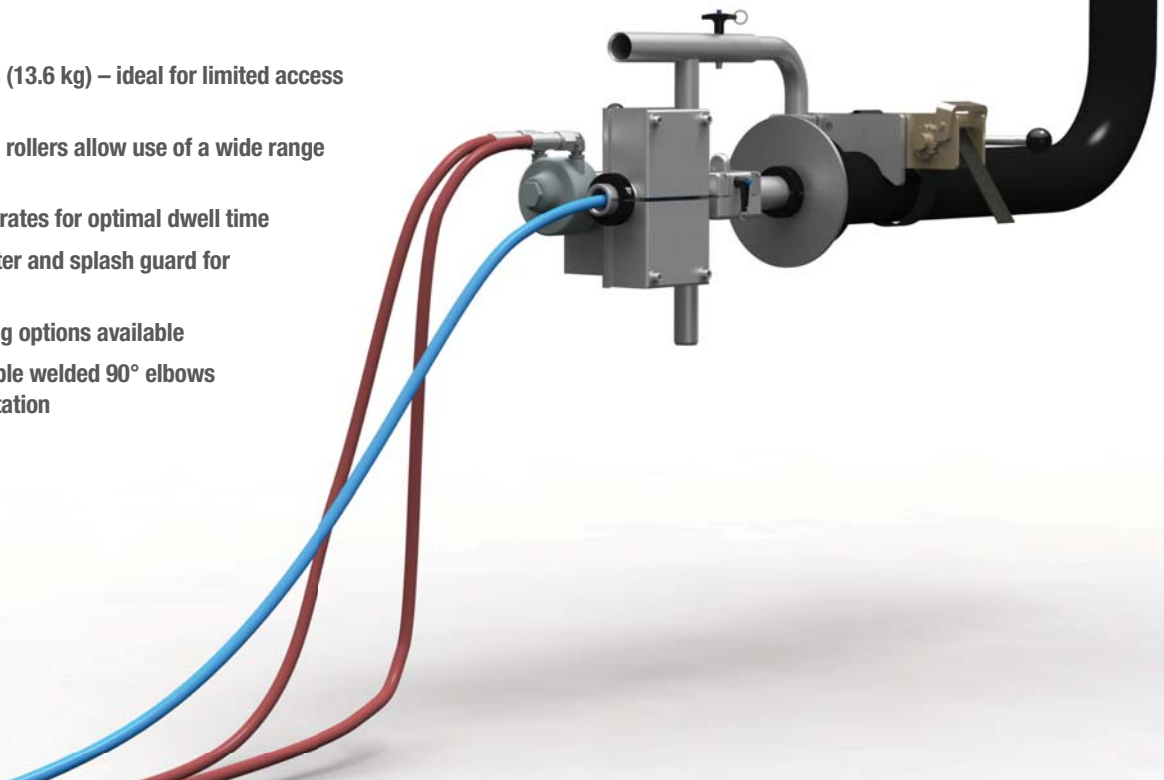
PRODRIVE™

The ProDrive hose feed device has been engineered to quickly and safely clean a broad range of pipes with or without a flange. The system is lightweight and designed for portability making it the perfect tool for limited access applications.

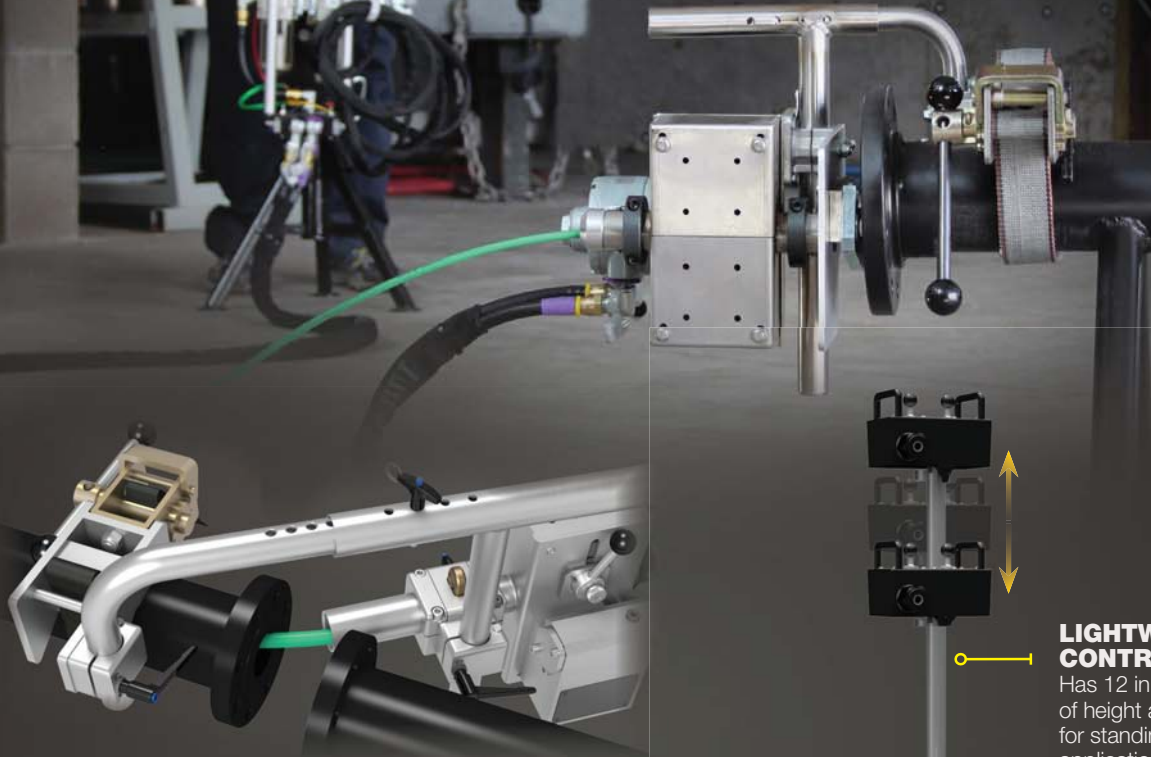
Lightweight floorstand control box gives maximum flexibility for efficient operation and operator safety.

FEATURES:

- Less than 30 lbs (13.6 kg) – ideal for limited access applications
- Interchangeable rollers allow use of a wide range of hoses
- Adjustable feed rates for optimal dwell time
- Backout preventer and splash guard for operator safety
- Several mounting options available
- Navigates multiple welded 90° elbows without hose rotation

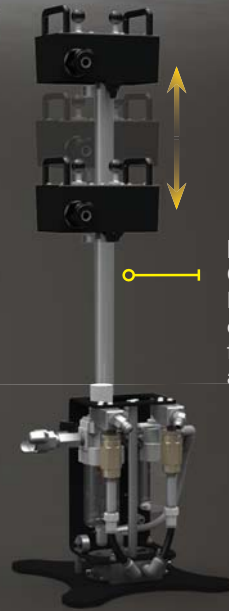


Tool Model	Max. Feed Rate	Min. Feed Rate	Poly Hoses	Weight (Tractor Only)
ProDrive	2.0 ft./sec 609 mm/sec	0.2 ft./sec 61 mm/sec	3/2–8/4, 3/8 Rubber Covered	22 lbs 10 kg



**MULTIPLE MOUNTING
OPTIONS AVAILABLE**

Allows the ProDrive to be used with a wide variety of pipe sizes and configurations.



**LIGHTWEIGHT
CONTROL BOX**
Has 12 in. (305 mm) of height adjustment for standing or sitting applications



DETACHABLE CONTROLS

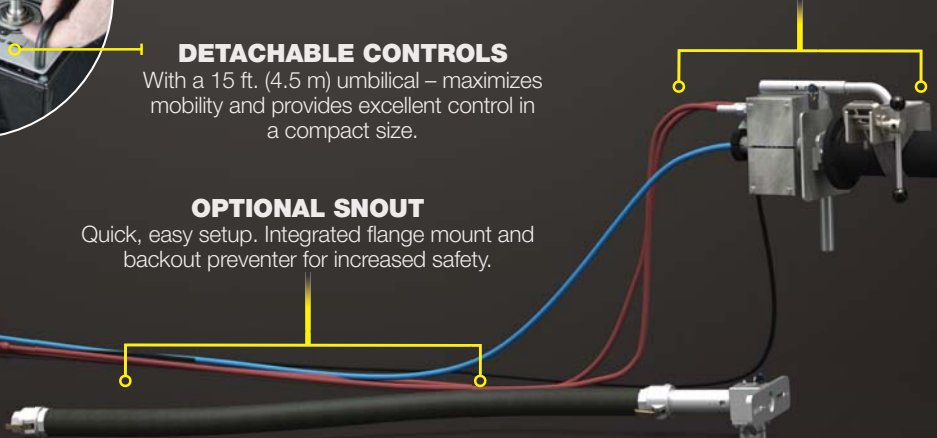
With a 15 ft. (4.5 m) umbilical – maximizes mobility and provides excellent control in a compact size.

OPTIONAL SNOOT

Quick, easy setup. Integrated flange mount and backout preventer for increased safety.

DRIVE

Simple hose drive is lightweight and easy to maintain.





**OPERATING WATERBLASTING EQUIPMENT
CAN BE POTENTIALLY HAZARDOUS.**

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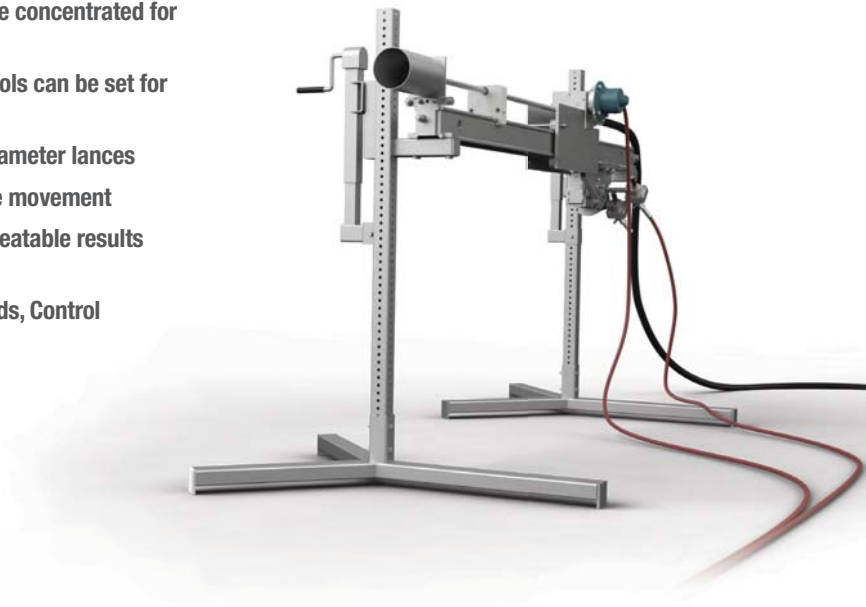
AUTOMATED PIPE CLEANING

INSIDE DIAMETER PIPE CLEANER

The StoneAge I.D. Pipe Cleaner is an automated rigid lance system designed to clean the interior surface of drill pipes used in the oil and gas industry. The I.D. Pipe Cleaner can run pressures up to 40K psi (2800 bar) and has adjustable rotation and stroke controls to optimize blast settings for any deposit including cement, drill mud, paraffin, and NORM. This system is also ideal for use in the descaling or pickling process used in many steel foundries.

FEATURES:

- Affordable modular design is configurable to clean pipes up to 55 ft (16.7 m) in length
- Can be adapted to a variety of pressures and flows up to 60 gpm (227 l/min) and 40k psi (2800 bar) for the highest level of cleaning efficiency
- Rigid rotating lance allows all power or flow to be concentrated for cleaning rather than pulling or rotation
- Independently adjustable rotation and feed controls can be set for optimal dwell to match any type of deposit
- Heavy-duty carriage assembly adapts to large diameter lances
- Rugged pipe vice attachment helps stabilize pipe movement
- Automated operation delivers consistent and repeatable results when cleaning thousands of linear feet of pipe
- Complete package includes adjustable jack stands, Control Box, rigid lance, and cleaning heads



Tool Model	Pressure Range	Flow Range	Rotation Speed	Stroke Length	Weight
ID PIPE CLEANER	Up to 40k psi 2800 bar	Up to 60 gpm 227 l/min	50–300 rpm	Up to 55 ft 16.7 m	87 lb 40 kg

REMOTE OPERATION

Lance rotation and stroke speed are independently managed from the control box

CUSTOM LENGTHS AVAILABLE

Configurable to clean pipes up to 55 ft (16.67 m) in length, at pressures up to 40k psi (2800 bar)

ADJUSTABLE JACK STANDS

Leg height adjusts up or down to create 3 ft (91.5 cm) of adjustability.



**OPERATING WATERBLASTING EQUIPMENT
CAN BE POTENTIALLY HAZARDOUS.
SEE PAGE 97 FOR IMPORTANT SAFETY INFORMATION**

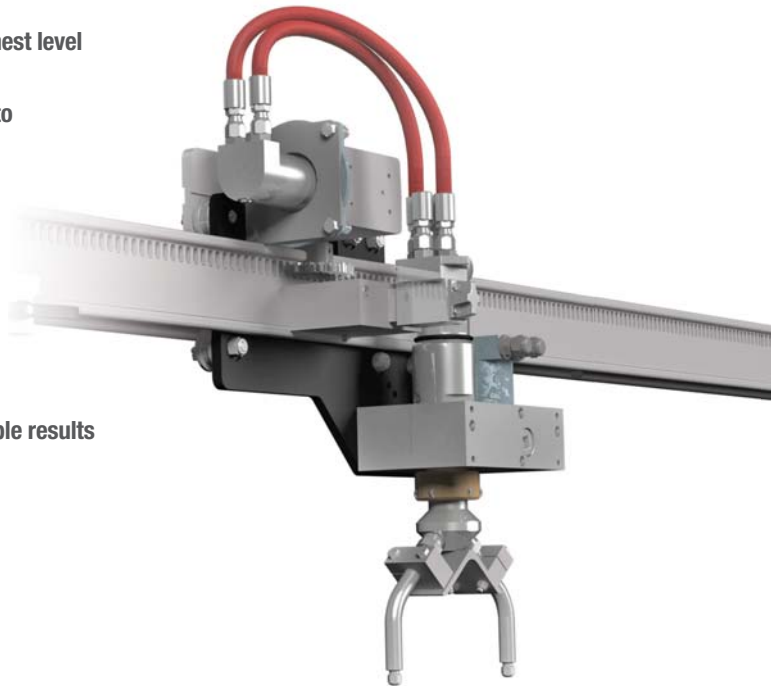
RIGID PIPE CLEANING

OUTSIDE DIAMETER PIPE CLEANER

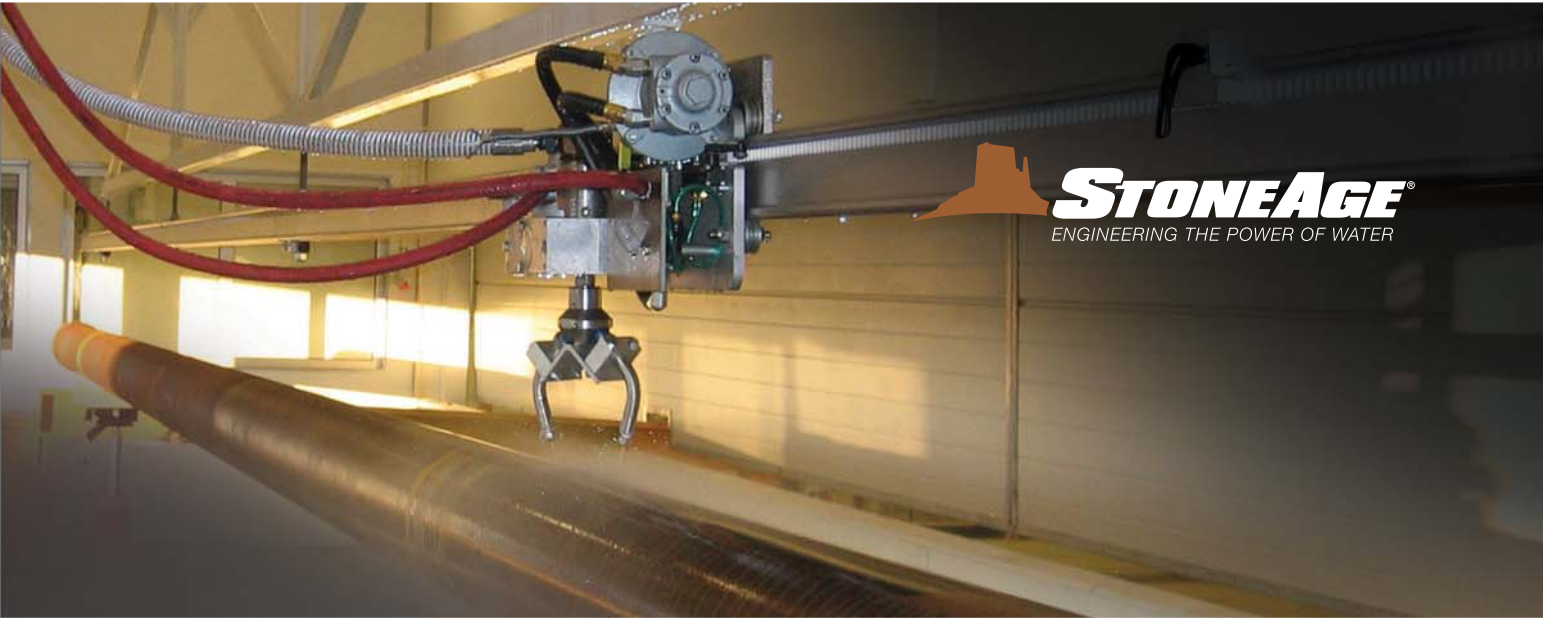
The StoneAge O.D. Pipe Cleaner is a powerful and affordable automated solution for cleaning the outer surface of drill pipes used in the oil and gas industry. The length of the system can be easily customized for permanent installation into pipe cleaning facilities providing consistent and efficient removal of drill mud, concrete, slag, or other exterior deposits on large volumes of pipe.

FEATURES:

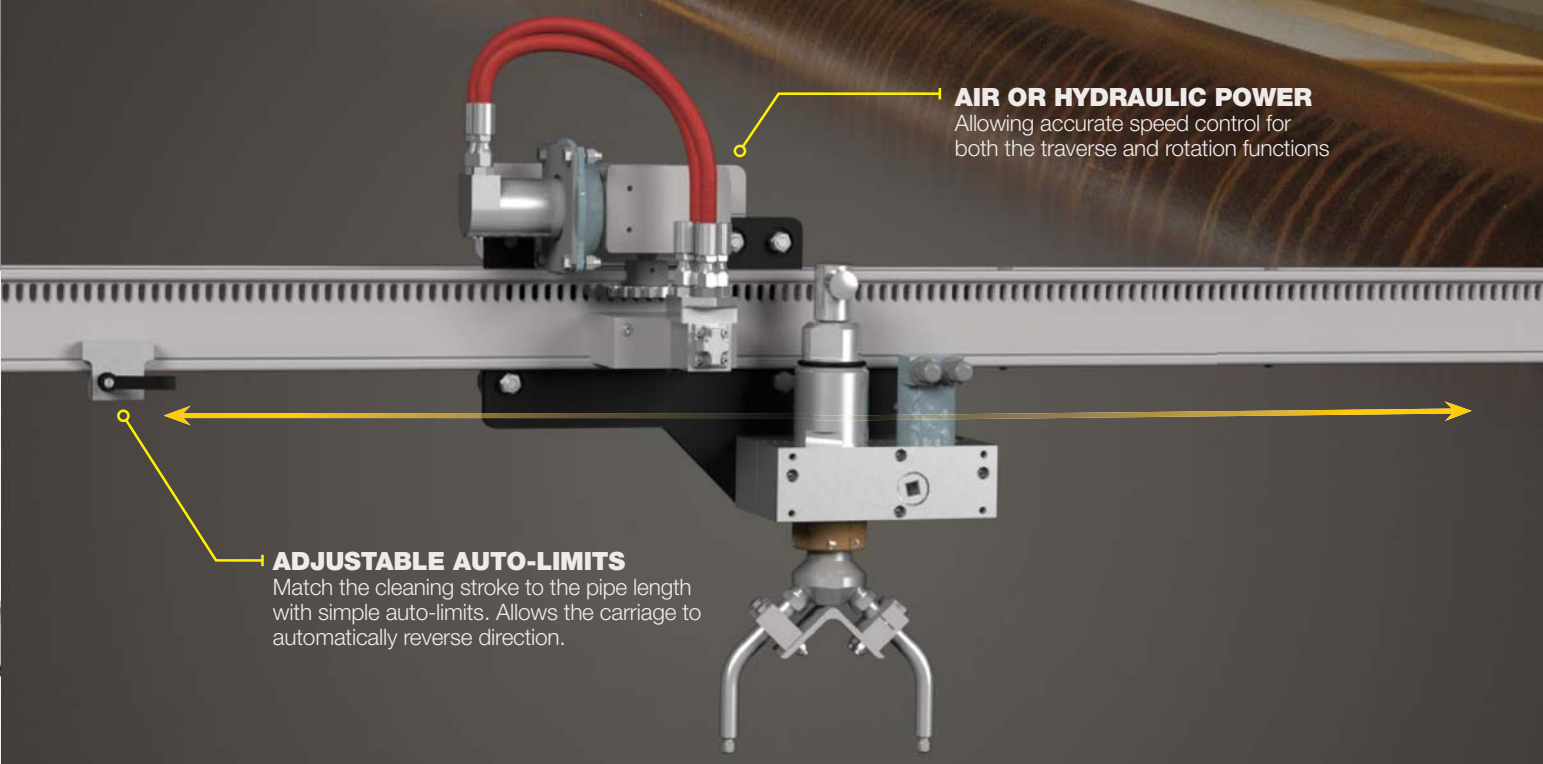
- Can be adapted to a variety of pressures and flows for highest level of cleaning efficiency
- Rotation and traverse speed are independently adjustable to customize dwell time
- Several head options available for delivering more concentrated power or covering a wider cleaning path
- Match the stroke length to the pipe sections being cleaned with simple auto-limits for efficient cleaning with no wasted time
- Modular rail allows the assembly to be customized to any length
- Fully automated operation delivers consistent and repeatable results when cleaning thousands of linear feet of pipe lengths



Tool Model	Pressure Range	Flow Range	Rotation Speed	Linear Speed	Air Supply	Rail Length
OD PIPE CLEANER	Up to 40k psi 2800 bar	Up to 50 gpm 190 l/min	50-1000 rpm	7-40 ft/min 2.1-12 m/min	60 cfm @ 80 psi 100 m/hr @ 5.5 bar	Up to 60 ft 18.3 m



AIR OR HYDRAULIC POWER
Allowing accurate speed control for both the traverse and rotation functions



ADJUSTABLE AUTO-LIMITS
Match the cleaning stroke to the pipe length with simple auto-limits. Allows the carriage to automatically reverse direction.

SEVERAL HEAD OPTIONS AVAILABLE
Maximize the O.D. Pipe Cleaner's capabilities for different applications.





**OPERATING WATERBLASTING EQUIPMENT
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AUTOMATED TANK CLEANING

TORUS® TR-130

3D Tank and Vessel Cleaning

The Torus TR-130 is a powerful and highly adaptable 3-D cleaning tool designed to easily adjust to a wide range of pump capacities, working pressures, and cleaning applications.

Today's cleaning environments demand hands-free automated technology for increased safety. When the Torus TR-130 is combined with our positioning equipment in chemical and power plants these challenges are met.

FEATURES:

- **Small entry diameter enables access to more tanks and vessels**
- **If the arms hit an internal obstruction while in operation, the Torus TR-130 simply stops rotating without damaging the gear mechanism**
- **Minimal pressure loss which provides more power delivery than other tools on the market**
- **Interchangeable manifolds and couplings allow the operator to use the TR-130 on different pumps ranging from 10k psi (700 bar) to 20k psi (1500 bar)**
- **Wide range of accessories available including positioning devices, cage centralizers and extensions help adapt the Torus TR-130 to specific needs and jobs**



Tool Model	Pressure Range	Flow Range	Cycle Time	Inlet Connection	Rotation Speed	Weight
TR-130	2–22k psi 138–1500 bar	10–81 gpm 38–307 l/min	4–24 minutes	3/4 NPT, 1 NPT, 3/4 MP, 1 MP, M24	Adjustable	35 lb 16 kg

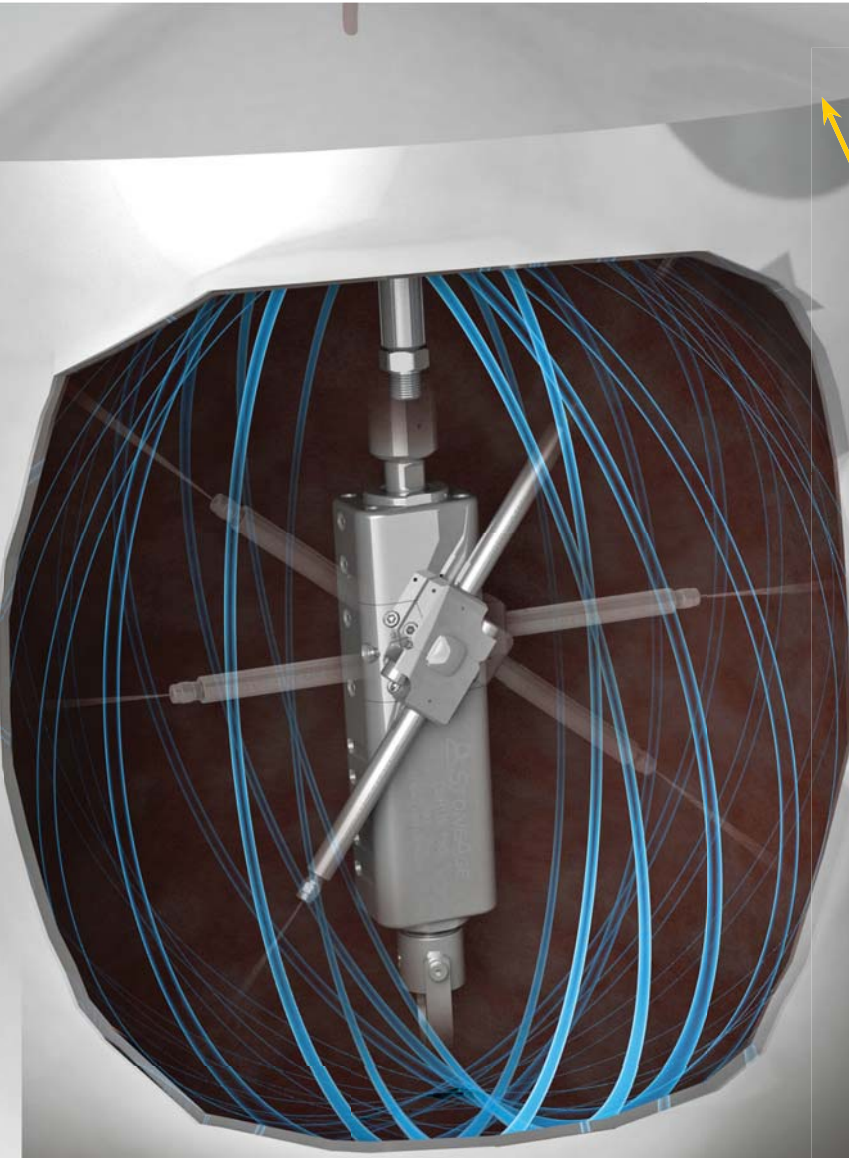


EXTENSION NIPPLES

The Torus TR-130 is supplied two standard 6 in (15 cm) nipples. Longer extension nipples can be supplied up to a maximum length of 39 in (99 cm). Custom lengths are available on request.

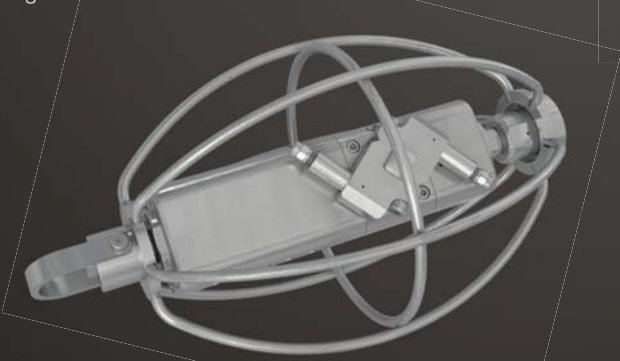
**UP TO
39 INCHES
(99 CM)**

**6 INCHES
(15 CM)
SUPPLIED**



TR 408-SS – CAGE CENTRALIZER

The Torus TR-130 can be fitted with a cage-style centralizer. This is ideal for applications where debris or internal structures may interfere with the cleaning operation. Nipples 2 in. (51 mm) in length must be used with the centralizer.



PULLING RING

A pulling ring is available for the TR-130. It is fitted on the opposite end of the tool from the hose inlet.



MAINTENANCE RESOURCES

Tool	Service Kit	Seal Kit	Overhaul Kit	Manual
TR-130	TR130 600	TR 602	TR130 610	PL 556



**OPERATING WATERBLASTING EQUIPMENT
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SEE PAGE 97 FOR IMPORTANT SAFETY INFORMATION**

AUTOMATED TANK CLEANING

TORUS® TR-200

High Flow 3D Tank and Vessel Cleaning

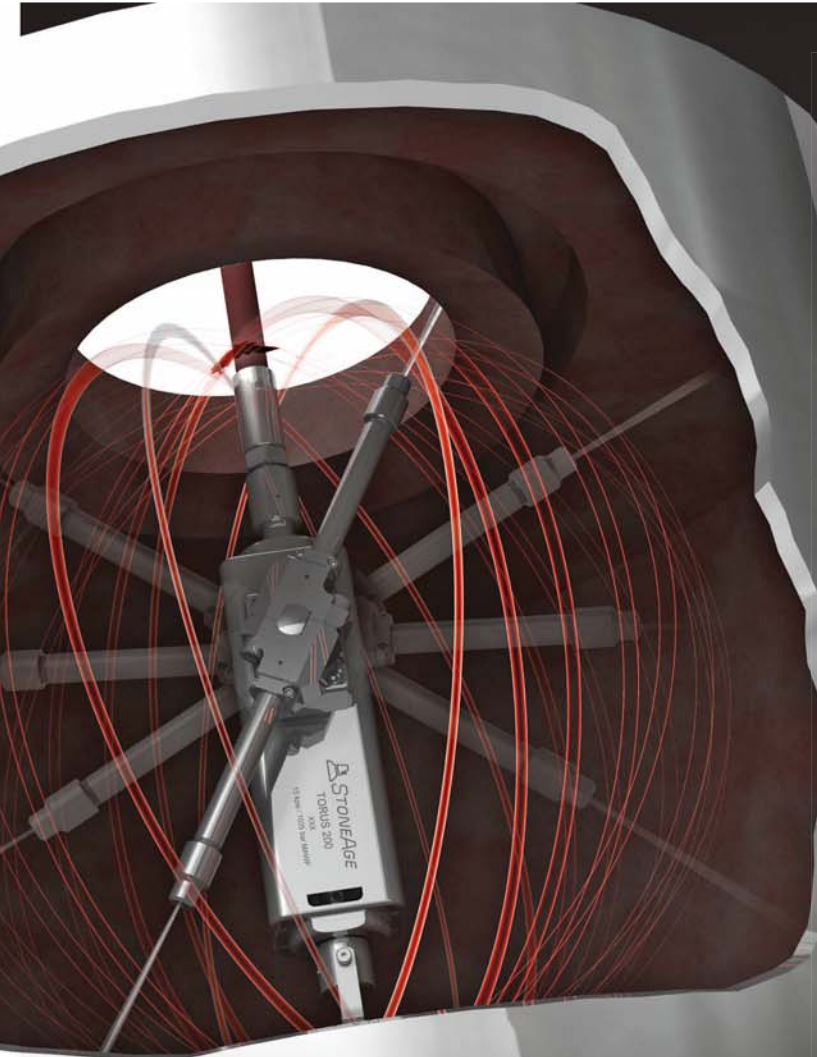
The Torus TR-200 is the industry's most powerful 3-D tool. It is capable of delivering flows up to 220 gpm (830 l/min) with minimal pressure loss. Applying higher flows allows contractors to remove thicker deposits and deliver longer and harder hitting jets from further distances. This is ideal for cleaning large tanks, removing coke deposits, and other hard to handle applications and materials.

FEATURES:

- **Small entry diameter and light weight enable easy transport, setup, storage, and access to more tanks and vessels**
- **If the arms hit an internal obstruction while in operation, the Torus TR-200 simply stops rotating without damaging the gear mechanism**
- **Side by side field trials prove that the Torus TR-200 experiences less pressure loss than competitive tools on the market – less pressure loss equals more power delivered to the cleaning surface and greater productivity**
- **Positioning devices and extensions help adapt the Torus TR-200 to specific needs**



Tool Model	Pressure Range	Flow Range	Cycle Time	Inlet Connection	Rotation Speed	Weight
TR-200	8–15k psi 550–1000 bar	50–220 gpm 190–830 l/min	10–88 minutes	P16 (up to 12k psi MAWP) MP16 (up to 15k psi MAWP)	Adjustable	100 lb 45 kg



EXTENSION NIPPLES

The Torus TR-200 is supplied with two standard 8-inch (203 mm) extension nipples. Longer nipples can be supplied up to a maximum length of 48 in. (1200 mm). Custom lengths are available on request.

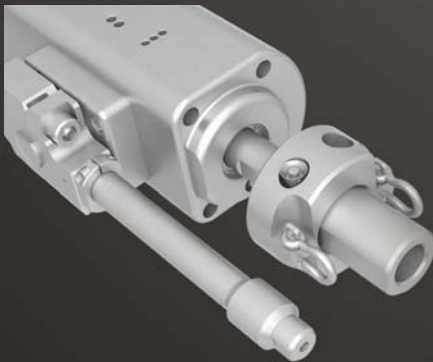
**UP TO
48 INCHES
(1200 MM)**

**8 INCHES
(203 MM)
SUPPLIED**



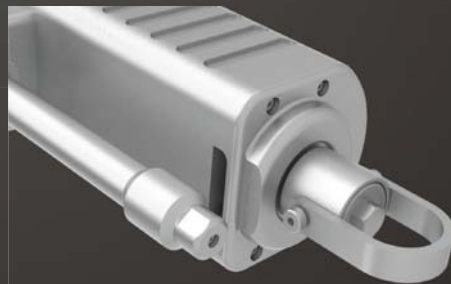
LIFTING ASSEMBLY

The Torus TR-200 comes with a heavy duty and versatile lifting assembly. It includes two quick release pins, two ring attachments, and a choice of P16 or MP16 coupling.



PULLING RING

A pulling ring is available for the Torus TR-200. It is fitted on the opposite end of the tool from the hose inlet.



MAINTENANCE RESOURCES

Tool	Service Kit	Seal Kit	Overhaul Kit	Manual
TR-200	TR200 600	TR200 602	TR200 610	PL 557



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TANK & VESSEL CLEANING

POSITIONING BOOMS

Positioners provide up to 19 ft (5.8 m) of reach for the Torus 3-D tank cleaner in addition to tilt and rotation adjustments. Intended for vertical or near vertical applications.

FEATURES:

- Easily adjustable extension/retraction lengths means the cleaning nozzle can be extended (or retracted) to a variety of insertion depths for better cleaning coverage
- 24 in. (61 cm) aluminum mounting plate secures to the vessel during cleaning operation, increasing operator safety
- Inspection hatch allows for line of sight placement of cleaning head and used to check cleaning progress
- Portable and easy setup; no special tools required to position head
- Control Box (optional) offers convenient controls for vertical positioning and linear speed



TORUS sold separately

SIMPLE BOOM SPECIFICATIONS

MODEL	SB-H	SB-P16
Maximum Pressure	N/A	10k psi (690 bar)
Maximum Flow	50 gpm (190 l/min)	150 gpm (570 l/min)
Inlet Connections	1/2 NPT or 1-12 "M"	1 NPT
Maximum Hose ID	0.5 in. (13 mm)	N/A
Maximum End Fitting	1.5 in. (38 mm)	N/A
Weight	80 lb (36 kg)	80 lb (36 kg)

EXTENSION BOOM SPECIFICATIONS

MODEL	EB-100
Maximum Pressure	12k psi (830 bar)
Linear Speed	8-45 in./min (0.2-1.1 m/min)
Maximum Stroke Length	12 ft (3.7 m)
Inlet Connection	3/4 NPT

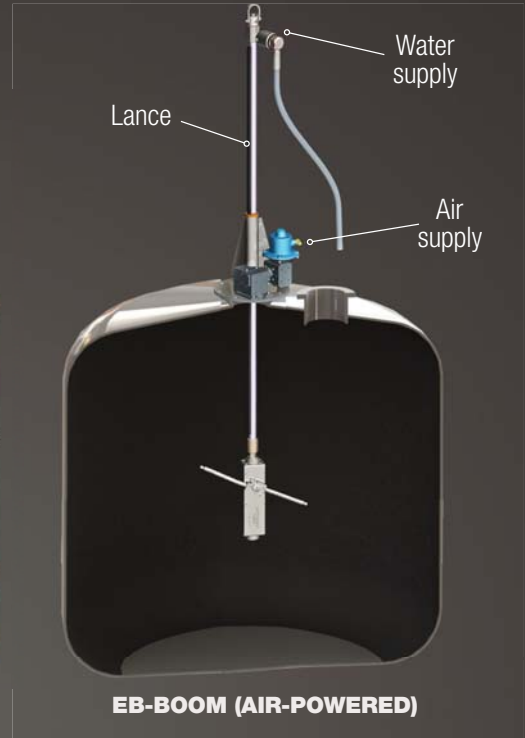
PRIMARY USES FOR POSITIONING BOOMS



SIMPLEBOOMS



TELEBOOM



EB-BOOM (AIR-POWERED)

POSITIONING BOOMS

Large tanks and vessels can be among the most difficult cleaning challenges due to their size, limited access, and internal geometries. StoneAge offers several tools that keep the operator out of the tank. The most efficient means of cleaning is a 2-D tool moved along the axis of the vessel. This is not possible in most tanks due to central obstructions such as agitators. In these cases the simplest way is to use a 3-D tank cleaning tool.

The easiest method for using a 3-D tool is to hang it in the tank by the high pressure hose. Several types of positioners for 3-D tools allow you to place the tool closer to the surface to be cleaned and position the tool away from obstructions. Large diameter tanks that have an accessible center can effectively be cleaned using a 2-D rotating tool that is slowly raised or lowered with a hose tractor such as the ABX-500 to achieve complete coverage. Nipple extensions should be used when possible to ensure proper standoff distances.

TELEBOOM SPECIFICATIONS

MODEL	TB-6-TR	TB-8-TR	TB-10-TR
Maximum Pressure	22k psi (1500 bar)	22k psi (1500 bar)	22k psi (1500 bar)
Maximum Flow	100 gpm 380 l/min)	100 gpm (380 l/min)	100 gpm (380 l/min)
Inlet Connections	3/4 NPT, 3/4 MP or M24	3/4 NPT, 3/4 MP or M24	3/4 NPT, 3/4 MP or M24
Maximum Hose ID	3/4 in. (19 mm)	3/4 in. (19 mm)	3/4 in. (19 mm)
Collapsed Length	6.5 ft (2.0 m)	8.5 ft (2.6 m)	10.5 ft (3.2 m)
Maximum Reach	13 ft (4.0 m)	19 ft (5.8 m)	25 ft (7.6 m)
Weight	120 lb (55 kg)	130 lb (59 kg)	140 lb (63 kg)



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AUTOMATED TANK CLEANING

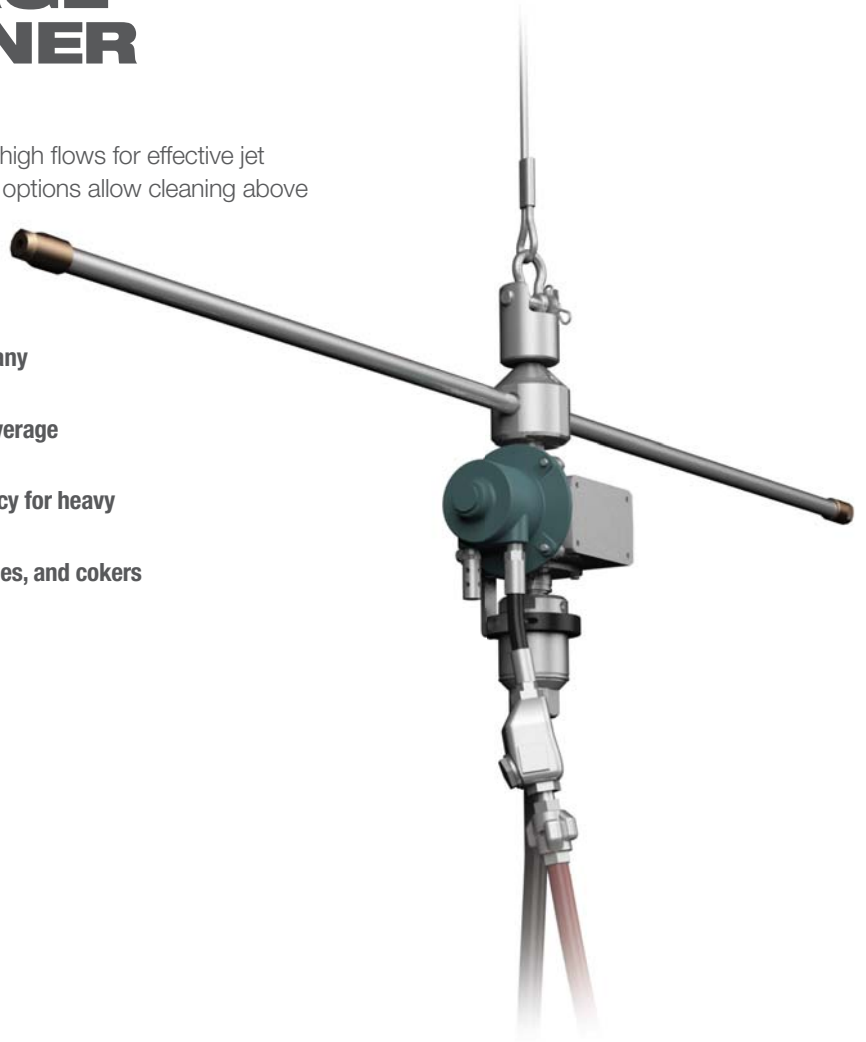
SM-AIR LARGE TANK CLEANER

High Flow Tank Cleaning

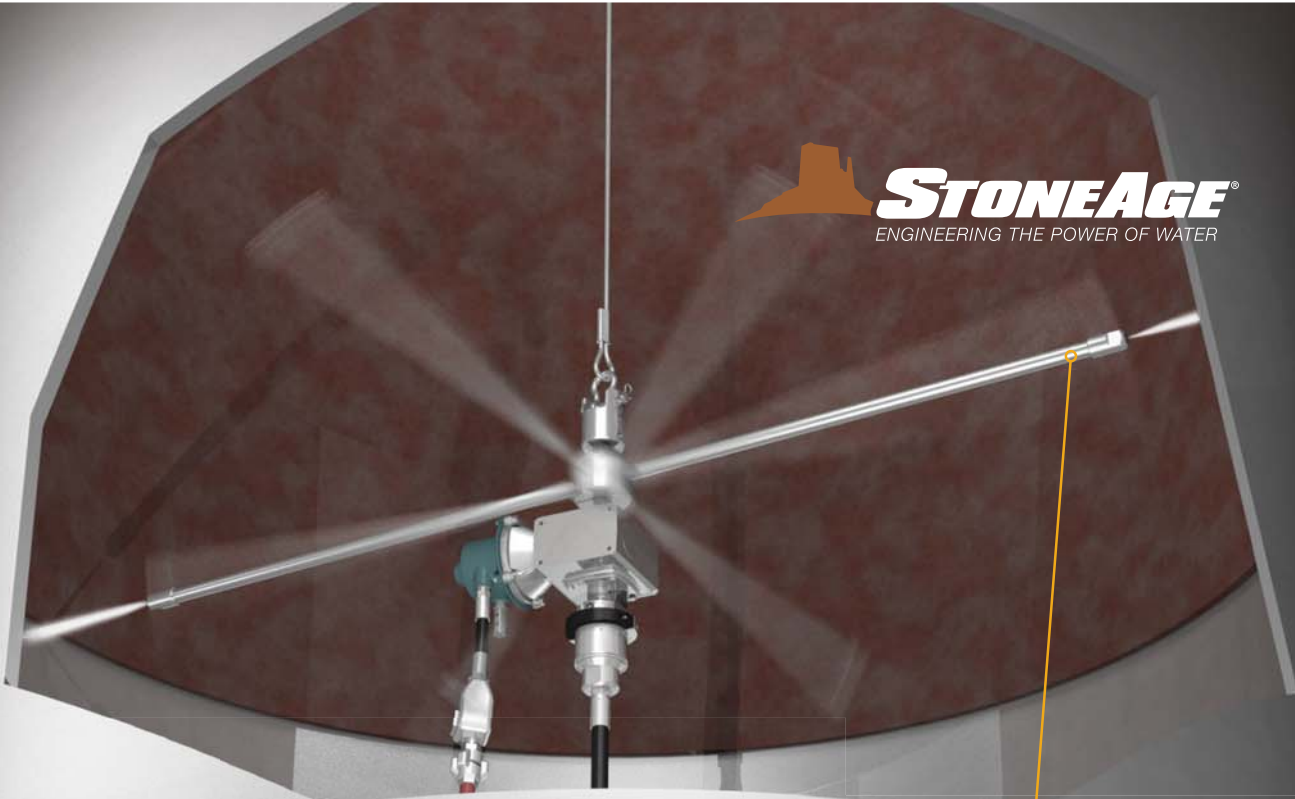
The SM-AIR offers air powered rotation at high flows for effective jet power over long distances. Different head designs allow cleaning above and below irregular surfaces.

FEATURES:

- Versatile and durable gearbox can be used with a variety of head designs for many different applications
- Air-powered rotation provides uniform coverage over a large area
- Variable speed control maximizes efficiency for heavy or light applications
- Ideal for cleaning boilers, furnaces, cyclones, and cokers



Tool Model	Pressure Range	Flow Range	Inlet Connection	Rotation Speed	Weight
SM-AIR	Up to 12k psi 830 bar	Up to 300 gpm 1140 l/min	1 NPT	10-70 rpm	78 lb 35 kg



EXTENSION NIPPLES

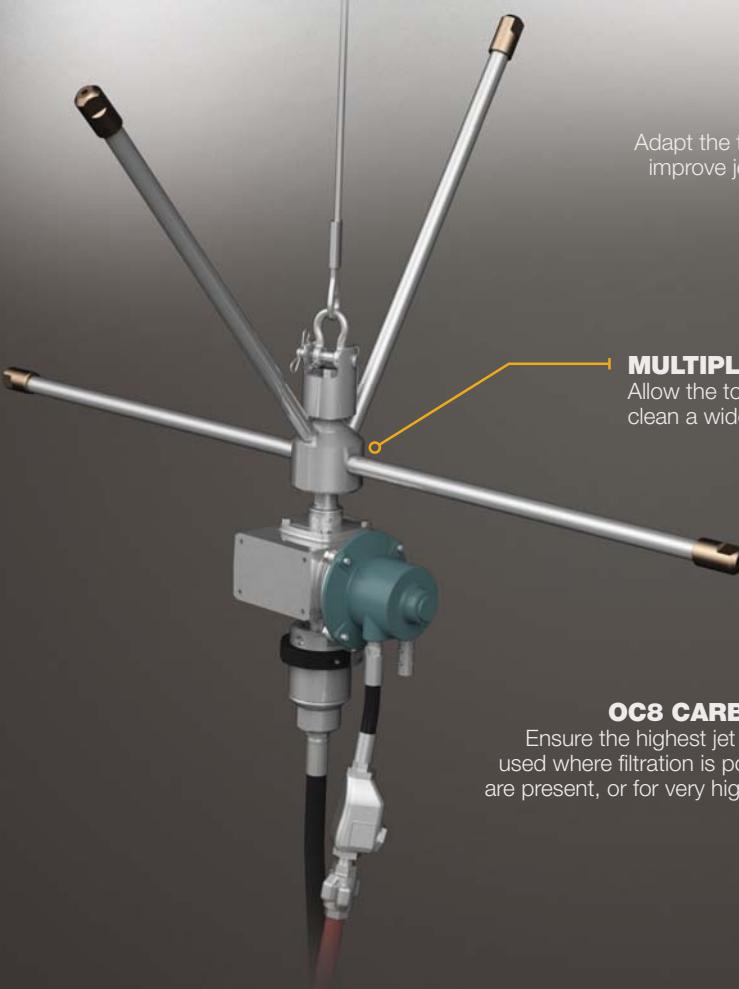
Adapt the tool to various vessel sizes and improve jet quality by reducing stand-off distance

MULTIPLE HEAD OPTIONS

Allow the tool to be configured to clean a wide range of applications

OC8 CARBIDE NOZZLES

Ensure the highest jet quality and can be used where filtration is poor, abrasive solids are present, or for very high flow applications



BOILER CLEANING



We're able to operate the BTC from completely outside the boiler—not having to enter that confined space. Besides that, the ability to apply the amount of horsepower that we're able to in combination with the nozzle technology that we have now makes it just so much better.

DOUG MCGEE
EVERGREEN INDUSTRIAL SERVICES

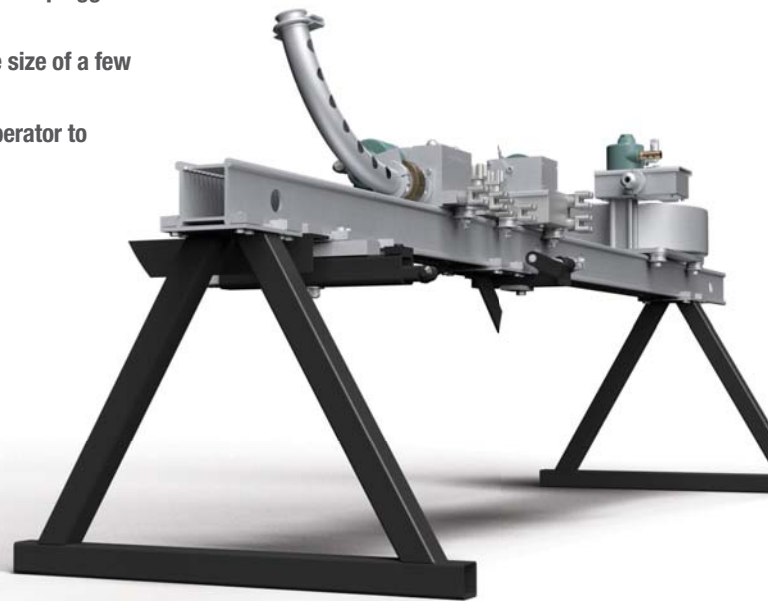
BOILER TUBE CLEANER

Safe and Productive Boiler Cleaning

The StoneAge BTC-100 Boiler Tube Cleaning system is engineered to automate the cleaning of radial tubes found in the mud drums of package boilers that are often found in chemical and petroleum refining plants. The BTC-100 fits through a standard mud drum manway and uses StoneAge's patent pending Helix™ Drive Technology to clean boiler tubes without the need for an operator to enter the vessel.

FEATURES:

- Lightweight, modular design allows a single operator to move, set-up and run
- Helix Drive Technology delivers up to 50 lbs (23 kg) of push to clear plugged tubes and travel long distances through multiple bends
- Can be adapted to clean other types of boilers by modifying the size of a few components
- Independent control of forward and reverse feed rate enable operator to set dwell time for optimal cleaning
- Eliminates the need for pulling jets on the rotary tool so that all pressure can be focused on cleaning jets
- Rail length is easily customizable to match the size of the mud drum
- Optional camera system simplifies tube indexing
- Optional hose containment drum available
- Operated remotely with Control Box from outside the blast zone
- Pairs with the Beetle™ and 2" Badger™ tube cleaning tools



Tool Model	Max Pressure	Flow Range	Hose OD	Feed Rate	Max Hose Length	Weight
BTC-100	20k psi 1400 bar	5–30 gpm 19–114 l/min	5/4–6/4 11.2–12.6 mm	9–50 ft/min 2.7–15.2 m/min	75 ft 22 m	90 lbs 41 kg



HOSE CONTAINMENT DRUM
For safe management and storage of high-pressure hose



OPTIONAL CAMERA SYSTEM
Facilitates quick indexing of boiler tubes



PRECISE, CONTROLLED HOSE FEED
Allows cleaning through multiple tube bends while protecting hose from damage



**OPERATING WATERBLASTING EQUIPMENT
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SEE PAGE 97 FOR IMPORTANT SAFETY INFORMATION**

BOILER CLEANING

YELLOW JACKET™

The StoneAge Yellow Jacket automated high flow water lancing system has been specifically designed for online boiler cleaning. The system features a pivoting lance that allows the waterjet to be precisely aimed for productive removal of excessive slag from key locations inside a boiler while the boiler is still online.

FEATURES:

- Lance pivot angle can be set at multiple positions to provide maximum range of motion
- Modular design with pinned connections for portability and quick assembly/disassembly
- Stand raises/lowers and telescopes for positioning flexibility
- Compact rigid base with multiple anchor locations
- Lower frame has integral wheels and can be moved similar to a furniture dolly
- Remote operation from corded pendant station
- All functions utilize low voltage electrical power for precise positioning functions
- 24V DC linear actuators for up/down and left/right positioning
- 24V DC winch extends lance into the boiler
- Requires 120 VAC 20A power supply
- Remote dump control available

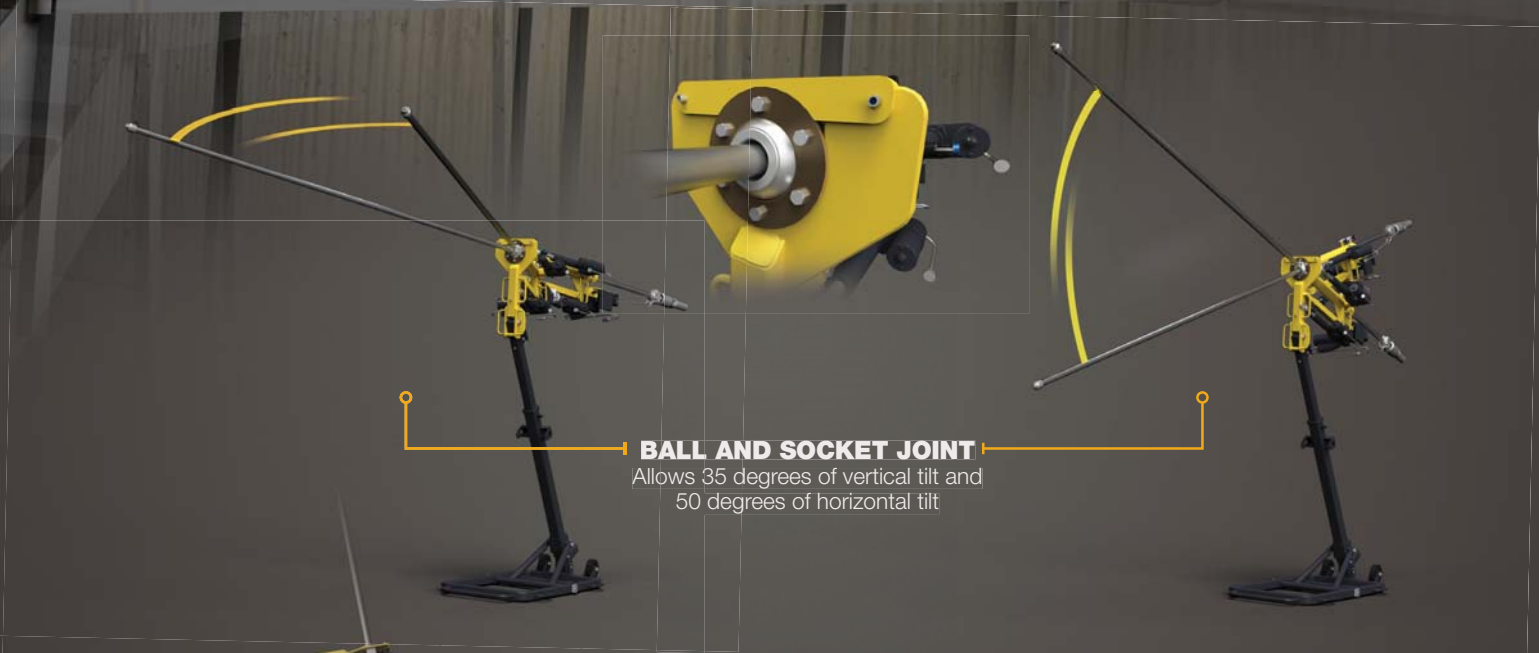


Tool Model	Max Pressure	Flow Range	Vertical Tilt	Horizontal Tilt	Lance Extension	Weight
JKT-100	Up to 10K psi 690 bar	Up to 100 gpm 380 l/min	35 degrees	50 degrees	15 ft 4.6 m	410 lbs 186 kg



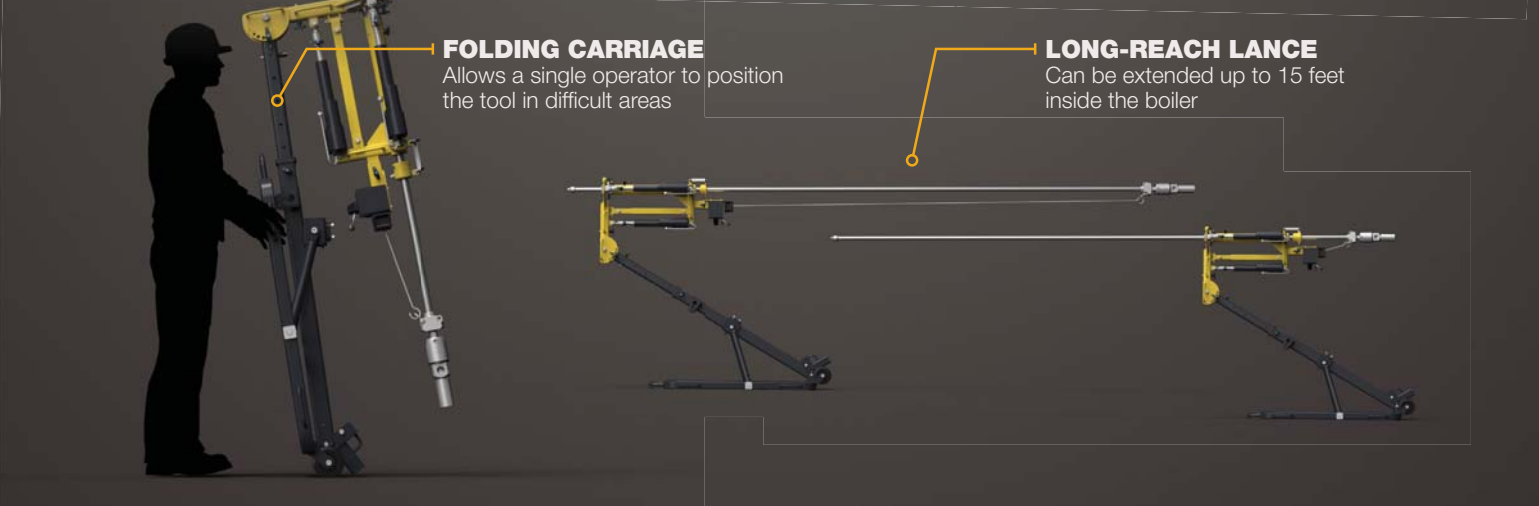
Lance direction and stroke are remotely controlled by a single operator

Designed to be used in the viewports typically located below the soot blowers



BALL AND SOCKET JOINT

Allows 35 degrees of vertical tilt and 50 degrees of horizontal tilt



FOLDING CARRIAGE

Allows a single operator to position the tool in difficult areas

LONG-REACH LANCE

Can be extended up to 15 feet inside the boiler



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FURNACE & BOILER CLEANING

CABLE SWIVEL TOOL (CST)

Furnace and Boiler Cleaning

The patented, hollow-shaft CST-AIR slides on a 3/8 in. (9.5 mm) diameter stretched cable (not supplied) and can be moved by a pulling cable. Head rotation is powered by an air motor.

Extension nipples further adapt the tool to various vessel sizes and improve jet quality by reducing stand-off distance.

IDEAL FOR:

- Direct fired furnaces, superheaters, and economizer sections
- Cleaning in difficult to reach locations
- Cleaning boilers, re-boilers, re-formers, cokers and precipitators

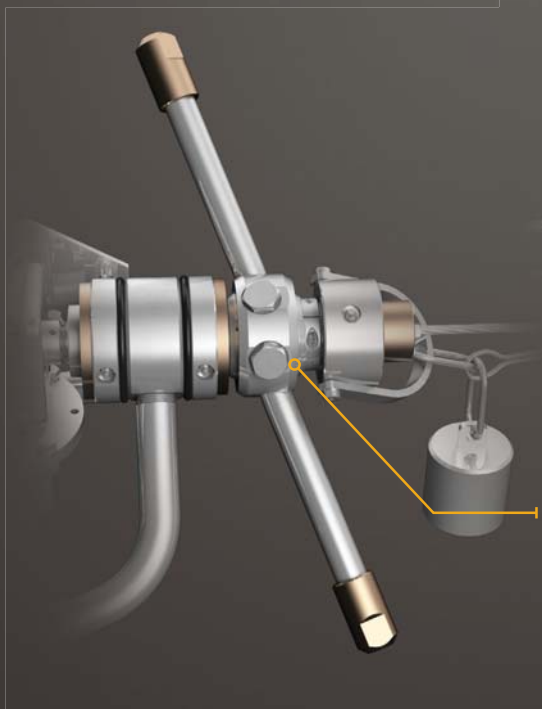


Tool Model	Pressure Range	Flow Range	Inlet Connection	Rotation Speed	Rotation Range	Weight
CST-AIR	Up to 10k psi 700 bar	Up to 170 gpm 640 l/min	2 x 1 NPT	5-60 rpm	360°	46 lb 21 kg



HOLLOW-SHAFT DESIGN

Allows the tool to slide along a stretched cable



FLEXIBLE 6-PORT HEAD

Configured with 2 ports @ 90°, 2 ports @ 80°, 1 port @ 70° and 1 port @ 110° – simply select the ports needed for the job and plug the others. Extension nipples further adapt the tool to various vessel sizes and improve jet quality by reducing stand-off distance.



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FURNACE & BOILER CLEANING

BFW-100

High Flow Online Boiler Cleaning

Designed for online boiler cleaning, contractors can reduce down time by cleaning at high temperatures. With a 300 gpm (1140 l/min) flow capability, the BFW-100 can effectively clean any large vessel with limited entry access.

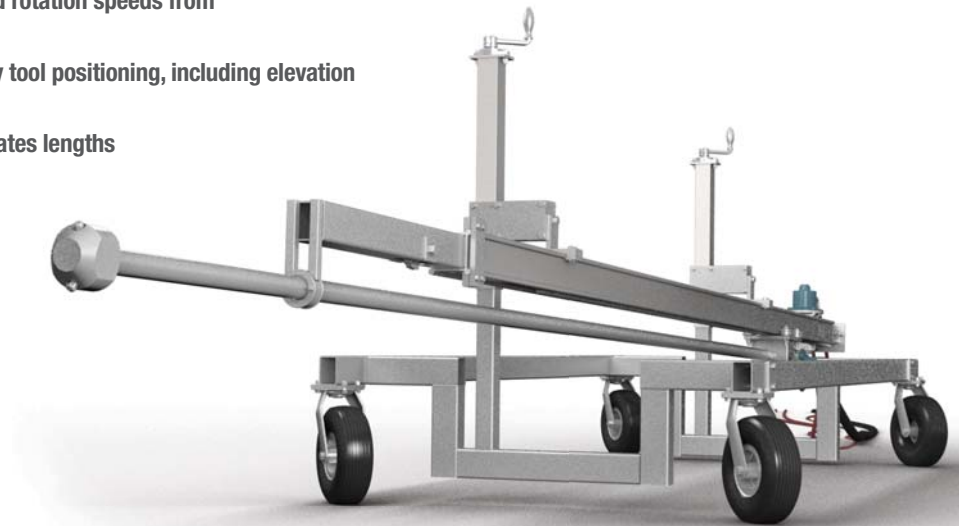
The BFW-100 features an adjustable cart with an air-powered boom positioner and provides excellent cleaning for pulp plant boilers, refinery and chemical plant vessels, as well as furnace radiant sections.

FEATURES:

- Temperature resistant design reduces downtime by allowing cleaning operation while online
- Remote Control Box controls linear and rotation speeds from a safe distance
- Adjustable rail and cart allows for easy tool positioning, including elevation and angle of the lance
- Cantilever option available accommodates lengths up to 24 ft (7.3 m)

IDEAL FOR:

- Pulp plant boilers
- Refinery and chemical plant vessels
- Furnace radiant sections
- Boiler floors

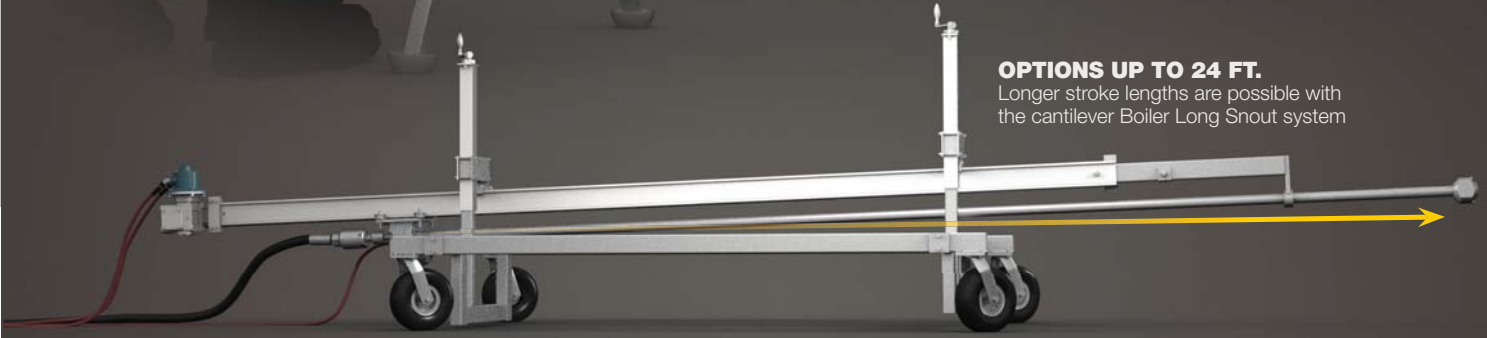


Tool Model	Pressure Range	Flow Range	Inlet Connection	Rotation Speed	Linear Speed	Stroke Length
BFW	10k psi 700 bar	300 gpm 1140 l/min	1 NPT	10–50 rpm	8–35 ft/min 2.4–11 m/min	13 ft 4.0 m



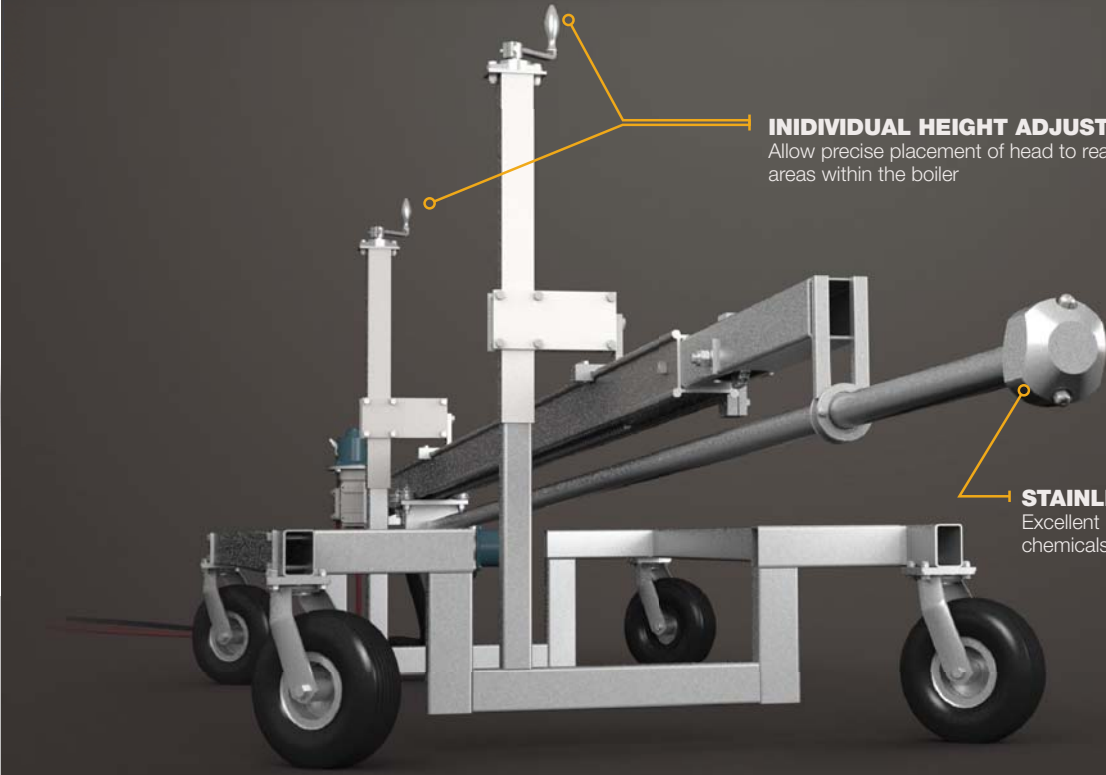
OPTIONS UP TO 24 FT.

Longer stroke lengths are possible with the cantilever Boiler Long Snout system



INDIVIDUAL HEIGHT ADJUSTMENTS

Allow precise placement of head to reach difficult areas within the boiler



STAINLESS STEEL HEAD/NOZZLES

Excellent heat tolerance – highly resistant to chemicals and harsh environments

AUTOMATED CONCRETE DEMOLITION

BLACKHAWK™ Automated Concrete Demolition System

The Blackhawk is a cost-effective, safe alternative to traditional methods of removing and scarifying concrete. The universal mounting plate allows the Blackhawk to easily adapt to your choice of equipment (Skid Steer, Telescopic Forklift, etc.)

FEATURES:

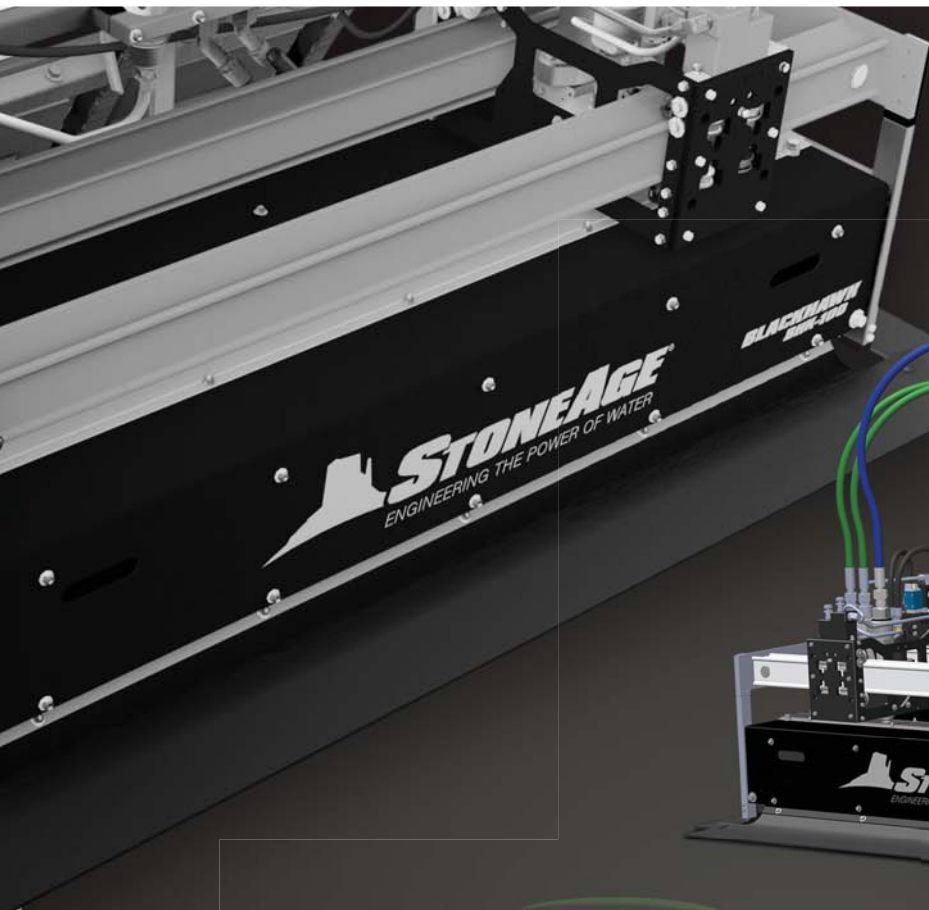
- Can be configured to specific nozzle standoff, traverse, and rotation speeds/rates which helps to maintain consistent/repeatable results. No need to reconfigure after each use
- Adjustment knobs are on the front of the carriage which allows the rotation speed and traverse speed to be independently adjusted
- Movable stops on either side control travel distance allowing for adjustable travel for specific applications
- Removes up to 12 in. (30.5 cm) of material or more based on pressure, flow, and grade of concrete

IDEAL FOR:

- Horizontal uses: bridge decks, parking structures, bike paths
- Vertical uses: piers, buildings, tanks, walls
- Scarification to provide a good bonding surface
- Partial depth cuts to expose rebar and remove damaged or defective concrete
- Removing concrete without causing damage to steel/rebar structure or fracturing



Tool Model	Pressure Range	Flow Range	Inlet Connection	Weight	Machine Attachment
BHK-100	Up to 22k psi 1500 bar	Up to 50 gpm 190 l/min	3/4 MP	1200 lbs 544 kg	Universal Skid Steer Plate



*Blackhawk shown attached to skid steer



WIRELESS DISPLAY SYSTEM (OPTIONAL)

Displays rotation speed in rpm and traverse rate in in/sec to operator

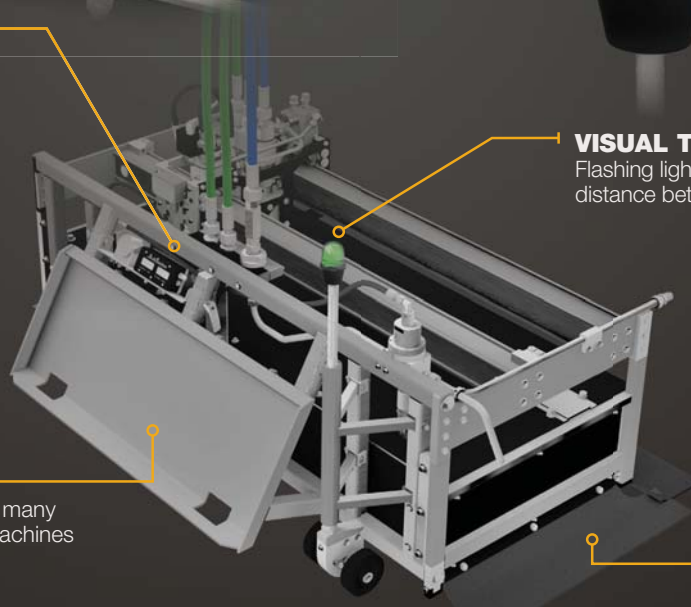


VISUAL TRAVEL INDICATOR

Flashing light indicates optimal travel distance between passes

UNIVERSAL MOUNTING PLATE

Usable in any orientation with many different hydraulic powered machines



RUBBER SHROUD

Helps to reduce noise and contain debris

STONEAGE SOLUTIONS

CUSTOM ENGINEERED WATERBLASTING SOLUTIONS

StoneAge offers a dedicated resource group for handling your difficult waterblast applications. StoneAge Solutions are available for a wide range of support from simple modifications to turn key comprehensive accessory packages. These services are available directly to our dealers, contractors, and end users.

-
- **CYCLONE CLEANING**
 - **LARGE TUNNEL CLEANING**
 - **ONLINE BOILER CLEANING**
 - **PORTABLE, EXTERNAL BUNDLE BLASTING**
 - **INTERNAL & EXTERNAL DRILL PIPE CLEANING**
-

**FOR MORE ABOUT HOW TO CUSTOMIZE THESE TOOLS
PLEASE CONTACT OUR SOLUTIONS DEPARTMENT**

970.403.1437

SOLUTIONS@STONEAGETOOLS.COM

A large industrial machine with a complex metal frame and a central rotating component, positioned inside a circular tunnel opening. The machine is designed for cleaning the interior of a tunnel.

**TUNNEL
CLEANING**

A detailed view of a conveyor cleaning system. It features a horizontal metal frame with several blue hydraulic cylinders and red hoses. The system is mounted on a dark surface, likely a conveyor belt, and includes several spray nozzles for cleaning.

**CONVEYOR
CLEANING**

A long, horizontal metal arm or stack cleaning tool. It is suspended by a central cable and has several black cables or hoses attached to its length. The tool is shown against a dark background, possibly a stack of material.

**STACK
CLEANING**

A cyclone cleaning system. It consists of a horizontal metal frame supported by two vertical legs. A complex network of pipes and hoses is connected to the frame, leading to a cyclone separator. A silhouette of a person is visible on the left side of the frame, providing a sense of scale.

**CYCLONE
CLEANING**



**OPERATING WATERBLASTING EQUIPMENT
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ROTARY SHOTGUN CLEANING

BARRACUDA®

Rotary Shotgun Tools for Heavy Deposits

Barracuda self-rotary tools are the industry standard for rotary shotgunning. Excellent for irregular surfaces where an operator using a hand-held tool can more efficiently maneuver. Also used on automated and hands-free equipment.

NEW UPGRADES:

- New BC 705 cartridge seal is designed as a drop-in replacement to the BC 505-S cartridge seal for 44k psi Barracuda Shotgun tool
- Field and in-house testing has shown the new cartridge effectively doubles the life of the seal

FEATURES:

- Effective shotgunning for a wide range of pressures
- Jet reaction creates rotation—no need for compressed air
- Light weight eases operator fatigue
- Field maintainable and easily rebuilt with low-cost fluid and parts
- Four port heads for thin, harder deposits can be also be configured to two port applications for thicker, softer deposits



Tool Model	Pressure Range	Flow Range	Inlet Connection	Weight	Max Water Temp.
BC-K	2–22k psi 140–1500 bar	4.4–11 gpm 17–42 l/min	9/16 MP	2.7 lb 1.2 kg	160 °F 70 °C
BC-K-P2	5–22k psi 340–1500 bar	4–13 gpm 16–49 l/min	9/16 MP	2.7 lb 1.2 kg	160 °F 70 °C
BC-H9-C	20–40k psi 1400–2800 bar	5–7.4 gpm 19–28 l/min	9/16 HP	2.9 lb 1.3 kg	160 °F 70 °C
BC-H9LF-C	20–40k psi 1400–2800 bar	2.9–4.8 gpm 11–18 l/min	9/16 HP	2.9 lb 1.3 kg	160 °F 70 °C
BC-H9XXLF-C-TI	20–40k psi 1400–2800 bar	1.7–3.1 gpm 6–12 l/min	9/16 HP	3.2 lb 1.45 kg	160 °F 70 °C



NEW BC 705 CARTRIDGE SEAL

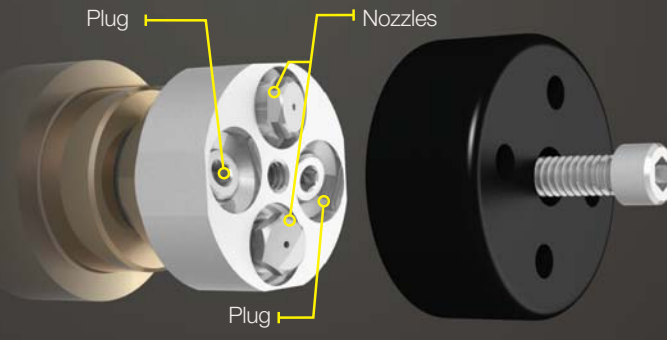
Effectively doubles the life of the previous BC 505-S Cartridge Seal. For Barracuda rotary shotgun tools rated up to 44k psi/3000 bar.



Exploded view.

NOZZLES AND PLUGS

Barracuda tools come in 2-port and 4-port configurations. Generally, two jets deliver more concentrated power for heavy, thick deposits and four jets are ideal for removing thin, hard deposits. It is possible to plug two of the ports on 4-port Barracuda tools. The plugs must always be installed in the ports positioned opposite each other, as indicated in Figure 1.



IMPACT RESISTANT SHIELD

Inexpensive and easily replaceable shield protects working parts of the tool

Figure 1. Plugs installed in opposite nozzle ports

MAINTENANCE RESOURCES

Tool	Service Kit	Seal Kit	Overhaul Kit	Tool Kit	Lubricant	Manual
BC-K	BC 600	BC 602	BC 610	BC 612	GP 042	PL 514
BC-K-P2	BC 600	BC 602	BC 610	BC 612	GP 042	PL 514
BC-H9-C	BC 600-H9-C	BC 607-H9-C	BC 610-H9-C	BC 612	GP 042	PL 515
BC-H9LF-C	BC 600-H9-C	BC 607-H9-C	BC 610-H9-C	BC 612	GP 042	PL 515
BC-H9-XXLF-C-TI	BC 600-H9-C	BC 607-H9-C	BC 610-H9-C-TI	BC 612	GP 042	PL 566



**OPERATING WATERBLASTING EQUIPMENT
CAN BE POTENTIALLY HAZARDOUS.
SEE PAGE 97 FOR IMPORTANT SAFETY INFORMATION**

ROTARY SHOTGUN CLEANING

SPITFIRE®

Rotary Shotgun Tools for Thin,
Hard Deposits

The Spitfire rotary shotgun tool is designed for cleaning difficult and irregular surfaces where manual shotgun cleaning is required. The extra lightweight Spitfire requires little maintenance, reducing down time and increasing productivity.

FEATURES:

- Handles a wide range of pressure ratings from 2–22k psi (140–1500 bar)
- Fewer tools to buy to cover all applications and less downtime swapping or rebuilding tools
- High speed rotation is excellent for removing thin coatings
- Angled jets allow for broader impact for quicker, more effective cleaning of large surfaces and odd shapes
- Fewer parts and no seals to stock or replace means reduced costs and maintenance downtime
- Short overall tool length and light weight makes for easy handling and less operator fatigue
- External shield option protects the tool from damage caused by lateral impacts



Tool Model	Pressure Range	Flow Range	Rotation Speed	Inlet Connection	Weight	Max Water Temperature
SPFR-P8-S/ SPFR-P8-B	5–15k psi 340–1000 bar	2–15 gpm 8–58 l/min	3000–5000 rpm	1/2 NPT	1.5 lb 0.7 kg (S) 1.7 lb 0.8 kg (B)	212 °F 100 °C
SPFR-MP9-S/ SPFR-MP9-B	5–22k psi 340–1500 bar	4–13 gpm 16–49 l/min	3000–5000 rpm	9/16 MP	1.5 lb 0.7 kg (S) 1.7 lb 0.8 kg (B)	250 °F 120 °C



SHIELDED HEAD OPTION

Protects the head from damage caused by lateral swinging of the tool

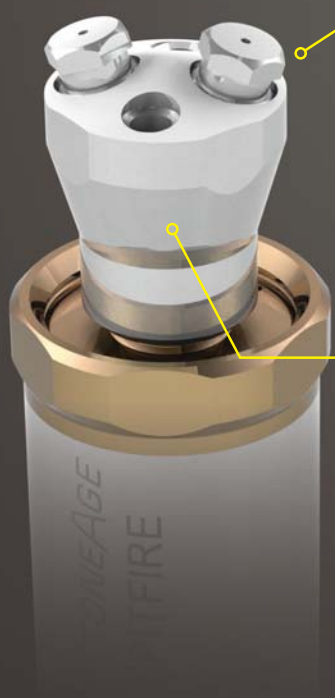


BUMPER HEAD OPTION

Alternative head for instances when debris gets lodged in the shield, preventing head rotation

IMPACT RESISTANT BUMPER

Inexpensive and easily replaceable bumper protects working parts of the tool



ANGLED JETS

2 AP2™ nozzles provide broader impact for quicker, more effective cleaning of large surfaces and odd shapes

HIGH SPEED ROTATION

Excellent for removing hardened paint and thin coatings





**OPERATING WATERBLASTING EQUIPMENT
CAN BE POTENTIALLY HAZARDOUS.**

SEE PAGE 97 FOR IMPORTANT SAFETY INFORMATION

HYDRO EXCAVATION

**NEW
COMING IN 2016**

HYDRO-X

Rotary Hydro Excavation Tools

Hydro Excavation is a safe alternative to access buried utilities by potholing or trenching with high pressure water. StoneAge now has four options available for different applications.

FEATURES:

- Angled rotating jet pattern removes more material and safely cleans around utilities (rotary model only)
- Save labor hours and expensive heavy equipment costs
- Avoid risks of costly and dangerous damage to existing utilities
- Replaceable shroud made from UHMW (rotary only)
- Rebuild kits available

**COMING 2016
ROTARY NOZZLE**



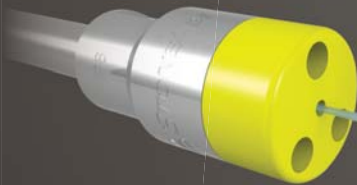
Tool Model	Pressure Range	Flow Range	Cone Angle	Inlet Connection	Weight	Diameter	Length
ROTARY NOZZLE	Up to 5k psi 340 bar	3-15 gpm 9-58 l/min	18°	0.5-14 NPT	1.1 lb 0.5 kg	1.75 in. 44 mm	4.2 in. 107 mm

COMING 2016
ROTARY HYDRO EXCAVATION TOOLS

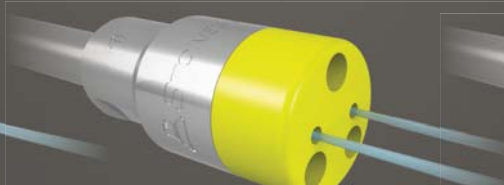


ANGLED ROTATING JET PATTERN
Removes more material and safely cleans around utilities

NON-ROTARY - AVAILABLE NOW
HYDRO EXCAVATION TOOLS



HX-101
Single Head Assembly
• OC1H Carbide (1)



HX-102
Double Head Assembly
• AP2 Attack Tips (2)



HX-103S
Triple Head Assembly
• AP2 Attack Tips (3)

Maximum Pressure*	Maximum Flow*	Inlet	Weight
5k psi (350 bar)	12 gpm (45 l/min)	1/2 NPT	1.0 lb (0.5 kg)

*Each assembly is jetted to match pump's pressure and flow.

ADJUSTABLE COMING 2016

ROTARY NOZZLE
HYDRO EXCAVATION TOOLS

One head adjusts from a single stream to a wide rotating fan





**OPERATING WATERBLASTING EQUIPMENT
CAN BE POTENTIALLY HAZARDOUS.
SEE PAGE 97 FOR IMPORTANT SAFETY INFORMATION**

EXCHANGER CLEANING

BANSHEE®

Rotary Small Tube Cleaning

Banshee tube cleaning nozzles are the industry standard for effective tube cleaning. They use high pressure water as a liquid bearing, thereby eliminating ball bearings, seals or lubricant used in conventional rotary tools. Each tool is easily configured to suit any application by choosing from a variety of replaceable heads and inlet options.

FEATURES:

- Patented liquid bearing design means no bearings, seals, or lubricants to replace
- Stainless steel construction for extreme durability and longevity
- Multiple inlet options and replaceable heads make configurations easy
- Shrouded model keeps head protected and rotating when tool is pushed against a plug

IDEAL FOR:

- Unplugging, cleaning, and polishing tubes, such as those found in heat exchangers and industrial tube bundles
- Effectively removes thin, hard scale, carbons, coke, and polymers
- Ideal for manual and powered lancing operations



**NEW
BANSHEE BEETLES**

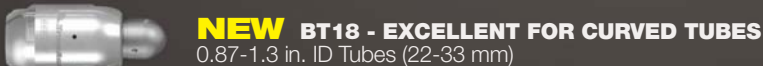
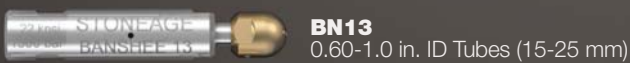
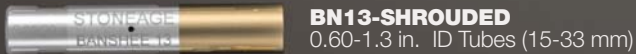
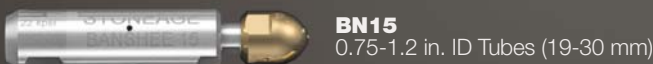
BANSHEE SPECIFICATIONS 22K PSI (1500 BAR) SEE PAGE 57 FOR 40K

	Tube ID Range	Max Pressure	Max Pressure (BSPP Inlet)	Flow Range	Inlet Connections	Diameter	Length
BN9.5	0.47-0.63 in. 12-16 mm	22k psi 1500 bar	N/A	4.5-8 gpm 17-30 l/min	M7, 1/16 NPT 1/4 LH or 1/4 RH	0.37 in. 9.5 mm	2.6 in. 65 mm
BN13	0.60-1.0 in. 15-25 mm	22k psi 1500 bar	18k psi 1250 bar	7-10 gpm 27-38 l/min	1/8 NPT, 1/8 BSPP, 1/4 LH, 1/4 RH, 3/8 LH or 3/8 RH	0.50 in. 13 mm	2.9 in. 74 mm
BN18	0.87-1.3 in. 22-33 mm	22k psi 1500 bar	20k psi 1400 bar	8-14 gpm 30-53 l/min	1/4 NPT, 1/4 BSPP 9/16 LH or 9/16 RH	0.69 in. 18 mm	3.8 in. 97 mm
BN24	1.1-2 in. 28-51 mm	22k psi 1500 bar	22k psi 1500 bar	12-25 gpm 45-95 l/min	3/8 NPT, 3/8 BSPP 9/16 LH or 9/16 RH	0.93 in. 24 mm	5.1 in. 130 mm
BN33	1.5-2.4 in. 38-60 mm	22k psi 1500 bar	15k psi 1000 bar	12-49 gpm 45-190 l/min	1/2 NPT, 1/2 BSPP or 9/16 MP	1.3 in. 33 mm	6.9 in. 180 mm
BT12	0.60-1.0 in. 15-25 mm	22k psi 1500 bar	N/A	Up to 8.5 gpm 32 l/min	P1, M7, MPL4, MPR4	0.50 in. 13 mm	1.3 in. 33 mm
BT18	0.87-1.3 in. 22-33 mm	22k psi 1500 bar	18k psi 1250 bar	Up to 11 gpm 42 l/min	P1, P2, BSPP2, MPL6, MPR6, MPL4, MPR4	0.69 in. 18 mm	1.5 in. 39 mm



12 MODELS AVAILABLE

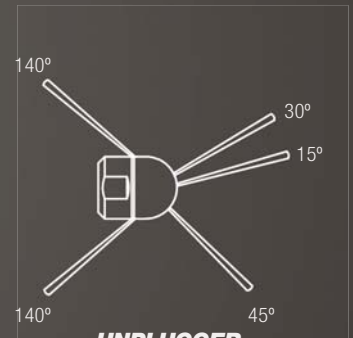
UP TO 40K PSI (2800 BAR)



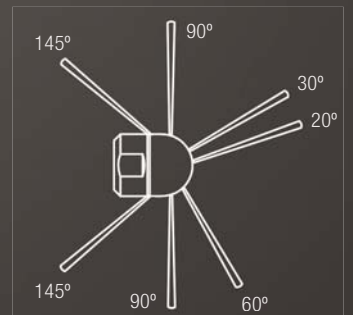
3 STANDARD HEAD CONFIGURATIONS



POLISHER
4 PORTS: 2 @ 85°, 2 @ 105°



UNPLUGGER
5 PORTS: 1 @ 15°, 1 @ 30°
1 @ 45°, 2 @ 145°



UNIVERSAL
7 PORTS: 1 @ 20°, 1 @ 30°
1 @ 60°, 2 @ 90°, 2 @ 145°

BANSHEE

22k (1500 bar) Head Options



**OPERATING WATERBLASTING EQUIPMENT
CAN BE POTENTIALLY HAZARDOUS.**
SEE PAGE 97 FOR IMPORTANT SAFETY INFORMATION

BN9.5 HEAD SELECTION



PRESSURE	PART NUMBER	STYLE	FLOW RANGE
10-15K PSI (700-1000 BAR)	BN9.5 042-A	Polisher	4.5-5.5 gpm (17-21 l/min)
	BN9.5 043-A	Unplugging	5-6 gpm (19-23 l/min)
15-22K PSI (1000-1500 BAR)	BN9.5 042-B	Polisher	5-6 gpm (19-23 l/min)
	BN9.5 043-B	Unplugging	5.5-6.5 gpm (21-25 l/min)
	BN9.5 044-1	Universal	7.0-8.0 gpm (27-30 l/min)

BN13 HEAD SELECTION



PRESSURE	PART NUMBER	STYLE	FLOW RANGE
10-15K PSI (700-1000 BAR)	BN13 042-A	Polisher	7-9 gpm (27-34 l/min)
	BN13 043-A	Unplugging	7-9 gpm (27-34 l/min)
	BN13 044-A	Universal	8-10 gpm (30-38 l/min)
15-22K PSI (1000-1500 BAR)	BN13 042-C	Polisher	7-9 gpm (27-34 l/min)
	BN13 043-C	Unplugging	7-9 gpm (27-34 l/min)
	BN13 044-C	Universal	8-10 gpm (30-38 l/min)

BN18 HEAD SELECTION



PRESSURE	PART NUMBER	STYLE	FLOW RANGE
10-15K PSI (700-1000 BAR)	BN18 042-A	Polisher	11-14 gpm (42-53 l/min)
	BN18 042-B	Polisher	8-10 gpm (30-38 l/min)
	BN18 043-A	Unplugging	11-14 gpm (42-53 l/min)
	BN18 043-B	Unplugging	8-10 gpm (30-38 l/min)
	BN18 044-A	Universal	11-14 gpm (42-53 l/min)
	BN18 044-B	Universal	8-10 gpm (30-38 l/min)
15-22K PSI (1000-1500 BAR)	BN18 042-C	Polisher	11-14 gpm (42-53 l/min)
	BN18 042-D	Polisher	8-10 gpm (30-38 l/min)
	BN18 043-C	Unplugging	11-14 gpm (42-53 l/min)
	BN18 043-D	Unplugging	8-10 gpm (30-38 l/min)
	BN18 044-C	Universal	11-14 gpm (42-53 l/min)

BN24 HEAD SELECTION



PRESSURE	PART NUMBER	STYLE	FLOW RANGE
10-15K PSI (700-1000 BAR)	BN24 042-A	Polisher	20-25 gpm (76-95 l/min)
	BN24 042-B	Polisher	15-19 gpm (57-72 l/min)
	BN24 042-C	Polisher	12-14 gpm (45-53 l/min)
	BN24 044-A	Universal	20-25 gpm (76-95 l/min)
	BN24 044-B	Universal	15-19 gpm (57-72 l/min)
	BN24 044-C	Universal	12-14 gpm (45-53 l/min)
15-22K PSI (1000-1500 BAR)	BN24 042-D	Polisher	18-21 gpm (68-80 l/min)
	BN24 042-E	Polisher	15-17 gpm (57-64 l/min)
	BN24 042-F	Polisher	12-14 gpm (45-53 l/min)
	BN24 044-D	Universal	18-21 gpm (68-80 l/min)
	BN24 044-E	Universal	15-17 gpm (57-64 l/min)
	BN24 044-F	Universal	12-14 gpm (45-53 l/min)

BN33 HEAD SELECTION



PRESSURE	PART NUMBER	STYLE	FLOW RANGE
10-15K PSI (700-1000 BAR)	BN33 044-A	Universal	40-49 gpm (150-190 l/min)
	BN33 044-B	Universal	33-39 gpm (130-150 l/min)
	BN33 044-C	Universal	26-32 gpm (98-120 l/min)
	BN33 044-D	Universal	20-25 gpm (76-95 l/min)
	BN33 044-E	Universal	15-19 gpm (57-72 l/min)
15-22K PSI (1000-1500 BAR)	BN33 044-F	Universal	22-26 gpm (83-98 l/min)
	BN33 044-G	Universal	18-21 gpm (68-80 l/min)
	BN33 044-H	Universal	15-17 gpm (57-64 l/min)
	BN33 044-I	Universal	12-14 gpm (45-53 l/min)

BANSHEE

40k (2800 bar) Models

HOSE CHARTS FOR BANSHEE TOOLS ARE NOW AVAILABLE ON OUR WEBSITE

BANSHEE SPECIFICATIONS 40K PSI (2800 BAR)			
MODEL	BN13	BN18	BN27
Tube ID Range*	0.60-1.0 in. 15-25 mm	0.87-1.3 in. 22-33 mm	1.25-2.0 in. 32-51 mm
Maximum Pressure	40k psi 2800 bar	40k psi 2800 bar	40k psi 2800 bar
Flow Range	4.5-6 gpm 17-23 l/min	5-8.5 gpm 19-32 l/min	5-8.5 gpm 19-32 l/min
Inlet Connections	1/4-28 LH or 3/8-24 LH	3/8-24 LH or M14 LH	9/16-18 LH or M14 LH
Diameter	0.52 in. 13 mm	0.69 in. 18 mm	1.06 in. 27 mm
Length	3.5 in. 89 mm	4.7 in. 120 mm	5.5 in. 140 mm

BN13-40K
0.60-1.0 in. ID Tubes (15-25 mm)



BN18-40K
LEFT-HANDED INLET NOW AVAILABLE
0.87-1.3 in. ID Tubes (22-33 mm)



BN27-40K
1.25-2.0 in. ID Tubes (32-51 mm)



* When cleaning 5/8" diameter tubes at 40k psi please contact our Technical Support team for hose specifications.

BANSHEE

40k (2800 bar) Head Options

BN13 40K HEAD SELECTION



PRESSURE	PART NUMBER	STYLE	FLOW RANGE
30-40K PSI (2100-2800 BAR)	BN13 442-C	Polisher	5.5-6 gpm 21-23 l/min
	BN13 442-D	Polisher	4.5-5 gpm 17-19 l/min
	BN13 443-C	Unplugger	5.5-6 gpm 21-23 l/min
	BN13 443-D	Unplugger	4.5-5 gpm 17-19 l/min

BN18 40K HEAD SELECTION



PRESSURE	PART NUMBER	STYLE	FLOW RANGE
30-40K PSI (2100-2800 BAR)	BN18 442-A	Polisher	8-8.5 gpm (30-32 l/min)
	BN18 442-B	Polisher	7-7.5 gpm (27-28 l/min)
	BN18 442-C	Polisher	6-6.5 gpm (23-25 l/min)
	BN18 442-D	Polisher	5-5.5 gpm (19-21 l/min)
	BN18 443-A	Unplugger	8-8.5 gpm (30-32 l/min)
	BN18 443-B	Unplugger	7-7.5 gpm (27-28 l/min)
	BN18 443-C	Unplugger	6-6.5 gpm (23-25 l/min)
	BN18 443-D	Unplugger	5-5.5 gpm (19-21 l/min)

IMPORTANT! //////////////

All **BANSHEE** tube cleaning tools require the use of a correctly sized open-end wrench to fit the flats provided on the inlet nut when attaching the tool to the lance.

DO NOT USE A PIPE WRENCH OR PLIERS WITH TEETH

This can crush and crack the hardened steel body, leading to tool breakage during operation. It is also recommended to flush the tool with WD-40® for storage.

BN27 40K HEAD SELECTION



PRESSURE	PART NUMBER	STYLE	FLOW RANGE
30-40K PSI (2100-2800 BAR)	BN27 442-A	Polisher	8-8.5 gpm (30-32 l/min)
	BN27 442-B	Polisher	7-7.5 gpm (27-28 l/min)
	BN27 442-C	Polisher	6-6.5 gpm (23-25 l/min)
	BN27 442-D	Polisher	5-5.5 gpm (19-21 l/min)
	BN27 443-A	Unplugger	8-8.5 gpm (30-32 l/min)
	BN27 443-B	Unplugger	7-7.5 gpm (27-28 l/min)
	BN27 443-C	Unplugger	6-6.5 gpm (23-25 l/min)
	BN27 443-D	Unplugger	5-5.5 gpm (19-21 l/min)



**OPERATING WATERBLASTING EQUIPMENT
CAN BE POTENTIALLY HAZARDOUS.**

SEE PAGE 97 FOR IMPORTANT SAFETY INFORMATION

CURVED PIPE CLEANING

NEW FOR 2016

2" BADGER®

Rotary Cleaning for Small Pipes with Elbows

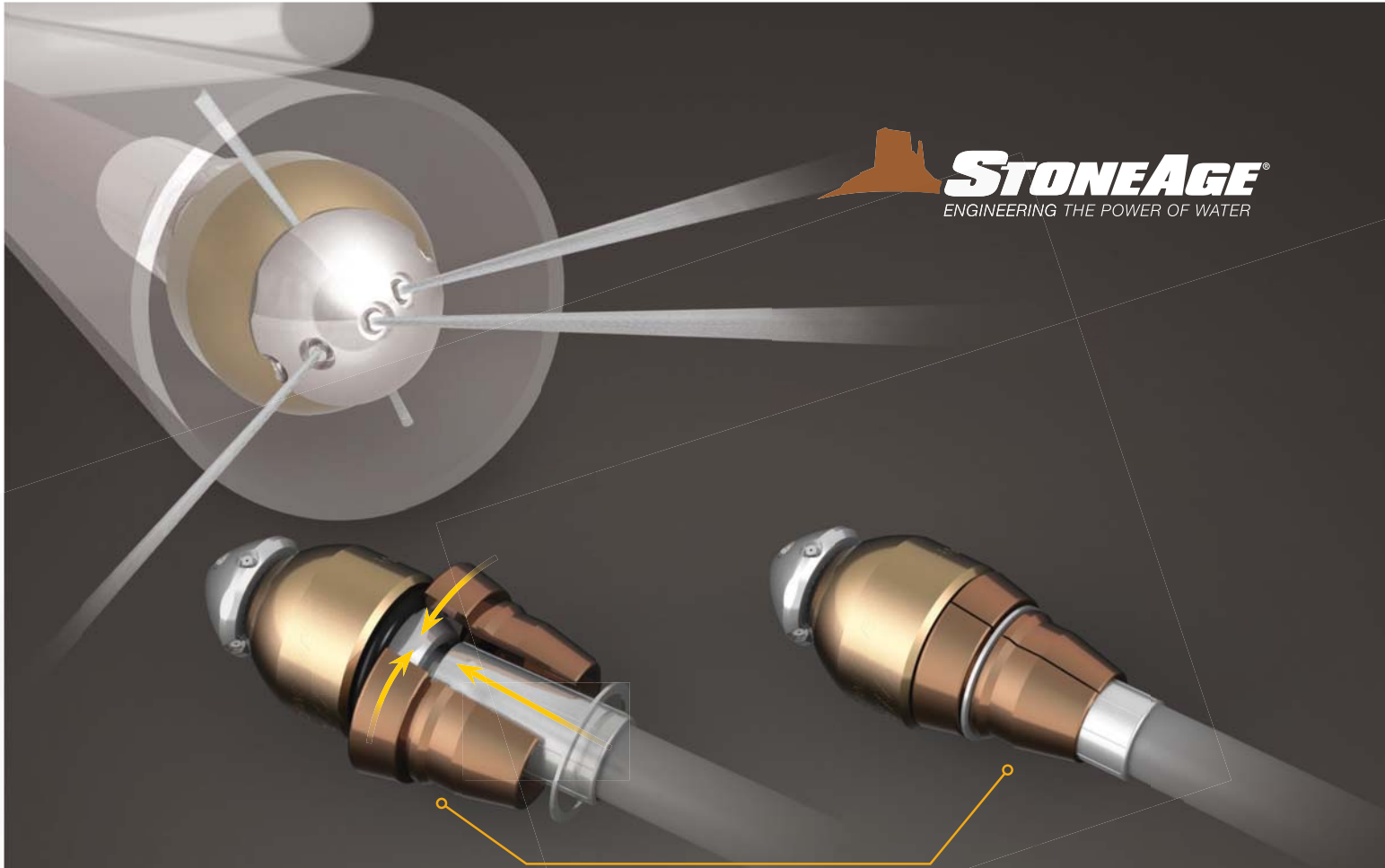
The 2" Badger is a self-rotating tool designed for cleaning 2–4 in. (51–102 mm) pipes with bends and long radius elbows such as U-Tubes and process lines. The latest design includes a spring-loaded pin that ratchets the head to machined edges on the shaft. Therefore, the head can only be removed with a special head removal tool and not while in operation.

FEATURES:

- The only self-rotary tool on the market that can navigate 2 in. (50 mm) pipes with bends
- The only tool in the industry with head locking technology for increased safety
- Multiple jetting options allow the tool to be optimized for a variety of pump pressures and flows. Unplug, polish, or run longer lines based on jetting
- Pair with the ProDrive for hands-free mole lining



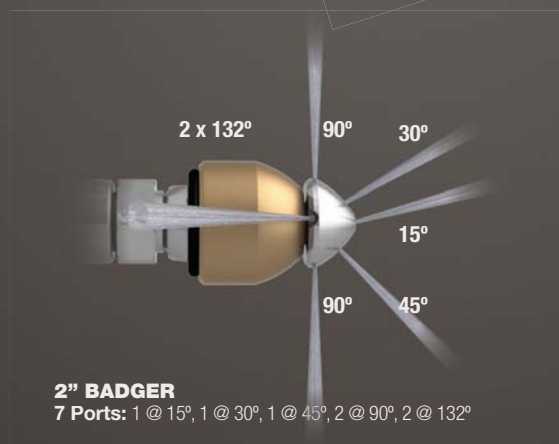
Tool Model	Pressure Range	Flow Range	Inlet Connection	Weight	Max Water Temperature
BA-LK-P4 BA-LK-BSPP4	2–15k psi 140–1000 bar	3–20 gpm 11–76 l/min	1/4 NPT or 1/4 BSPP	0.45 lb 0.20 kg	250 °F 120 °C
BA-LK-MP9L BA-LK-MP9R	12–22k psi 830–1500 bar	3–15 gpm 11–57 l/min	9/16 MP or M24	0.45 lb 0.20 kg	250 °F 120 °C



NEW BA-530 FAIRING

Specifically designed to be attached to the hose behind a 2" Badger rotary pipe cleaning tool.

The tapered sides of the fairing prevent the rear edge of the Badger from getting caught on obstructions when being removed from a pipe.



NOZZLES AND PLUGS

The 2" Badger can be jetted in different configurations depending on the application. The image below shows the standard nozzle/plug configuration for the 2" Badger tool.

Tool	Tool Kit	Manual
2" BADGER	BA 612-LK	PL 593



**OPERATING WATERBLASTING EQUIPMENT
CAN BE POTENTIALLY HAZARDOUS.
SEE PAGE 97 FOR IMPORTANT SAFETY INFORMATION**

CURVED PIPE CLEANING

4" BADGER®

Rotary Cleaning for Medium Pipes with Elbows

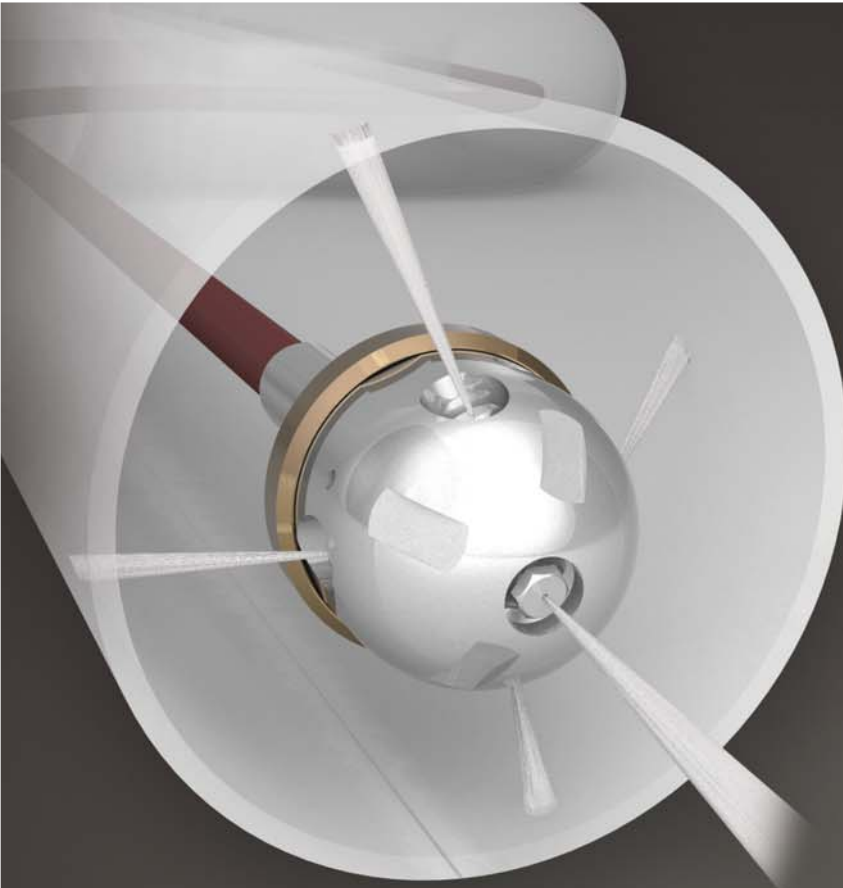
The 4" Badger self-rotary tool makes cleaning pipes with elbows easy, navigating 4 in. (102 mm) bends with controlled rotation which is important for efficiently cleaning larger pipes. The operator can choose between two rotation speeds by selecting fast or slow viscous fluid.

FEATURES:

- Different jetting configurations allow for more or less pull and forward hitting power
- Navigates elbows as small as 4 in. (102 mm)
- Self-rotary, speed control provides complete internal coverage, while speed control provides optimum jet delivery
- Two speeds to choose from to maximize cleaning by choosing slower speeds for hard to clean or plugged pipes, and faster speeds for polishing easy to clean pipes with a single tool
- Multiple jetting options optimize the tool for a variety of pumps pressures and flows. Unplug, polish, or run longer lines based on jetting
- Designed to pair with the AutoBox ABX-500 hose handling system for hands-free pipe cleaning



Tool Model	Pressure Range	Flow Range	Inlet Connection	Rotation Speed	Weight
BA-P6, BA-BSPP6	2–15k psi 140–1000 bar	13–30 gpm 49–110 l/min	3/8 NPT, 3/8 BSPP	20–100 rpm (Slow Fluid) 75–250 rpm (Fast Fluid)	3.0 lbs 1.4 kg
BA-TM12	12–22k psi 830–1500 bar	12–25 gpm 45–95 l/min	3/4 Type M Male	20–100 rpm (Slow Fluid) 75–250 rpm (Fast Fluid)	3.0 lbs 1.4 kg
BA-H6	43.5k psi 3000 bar	4.5–12 gpm 17–45.5 l/min	3/8 HP Female	100–400 rpm	4.0 lbs 1.8 kg

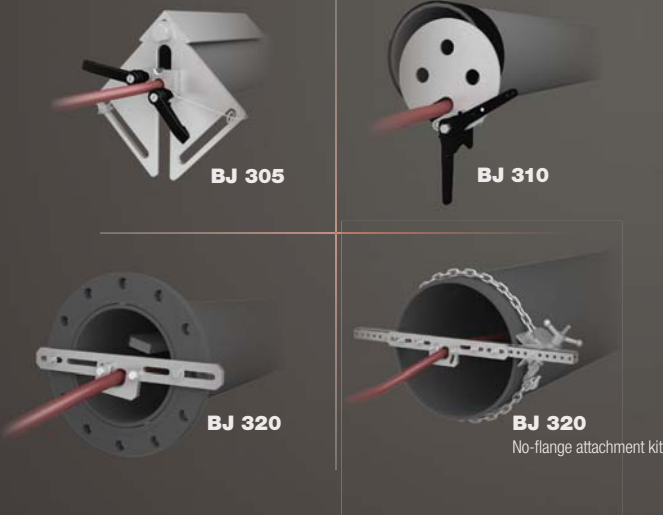


40K

CURVED PIPE CLEANING TOOL

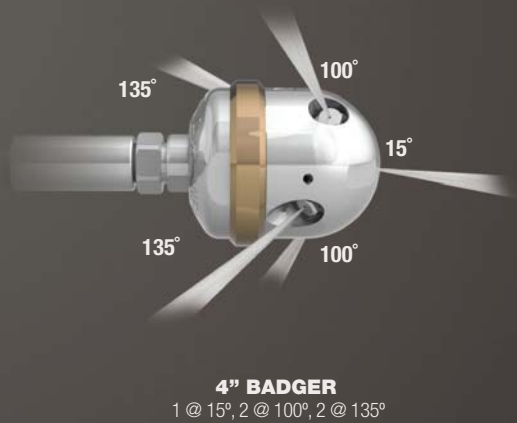
BACKOUT PREVENTERS

Increase safety by keeping the tool from backing out of the pipe. Several options are available including fixtures for small diameter pipes, pipes with various flange bolt circle diameters, and adapters for pipes with no-flange entry.



NOZZLES AND PLUGS

The 4" Badger can be jetted in different configurations depending on the application. The image below shows the standard nozzle/plug configuration for the 4" Badger tool.



MAINTENANCE RESOURCES

Tool	Rotation Speed	Seal Kit	Service Kit	Overhaul Kit	Disk Kit	Tool Kit	Lubricant	Manual
BA-P6/ BA-BSPP6	Slow	BA 602	BA 600-S	BA 610-S	BA 604	BA 612	BJ 048-S	PL 501
	Fast	BA 602	BA 600-F	BA 610-F	BA 604	BA 612	BJ 048-F	PL 501
BA-TM12	Slow	BA 602-TM12	BA 600-TM12-S	BA 610-TM12-S	BA 604	BA 612	BJ 048-S	PL 501
	Fast	BA 602-TM12	BA 600-TM12-F	BA 610-TM12-S	BA 604	BA 612	BJ 048-F	PL 501



**OPERATING WATERBLASTING EQUIPMENT
CAN BE POTENTIALLY HAZARDOUS.
SEE PAGE 97 FOR IMPORTANT SAFETY INFORMATION**

CURVED PIPE CLEANING

6" BADGER®

Rotary Cleaning for Large Pipes with Elbows

The 6" Badger self-rotary tool features adjustable speed control which allows operators to meet the demands of the task at hand – slower rotational speeds for tough deposits and plugs, faster rotation for easier jobs or polishing.

FEATURES:

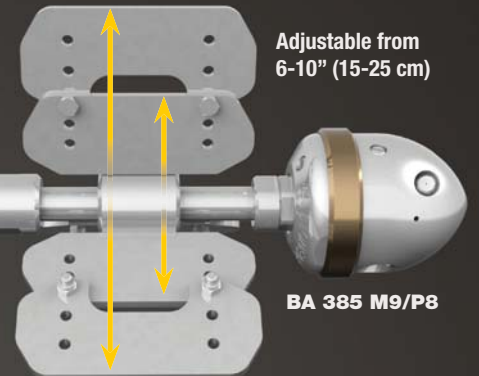
- Only rotary pipe cleaning tool on the market with adjustable speed control for fine-tuning to specific requirements
- Different jetting configurations allow for more or less pull and forward hitting power
- Navigates elbows as small as 6 in. (152 mm)
- Speed controlled rotary tools provide complete internal coverage, while speed control provides optimum jet delivery
- Maximize cleaning by choosing slower speeds for hard to clean or plugged pipes and faster speeds for polishing easy to clean pipes with a single tool
- Optimize the tool for a variety of pumps pressures and flows with multiple jetting options
- Pair with the ABX-500 for hands-free pipe cleaning



Tool Model	Pressure Range	Flow Range	Rotation Speed	Inlet Connection	Weight	Max Operating Temperature
BA-MP9/BA-M24	12–22k psi 840–1500 bar	14–43 gpm 53–163 l/min	50–300 rpm (Adjustable)	9/16 MP, M24	8.0 lbs 3.6 kg	250 °F 120 °C
BA-P8	2–15k psi 140–1000 bar	15–55 gpm 57–208 l/min	50–300 rpm (Adjustable)	1/2 NPT	8.0 lbs 3.6 kg	250 °F 120 °C

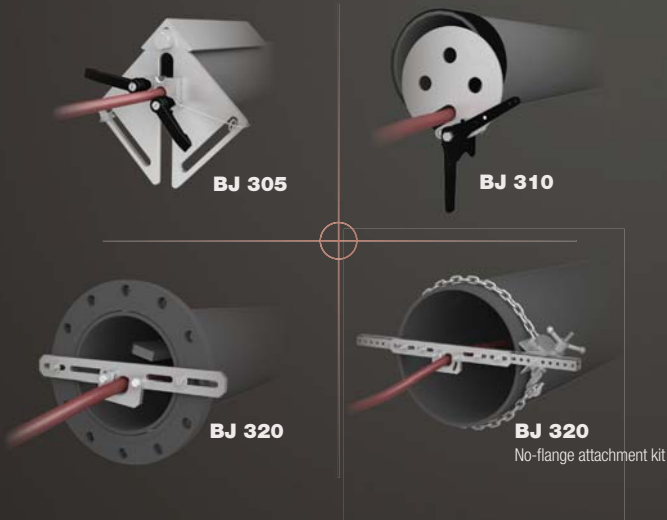
OPTIONAL CENTRALIZERS

A centralizer helps to protect the tool as it passes through the pipe and balances jet standoff distance for more consistent cleaning. In cases where pipe size is more than 1.5 times the diameter of the tool, a centralizer is an important safety device, preventing the tool from turning around and thrusting backwards out of the pipe.



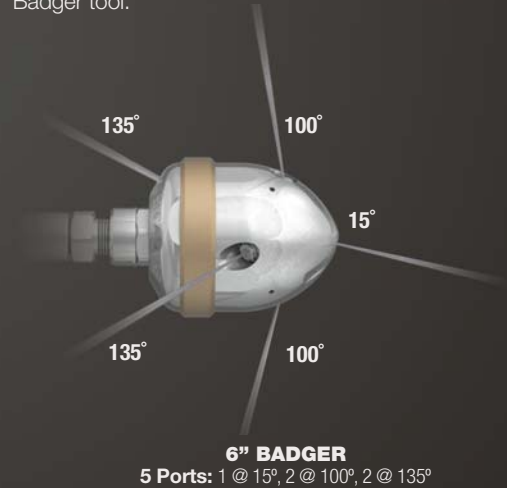
BACKOUT PREVENTERS

Increase safety by keeping the tool from backing out of the pipe. Several options are available including fixtures for small diameter pipes, pipes with various flange bolt circle diameters, and adapters for pipes with no-flange entry.



NOZZLES AND PLUGS

The 6" Badger can be jetted in different configurations depending on the application. The image below shows the standard nozzle/plug configuration for the 6" Badger tool.



MAINTENANCE RESOURCES

Tool	Seal Kit	Service Kit	Overhaul Kit	Disk Kit	Tool Kit	Lubricant	Manual
BA-P8	BA 602-P8/MP9	BA 600-P8/MP9	BA 610-P8/M9	BA 606	BA 612-P8/MP9	BJ 048-F	PL 503
BA-M24	BA 602-P8/MP9	BA 600-P8/MP9	BA 610-P8/M9	BA 606	BA 612-P8/MP9	BJ 048-F	PL 503
BA-MP9	BA 602-P8/MP9	BA 600-P8/MP9	BA 610-P8/M9	BA 606	BA 612-P8/MP9	BJ 048-F	PL 503



**OPERATING WATERBLASTING EQUIPMENT
CAN BE POTENTIALLY HAZARDOUS.
SEE PAGE 97 FOR IMPORTANT SAFETY INFORMATION**

STRAIGHT PIPE CLEANING

BJV™

Rotary Cleaning for Straight Pipes

The BJV family is our most versatile line of pipe cleaning tools, designed for the widest range of configurations. A variety of head choices allow for pulling ring connections, customized porting, and multiple jetting options. Different viscous fluid options give operators the ability to change the speed of rotation for hard or easy applications. Can be used with a wide range of centralizers and backout preventers for added safety.

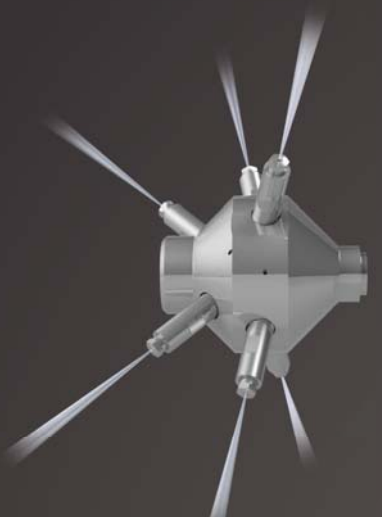
BJV tools are also highly effective tank and stack cleaners.

FEATURES:

- Clean 6 in. (152 mm) pipes to 15 ft (4.5 m) diameter tanks with simple modifications
- Interchangeable heads allow the tool to be used on any type of pump
- Multiple head options to allow for flush mounted nozzles, extension arms, plugs, and pulling rings
- Simple nozzle changes allow operators to configure for many cleaning applications
- Easy to pair with AutoBox ABX-500 for hands-free pipe cleaning

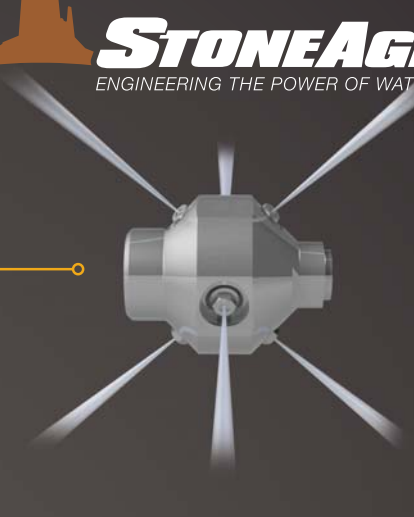


Tool Model	Pressure Range	Flow Range	Rotation Speed	Inlet Connection	Weight	Max Water Temperature
BJV-P16	2–10k psi 140–700 bar	20–200 gpm 76–757 l/min	20–80 rpm (Slow Fluid) 50–200 rpm (Fast Fluid)	1 NPT	9.2 lbs 4.2 kg	160 °F 70 °C
BJV-P12	2–15k psi 140–1000 bar	12–100 gpm 45–380 l/min	20–80 rpm (Slow Fluid) 40–200 rpm (Fast Fluid)	3/4 NPT	8.6 lbs 3.9 kg	160 °F 70 °C
BJV-M24	2–22k psi 140–1500 bar	12–100 gpm 45–380 l/min	20–80 rpm (Slow Fluid) 40–200 rpm (Fast Fluid)	M24	9.0 lbs 4.1 kg	160 °F 70 °C
BJV-MP12	2–22k psi 140–1500 bar	10–60 gpm 38–230 l/min	20–50 rpm (Slow Fluid) 70–300 rpm (Fast Fluid)	3/4 MP	9.4 lbs 4.3 kg	160 °F 70 °C
BJV-H9	20–40k psi 1400–2800 bar	3.4–20 gpm 13–76 l/min	20–60 rpm (Slow Fluid) 90–250 rpm (Fast Fluid)	9/16 HP	9.3 lbs 4.4 kg	160 °F 70 °C



OPTIONAL HEAD-TYPES

There are several head configurations for the BJV. The correct head specification is based on the pressure and flow of the pump and the required port size.



BJV HEAD SPECIFICATIONS	BJV-P16		BJV-P12		BJV-M24		BJV-MP12		BJV-H9		
	STANDARD HEAD	<i>BJ 041-P8-RX</i>		<i>BJ 044-P4-RX</i>		<i>BJ 144-P4-RX</i>		<i>BJ 144-P4-RX</i>		<i>BJ 444-S6-RX</i>	
	DIAMETER	3.5 in.	89 mm	3.0 in.	76 mm	3.0 in.	76 mm	3.0 in.	76 mm	3.0 in.	76 mm
	NOZZLES	6 x OC8		6 or 7 x AP4		6 or 7 x AP4		6 or 7 x AP4		6, 7 or 8 x OS6	
	HEAD WEIGHT	4.8 lb	2.2 kg	3.3 lb	1.5 kg	3.3 lb	1.5 kg	3.3 lb	1.5 kg	3.3 lb	1.5 kg
	EXTENSION HEAD	<i>BJ 041-P12-RX</i>		<i>BJ 041-P8-RX</i>		<i>BJ 145-G12-RX</i>		<i>BJ 145-G12-RX</i>		<i>BJ 441-G9-RX</i>	
	DIAMETER	3.5 in.	89 mm	3.5 in.	89 mm	3.5 in.	89 mm	3.5 in.	89 mm	3.5 in.	89 mm
	EXTENSION PORTS	6 x 3/4 NPT		6 x 1/2 NPT		6 x G12		6 x G12		6 x G9	
	HEAD WEIGHT	4.6 lb	2.1 kg	4.8 lb	2.2 kg	4.5 lb	2.0 kg	5.2 lb	2.4 kg	5.8 lb	2.6 kg

BJV HEAD SELECTION	• BJV-P12										
	OFFSET			R60		R35		R20		R12	
	PRESSURE	10k psi	700 bar	13-25 gpm	49-95 l/min	22-39 gpm	83-150 l/min	40-67 gpm	150-250 l/min	65-100 gpm	250-380 l/min
		15k psi	1000 bar	12-21 gpm	45-79 l/min	22-39 gpm	83-150 l/min	40-64 gpm	150-240 l/min	65-100 gpm	250-380 l/min
	• BJV-P16										
	OFFSET			R20		R12		R09			
	PRESSURE	10k psi	700 bar	50-85 gpm	190-320 l/min	85-120 gpm	320-450 l/min	150-200 gpm			570-760 l/min
	• BJV-MP12										
	OFFSET			R60		R35		R20		R12	
	PRESSURE	22k psi	1500 bar	10-15 gpm	38-57 l/min	15-24 gpm	57-91 l/min	24 - 40 gpm	91-150 l/min	40-60 gpm	150-230 l/min
• BJV-M24											
OFFSET			R60		R35		R20		R12		
PRESSURE	15k psi	1000 bar	12-21 gpm	45-79 l/min	22-39 gpm	83-150 l/min	40-64 gpm	150-240 l/min	65-100 gpm	250-380 l/min	
	22k psi	1500 bar	12-20 gpm	45-76 l/min	21-34 gpm	45-79 l/min	35-58 gpm	130-220 l/min	59-100 gpm	220-380 l/min	
• BJV-H9											
OFFSET			R70		R40		R25				
PRESSURE	30k psi	2100 bar	3.9-6.7 gpm	15-25 l/min	6.7-12 gpm	25-45 l/min	11-20 gpm	41-76 l/min			
	35k psi	2400 bar	3.6-6.2 gpm	14-24 l/min	6.4-11 gpm	24-42 l/min	10-18 gpm	38-68 l/min			
	40k psi	2800 bar	3.4-5.8 gpm	3-22 l/min	5.8-10 gpm	22-39 l/min	9.3-17 gpm	35-65 l/min			



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SEE PAGE 97 FOR IMPORTANT SAFETY INFORMATION

STRAIGHT PIPE CLEANING

BJV CENTRALIZERS

Centering Devices for Any Application



BJ-070 SKID STYLE

Utilizes interchangeable plastic runners which can be easily replaced. Works well in elbows and can effectively clean up to 12 in. (305 mm) diameter pipes and works with all BJV models.

Tool not included.

Skid Sizes (Diameter)	
BJ 070-6	6 in. 150 mm
BJ 070-8	8 in. 200 mm
BJ 070-10	10 in. 250 mm
BJ 070-12	12 in. 300 mm



BJ-286 CENTRALIZER

Designed for straight pipe runs only, these six-wheel centralizers feature an adjustable, scissor-style aluminum frame and tough plastic wheels. They are compatible with the entire BJV line of rotary tools.

Tool not included.

Centralizer Sizes (Diameter)		Weight
BJ 286-S	9–18 in. 230–460 mm	20 lb 9 kg
BJ 286-M	13–40 in. 330–1000 mm	32 lb 15 kg
BJ 286-L	16–60 in. 410–1500 mm	40 lb 18 kg

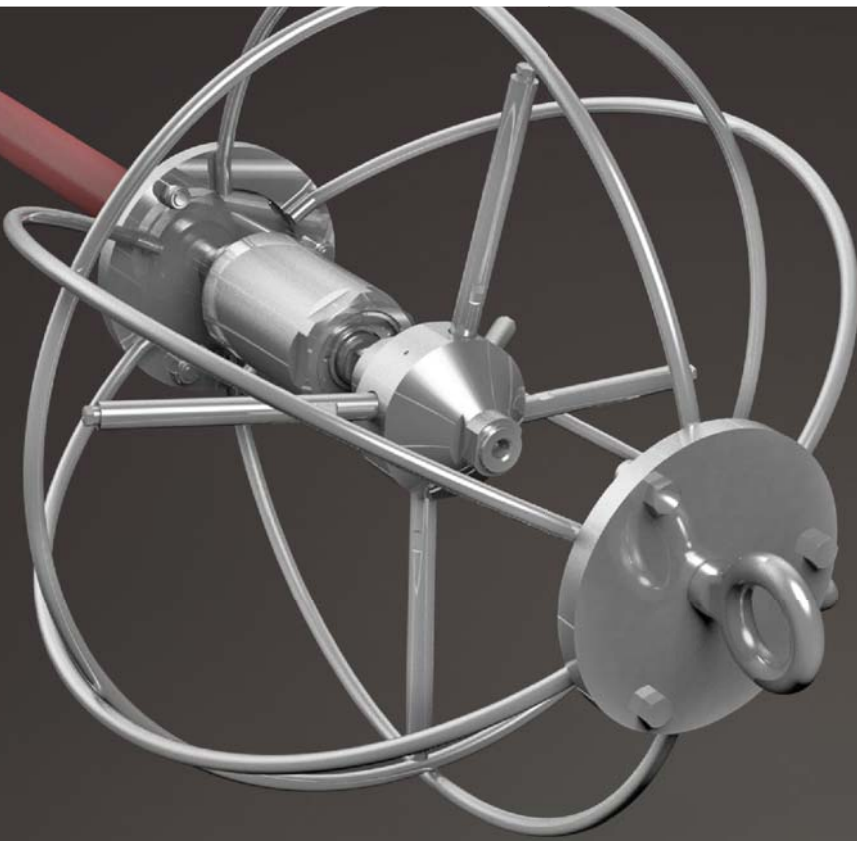


BJ-288 FOR PIPES WITH BENDS

With adjustable, telescopic steel legs and tough plastic wheels, these eight-wheel centralizers are designed to travel through elbows easily and are compatible with the entire BJV line of rotary tools.

Tool not included.

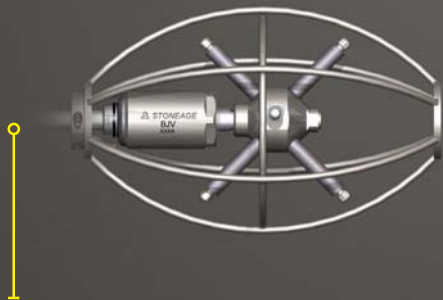
Centralizer Sizes (Diameter)		Weight
BJ 288-S	16–21 in. 410–530 mm	12 lb 5.5 kg
BJ 288-M	22–29 in. 560–740 mm	13 lb 5.9 kg
BJ 288-L	30–37 in. 770–940 mm	16 lb 7.3 kg



CAGE-STYLE CENTRALIZERS

We recommend using stainless steel centralizers when negotiating complex piping arrangements and removing built-up debris while maintaining jet rotation.

BJ 408-MP12/H9
BJ 408-P12/M24



Different inlet plates are available for all models.

BJ 100-SS
BJ 100-SS-MP



Different collar sizes are available for all models.

Part ID	BJ 408-MP12/H9	BJ 408-P12/M24*	BJ 100-SS	BJ 100-SS-MP
DIAMETER	12 in. 300 mm	12 in. 300 mm	20 in. 510 mm	20 in. 510 mm
LENGTH	20 in. 510 mm	20 in. 510 mm	24 in. 610 mm	24 in. 610 mm
WEIGHT	10 lb 4.5 kg	10 lb 4.5 kg	11 lb 5.0 kg	11 lb 5.0 kg

*Requires specified extension nipple on the inlet



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STRAIGHT PIPE CLEANING

RAPTOR™

Rotary Cleaning for Straight Pipes

The Raptor 2-D self-rotating tool is used to clean process drains, totes, closed head drums, water well screens, ducts, and exhaust stacks. Combined with a centralizer, it cleans pipes from 3–12 in. (76–305 mm) in diameter and can clean straight tubes as small as 2.25 in. (57 mm) in diameter.

The Raptor uses viscous fluid speed control and operates with 2, 4, or 6 jets in balance. We recommend using a centralizer to protect the head and improve jet action on the wall being cleaned.

FEATURES:

- High flow range aids in removing thick, tough deposits
- Controlled rotation for longer jet dwell times for difficult deposits
- Multiple jetting options allows for fine tuning heads to optimize cleaning
- Optional pull ring connection aids in jobs where tool needs to be pulled through the pipe
- Multiple head options available
- Optional entering devices available



Tool Model	Pressure Range	Flow Range	Rotation Speed	Inlet Connection	Length	Weight
RPT	Up to 22k psi 1500 bar	Up to 60 gpm 230 l/min	15-60 rpm (Slow Fluid) 50-250 rpm (Fast Fluid)	1/2 NPT, 9/16 MP or M24	9.5 in. 240 mm	5.5 lbs 2.5 kg



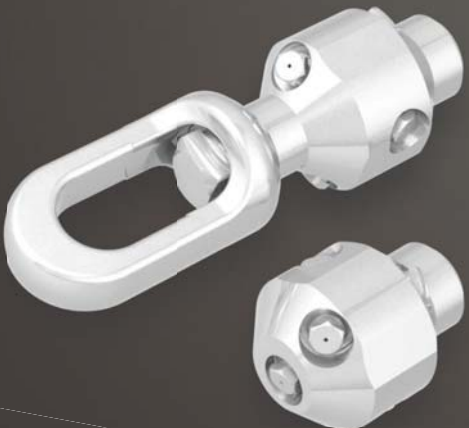
RPT 070
For 4", 5", 6", 8", 10" and 12" pipes.



RPT 075
For 3" or 4.5" pipes.

OPTIONAL CENTRALIZERS

A centralizer helps to protect the tool as it passes through the pipe and balances jet standoff distance for more consistent cleaning. In cases where pipe size is more than 1.5 times the diameter of the tool, a centralizer is an important safety device, preventing the tool from turning around and thrusting backwards out of the pipe.



RAPTOR HEAD SPECIFICATIONS

HEAD	RPT 043-P2-6	RPT 044-P4-6
Diameter	2.0 in. 51 mm	2.5 in. 64 mm
Nozzles	6 or 7 x AP2	6 x AP4

RAPTOR HEAD SELECTION

Head Offset		R30	R18	R11
PRESSURE	5k psi 350 bar	10-23 gpm 38-87 l/min	16-38 gpm 60-140 l/min	25-60 gpm 95-230 l/min
	10k psi 700 bar	10-18 gpm 38-68 l/min	15-31 gpm 57-120 l/min	25-51 gpm 95-190 l/min
	15k psi 1000 bar	10-17 gpm 38-64 l/min	16-28 gpm 60-110 l/min	26-47 gpm 98-180 l/min
	22k psi 1500 bar	10-16 gpm 38-60 l/min	17-26 gpm 64-100 l/min	27-43 gpm 100-160 l/min



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STRAIGHT PIPE CLEANING

GOPHER™

Speed Controlled Rotary Cleaning for Tubes
2–6 Inches (51–152 mm) in Diameter

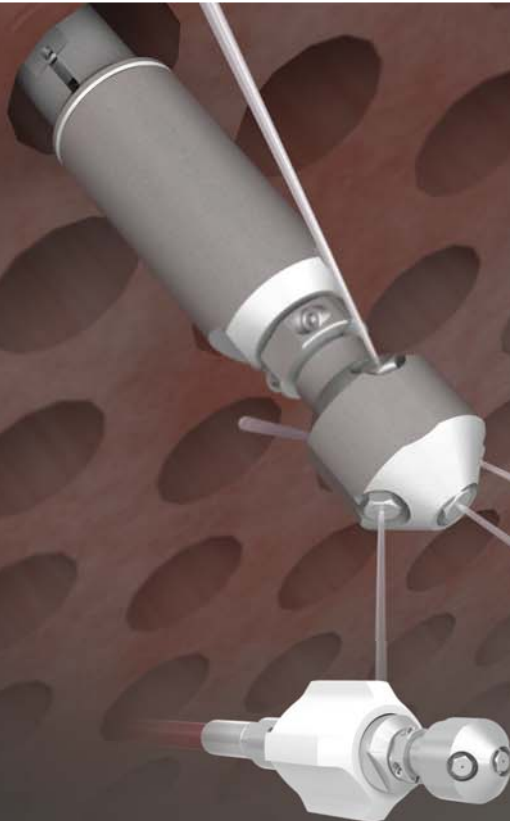
The Gopher self-rotary tool is ideal for cleaning evaporator tubes and a variety of process lines. It is ideal for cutting through coke, polymers, coatings and latex. The Gopher is offered in two pressure ranges up to 40,000 psi (2800 bar).

FEATURES:

- **Self-rotary, speed control provides complete internal coverage while speed control provides optimum jet delivery**
- **Two head options available: 7 port unplugging option for maximum forward hitting power and a 6 port polishing head for IRIS inspection polishing**
- **Multiple jetting configurations means the same tool can be re-jetted to match a wide variety of cleaning applications—great for when you need more pulling force or forward hitting power**

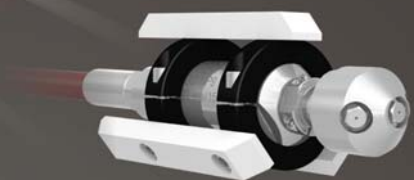


Tool Model	Pressure Range	Flow Range	Inlet Connection	Rotation Speed	Weight	Max Operating Temperature
GO-MP9	2–22k psi 140–1500 bar	18–25 gpm 30–95 l/min	9/16 MP	600–1000 rpm	3.0 lb 1.36 kg	160 °F 70 °C
GO-H9-C	22k–40k psi 1500–2800 bar	4–10 gpm 15–40 l/min	9/16 HP	600–1000 rpm	3.3 lb 1.5 kg	160 °F 70 °C



OPTIONAL CENTRALIZERS

A centralizer helps to protect the tool as it passes through the pipe and balances jet standoff distance for more consistent cleaning. In cases where pipe size is more than 1.5 times the diameter of the tool, a centralizer is an important safety device, preventing the tool from turning around and thrusting backwards out of the pipe.



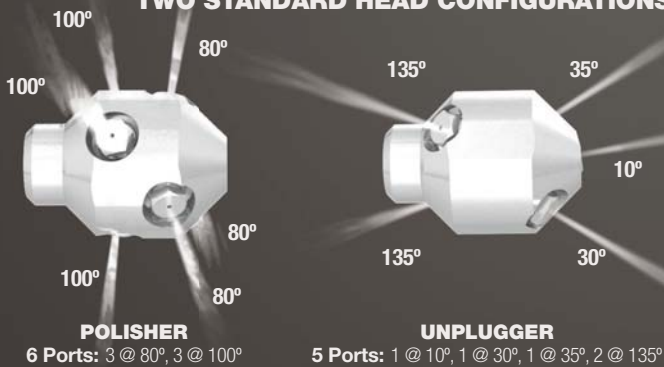
Pipe Size	Centralizer (Complete)	Weight
3 in. 76 mm	GO 075-3	0.3 lb 0.1 kg
4.5 in. 114 mm	GO 075-4.5	0.4 lb 0.2 kg

Pipe Size	Centralizer (Complete)	Weight	Collar*	Skid**
4 in. 100 mm	GO 070-4	1.4 lb 0.6 kg	GO 070.1	RJ 070.2-4
5 in. 127 mm	GO 070-5	1.6 lb 0.7 kg	GO 070.1	RJ 070.2-5
6 in. 152 mm	GO 070-6	1.9 lb 0.9 kg	GO 070.1	RJ 070.2-6
8 in. 203 mm	GO 070-8	2.2 lb 1.0 kg	GO 070.1	RJ 070.2-8
12 in. 305 mm	GO 070-12	4.0 lb 1.8 kg	GO 070.1	RJ 070.2-12

*Set of 2 collars

**Set of 3 skids with 6 screws

TWO STANDARD HEAD CONFIGURATIONS



GOPHER HEAD SELECTION

MODEL	GO-MP9	GO-H9-C
Polisher LF	7-14 gpm (27-53 l/min)	4-7 gpm (20-27 l/min)
Model	GO 042-R.14	GO 342-R.14
Polisher HF	14-25 gpm (53-95 l/min)	7-12 gpm (27-45 l/min)
Model	GO 042-R.07	GO 342-R.08
Unplugger LF	8-15 gpm (30-57 l/min)	4-7 gpm (20-27 l/min)
Model	GO 043-R.17	GO 343-R.18
Unplugger HF	15-25 gpm (57-95 l/min)	7-12 gpm (27-45 l/min)
Model	GO 043-R.08	GO 343-R.08

MAINTENANCE RESOURCES

Swivel	Service Kit	Seal Kit	Overhaul Kit	Tool Kit	Lubricant	Manual
GO-MP9	GO 600	GO 602	GO 610	GO 612	GP 044	PL 511
GO-H9-C	GO 600-H9-C	BC 602-H9-C	GO 610-H9-C	GO 612	GP 044	PL 510

ROTARY SWIVELS



ROTARY SWIVELS

The Industry's Largest Selection

Stainless steel construction, heavy duty bearings, and long lasting high pressure seals. Either 0° or 90° inlet connections are available.

FEATURES:

- Heavy-duty stainless steel construction
- Unique, leak-free seal design requires very little torque for rotation
- Multiple inlet options available mean the tool can be used at different pressures
- External grease fittings for easy maintenance
- 0° or 90° inlet connection simplifies hose routing

IDEAL FOR:

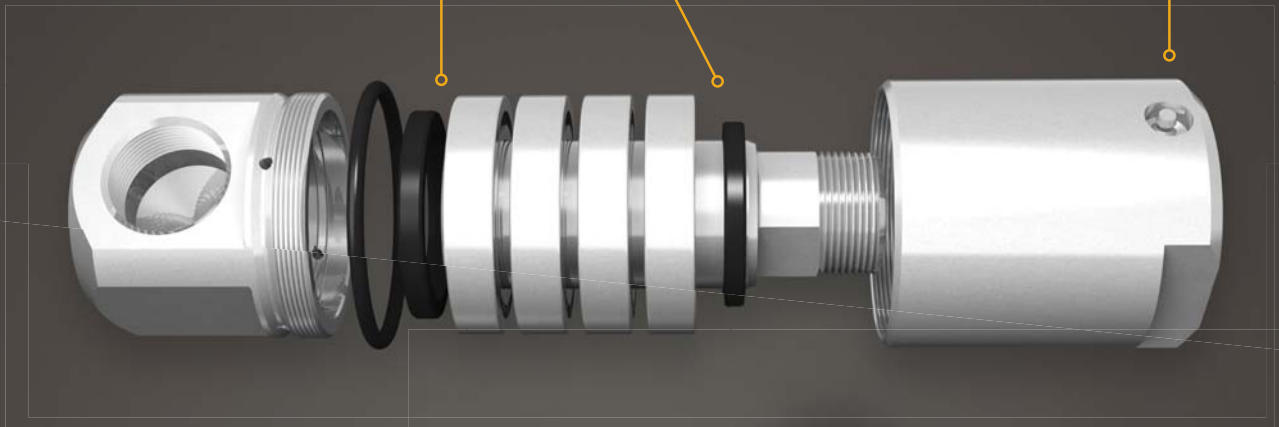
- Floor cleaners, hose reels, and shot guns
- Preventing hose kink
- Conveying high pressure water from a stationary line to a powered rotating or twisting assembly



Pressure Range	Flow Range	Length	Diameter	Weight	Rotation
2-40k psi 138-2800 l/min	Up to 400 gpm 1500 l/min	2.6-6.9 in. 792-2103 mm	0.37-1.3 in. 9.4-33 mm	3-15 lbs 1.4-6.8 kg	Up to 1000 rpm

LEAK-FREE SEAL DESIGN
Requires very little torque for rotation

EXTERNAL GREASE FITTINGS
Easy maintenance



SG SWIVEL

The Industry's Widest Selection

SG Swivels are reliable, easy to maintain, and are widely used in our surface preparation tools. Heavy-duty ball bearings with external grease fittings, stainless steel construction, and long lasting high pressure seals combine to make these the best swivels in the industry.



SG-P12P12-62

SG-MP12AV12

SG-CCN MP12K

	SG-P8P8		SG-P12P12-62		SG-MP12AV12		SG-MP16MP16		SG-CCN P12K		SG-CCN MP12K	
Maximum Pressure	15k psi	1000 bar	15k psi	1000 bar	22k psi	1500 bar	22k psi	1500 bar	15k psi	1000 bar	22k psi	1500 bar
Maximum Flow	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
Rotation Speed	0-600 rpm		0-600 rpm		0-600 rpm		0-600 rpm		0-2000 rpm		0-2000 rpm	
Flow Coefficient	2.3 Cv		4.6 Cv		2.0 Cv		4.6 Cv		2.3 Cv		2.0 Cv	
Inlet Connection	1/2 NPT, 1/2 BSPP		3/4 NPT, 3/4 BSPP		3/4 MP		1 MP		3/4 NPT		3/4 MP	
Shaft Connection	1/2 NPT		3/4 NPT		3/4 MP		1 MP		1-1/8 K		1-1/8 K	
Diameter	3.0 in.	76 mm	3.0 in.	76 mm	3.0 in.	76 mm	3.0 in.	76 mm	3.0 in.	76 mm	3.0 in.	76 mm
Length	6.6 in.	170 mm	6.6 in.	170 mm	7.9 in.	200 mm	9.0 in.	230 mm	7.0 in.	180 mm	7.0 in.	180 mm
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	3.8 kg

ROTARY SWIVELS



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SEE PAGE 97 FOR IMPORTANT SAFETY INFORMATION**

UH SWIVEL

Ultra High Pressure Rotation

Considered the benchmark of high pressure rotary couplings, UH Swivels lead the industry in durability. The UH-H9H6 is available in either a 0° or 90° inlet connection.

	UHS-H9H9	UH-H9H6
Maximum Pressure	40k psi 2800 bar	44k psi 3000 bar
Maximum Flow	10 gpm 38 l/min	20 gpm 76 l/min
Flow Coefficient	0.30 Cv	0.50 Cv
Rotation Speed*	0-1500 rpm	0-1000 rpm
Inlet Connection	9/16 HP	9/16 HP
Shaft Connection	9/16 HP	3/8 HP, G12
Diameter	1.75 in. 45 mm	2.5 in. 64 mm
Length	5.9 in. 130 mm	8.8 in. 220 mm
Weight	2.0 lb 0.90 kg	7.5 lb 3.4 kg

*NOTE: Break in new seals for 1/2 hour at 500 rpm max.



UHS-H9H9

UH-H9H6

SL SWIVEL

Lightweight and Compact

SL swivels feature replaceable seals, smooth ball bearings, stainless steel construction, and low static torque for easy rotation. They are installed standard on our Lancing Machines and are available with either 0° or 90° inlets.

	SL-P8P4	SL-MP9AV9
Maximum Pressure	15k psi 1000 bar	22k psi 1500 bar
Maximum Flow	35 gpm 130 l/min	25 gpm 95 l/min
Rotation Speed	0-1000 rpm	0-800 rpm
Flow Coefficient	1.6 Cv	1.1 Cv
Inlet Connection	1/2 NPT	9/16 MP
Shaft Connection	1/4 NPT	9/16 MP
Diameter	1.75 in. 45 mm	1.75 in. 45 mm
Length	4.6 in. 120 mm	5.9 in. 130 mm
Weight	1.63 lb 0.74 kg	2.0 lb 0.89 kg



SL-P8P4-0

SL-MP9AV9-0

ROTARY SWIVELS

SM SWIVEL

High Flow Rotation

Constructed similarly to the SG swivel, the heavy-duty SM series is built to handle up to 3500 hp. Featuring stainless steel construction, heavy duty bearings, and long lasting high pressure seals, SM Swivels are excellent for boilers, furnaces, tube bundles, large tank, and vessel cleaning applications. Either 0° or 90° inlet connections are available.

	SM-P16	SM-P20
Maximum Pressure	12k psi 830 bar	10k psi 700 bar
Maximum Flow	300 gpm 1100 l/min	600 gpm 2300 l/min
Flow Coefficient	13 Cv	18 Cv
Rotation Speed	0-300 rpm	0-300 rpm
Inlet Connection	1 NPT	1-1/4 NPT
Shaft Connection	1 NPT	1-1/4 NPT
Diameter	3.5 in. 8.9 mm	3.5 in. 8.9 mm
Length	7.3 in. 190 mm	*7.3 in. *190 mm
Weight	10 lb 4.5 kg	*11 lb *5.0 kg

*For 0° inlet.



SM-P16-0

SM-P20-90

SH SWIVEL

Prevents Hose Twist

SH swivels can be installed between a tool's inlet connection and the high pressure hose to prevent hose twist and ease hose handling. They can also provide compact rotary motion for a variety of low speed applications.

	SH-P8P8
Maximum Pressure	15k psi 1000 bar
Maximum Flow	50 gpm 190 l/min
Rotation Speed	0-250 rpm
Flow Coefficient	2.3 Cv
Inlet Connection	1/2 NPT
Shaft Connection	1/2 NPT
Diameter	2.25 in. 57 mm
Length	4.13 in. 105 mm
Weight	1.9 lb 0.86 kg



SH-P8P8



**OPERATING WATERBLASTING EQUIPMENT
CAN BE POTENTIALLY HAZARDOUS.**

SEE PAGE 97 FOR IMPORTANT SAFETY INFORMATION

WATERBLAST ACCESSORIES

BACKOUT PREVENTERS

Backout preventers increase safety by keeping the tool from backing out of the pipe. Several options are available including fixtures for small diameter pipes, pipes with various flange bolt circle diameters, and adapters for pipes with no-flange entry.



BJ 305
Pipe Sizes 2-6 in. (51-150 mm)
Hose Sizes (ID) 0.12-0.32 in. (3-8 mm)



BJ 310
Pipe Sizes 4-8 in. (100-200 mm)
For Hose Sizes (ID) 0.32-0.75 in. (8-19 mm)



BJ 320
Pipe Sizes 5-17 in. (130-430 mm)
Hose Sizes (ID) 0.32-0.75 in. (8-19 mm)



BJ 340 NO-FLANGE KIT
Pipe Sizes 15-36 in. (380-910 mm)
For Hose Sizes (ID) 0.32-0.75 in. (8-19 mm)

VE-400™ SAFETY STOP

Tube Cleaning Safety

The VE-400 is designed to protect the operator from a flex-lance exiting the tube sheet during cleaning operations.

The VE-400 adapts to both horizontal and vertical applications and has a wide range of adjustments that easily accommodates different tube sheet sizes.

Weight Complete: 20 lb – (9.0 kg)



WATERBLAST ACCESSORIES

BANSHEE PROTEX™

Vertical Splash Guard

The Banshee ProTex is a lightweight, durable splash guard built to keep operators safe from the potential hazards of manual flex-lancing.

The ProTex is designed specifically for use with Banshee tube cleaning tools and the anti-withdrawal collet easily adjusts to fit many hose sizes. A removable insert easily centers smaller tools and we offer an optional three foot long tube for use with a Stinger.

Weight Complete: 12 lb – (5.5 kg)

Hose Range: 0.125–1.3 in. – (3–33 mm) OD



HOSE STORAGE REEL

Protect your hoses while improving job site safety. The HWB safely stores hoses, easily moves from job to job and reduces trip hazards.

Featuring StoneAge rotary couplings, these reels can accommodate pressures up to 40k psi*. Air or hydraulic powered rewind systems available. Hose not included.

Diameter	32 in. 810 mm
Height	34 in. 860 mm
Width	18 in. 460 mm
Hose Bend Radius	10 in. 810 mm
Weight	170 lb 77 kg
HOSE O.D.	MAXIMUM LENGTH
0.8 in. 20 mm	440 ft 134 m
1.0 in. 25 mm	275 ft 84 m
1.2 in. 30 mm	167 ft 51 m



*Hose must be extended prior to use.

WATERBLAST ACCESSORIES

SAPPHIRE NOZZLES

For High Pressure Applications

These nozzles are used for high pressure jetting applications where water filtration of 10 micron or better is required. Jeweled orifices make the best quality, longest lasting jets possible, especially for ultra-high pressures.

- Pressure Range: 20–40k psi (1400–2800 bar)
- Flow Range: 0.2–4.8 gpm (0.75–18 l/min)



Shown larger than actual size.

SAPPHIRE NOZZLE FLOW CHART (GPM)

ORIFICE ID in. mm	PRESSURE KPSI & (BAR)											AVAILABILITY		
	20 (1400)	22 (1500)	24 (1700)	26 (1800)	28 (1900)	30 (2100)	32 (2200)	34 (2300)	36 (2500)	38 (2600)	40 (2800)	OS4	OS6	OS7
.009 (0.23)	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3		•	
.010 (0.25)	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	•	•	
.011 (0.28)	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5		•	•
.012 (0.30)	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.6	•	•	•
.013 (0.33)	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.7	•	•	•
.014 (0.36)	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.8	•	•	•
.015 (0.38)	0.6	0.7	0.7	0.7	0.7	0.8	0.9	0.8	0.8	0.9	0.9	•	•	•
.016 (0.41)	0.7	0.7	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.0	1.0	•	•	•
.017 (0.43)	0.8	0.8	0.9	0.9	0.9	1.0	1.0	1.0	1.1	1.1	1.1	•	•	•
.018 (0.46)	0.9	0.9	1.0	1.0	1.1	1.1	1.1	1.2	1.2	1.2	1.3	•	•	•
.019 (0.48)	1.0	1.0	1.1	1.1	1.9	1.2	1.3	1.3	1.3	1.4	1.4	•	•	•
.020 (0.51)	1.1	1.2	1.2	1.3	1.3	1.4	1.4	1.4	1.5	1.5	1.6	•	•	•
.021 (0.53)	1.2	1.3	1.3	1.4	1.4	1.5	1.5	1.6	1.6	1.7	1.7	•	•	•
.022 (0.56)	1.3	1.4	1.5	1.5	1.6	1.6	1.7	1.7	1.8	1.8	1.9	•	•	•
.023 (0.58)	1.5	1.5	1.6	1.7	1.7	1.7	1.8	1.9	1.9	2.0	2.0	•	•	•
.024 (0.61)	1.6	1.7	1.7	1.8	1.9	1.9	2.0	2.1	2.1	2.2	2.2	•	•	•
.025 (0.64)	1.7	1.8	1.9	2.0	2.0	2.1	2.2	2.2	2.3	2.4	2.4	•	•	•
.026 (0.66)	1.9	1.9	2.0	2.1	2.2	2.3	2.3	2.4	2.5	2.6	2.6	•	•	
.027 (0.69)	2.0	2.1	2.2	2.3	2.4	2.5	2.5	2.6	2.7	2.8	2.8	•	•	
.028 (0.71)	2.2	2.3	2.4	2.5	2.6	2.5	2.7	2.8	2.9	3.0	3.1	•	•	•
.031 (0.79)	2.6	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	•	•	•
.033 (0.84)	3.0	3.1	3.3	3.4	3.5	3.7	3.8	3.9	4.0	4.1	4.2			•
.034 (0.86)	3.2	3.3	3.5	3.6	3.8	3.9	4.0	4.2	4.3	4.4	4.5	•	•	
.035 (0.89)	3.4	3.5	3.7	3.8	4.0	4.1	4.3	4.4	4.5	4.6	4.8	•		•

WATERBLAST ACCESSORIES

ATTACK TIPS™

For Low/Medium Pressure Applications

StoneAge Attack Tips are the highest quality, longest lasting nozzles available for low and medium pressure applications (up to 22k psi - 1500 bar). Flow straighteners correct turbulence, ensuring excellent jetting results.

- Pressure Range: 20–40k psi (1400–2800 bar)
- Flow Range: 0.6–46 gpm (2.27–174 l/min)

STAINLESS STEEL OR CARBIDE AVAILABLE

Shown larger than actual size.



AP2
1/8 NPT



APF4
1/4 NPT
FLUSH MOUNT



AP4
1/4 NPT

ATTACK TIP NOZZLE FLOW CHART (GPM)

ORIFICE ID		PRESSURE - KPSI & (BAR)											FLOW RATING	
		2 (140)	4 (280)	6 (410)	8 (550)	10 (700)	12 (830)	14 (970)	15 (1000)	16 (1100)	18 (1200)	20 (1400)		22 (1500)
in.	mm													
.018	(0.46)	0.39	0.55	0.68	0.78	0.87	0.96	1.0	1.1	1.1	1.2	1.2	1.3	0.6
.020	(0.51)	0.48	0.68	0.83	0.96	1.1	1.2	1.3	1.3	1.5	1.5	1.5	1.6	0.7
.022	(0.56)	0.58	0.82	1.0	1.2	1.3	1.4	1.5	1.6	1.6	1.7	1.8	1.9	0.8
.024	(0.61)	0.69	0.98	1.2	1.4	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	1.0
.026	(0.66)	0.81	1.2	1.4	1.6	1.8	2.0	2.1	2.2	2.3	2.4	2.6	2.7	1.1
.029	(0.74)	1.0	1.4	1.7	2.0	2.3	2.5	2.7	2.8	2.9	3.0	3.2	3.4	1.4
.032	(0.81)	1.2	1.7	2.1	2.5	2.8	3.0	3.3	3.4	3.5	3.7	3.9	4.1	1.7
.035	(0.89)	1.5	2.1	2.6	3.0	3.3	3.6	3.9	4.0	4.2	4.4	4.7	4.9	2.1
.038	(0.97)	1.7	2.5	3.0	3.5	3.9	4.3	4.6	4.8	4.9	5.2	5.5	5.7	2.5
.042	(1.07)	2.1	3.0	3.7	4.2	4.7	5.2	5.6	5.8	6.0	6.4	6.7	7.0	3.0
.047	(1.19)	2.7	3.8	4.6	5.3	5.9	6.5	7.0	7.3	7.5	8.0	8.4	8.8	3.8
.052	(1.32)	3.3	4.6	5.6	6.5	7.3	8.0	8.6	8.9	9.2	9.8	10	11	4.6
.057	(1.45)	3.9	5.5	6.8	7.8	8.7	9.6	10	11	11	12	12	13	5.5
.063	(1.60)	4.8	6.8	8.3	9.6	11	12	13	13	14	14	15	16	6.8
.069	(1.78)	5.7	8.1	9.9	12	13	14	15	16	16	17	18	19	8.1
.075	(1.91)	6.8	9.6	12	13	15	17	18	19	19	20	21	23	9.6
.082	(2.08)	8.1	12	14	16	18	20	21	22	23	24	26	27	12
.090	(2.29)	9.8	14	17	20	22	24	26	27	28	29	31	32	14
.098	(2.49)	12	16	20	23	26	28	31	32	33	35	37	38	16
.106	(2.69)	14	19	23	27	30	33	36	37	38	41	43	45	19
.115	(2.92)	16	23	28	32	36	39	42	44	45	48	50	53	23
.125	(3.18)	17	27	33	38	42	46	50	52	53	56	60	62	27
.135	(3.43)	22	31	38	44	49	54	58	60	62	66	69	73	31
.145	(3.68)	25	36	44	51	57	62	67	69	72	76	80	84	36
.155	(3.94)	29	41	50	58	65	71	77	79	82	87	92	96	41
.165	(4.19)	33	46	57	66	73	80	87	90	93	98	104	109	46

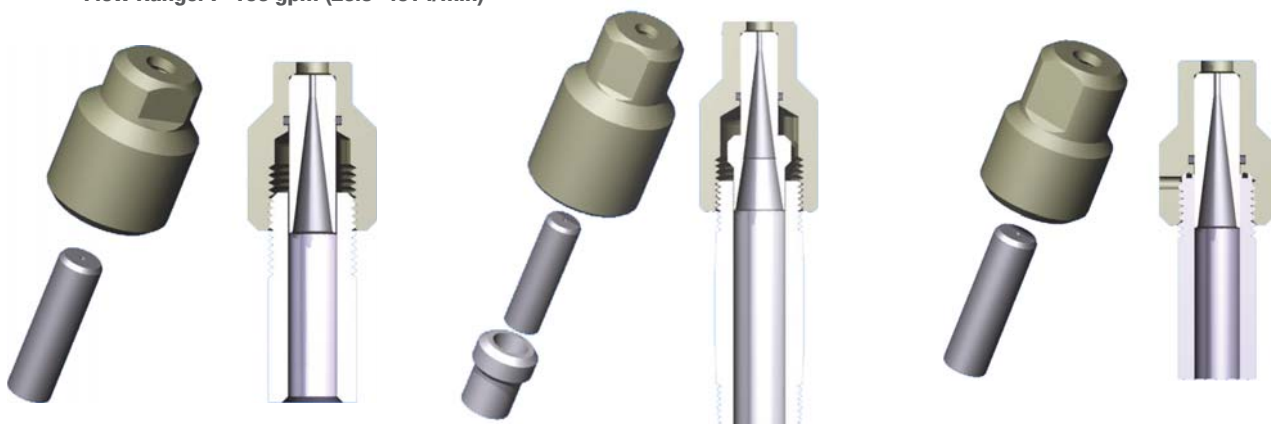
WATERBLAST ACCESSORIES

OC8 CARBIDE INSERTS

For High Flow Applications

We recommend using our OC8 Holders and OC8 Carbide Inserts where filtration is poor, abrasive solids are present or for very high flows. Replaceable carbide inserts are available in large orifice diameters to handle high flows and contain a long taper to provide excellent jet quality.

- Pressure Range: 2–22k psi (138–1500 bar)
- Flow Range: 7–106 gpm (26.5–401 l/min)



OC8 P8 HOLDER & OC8 CARBIDE INSERTS
For 15k psi (1000 bar) 1/2 NPT female connection.

OC8 P12 HOLDER & OC8 CARBIDE INSERTS
For 15k psi (1000 bar) 3/4 NPT female connection.

OC8 G12 HOLDER & OC8 CARBIDE INSERTS
For 22k psi (1500 bar) G12 female connection.

OC8 NOZZLE FLOW CHART (GPM)

ORIFICE ID in. mm	PRESSURE - KPSI & BAR												FLOW RATING
	2 (140)	4 (280)	6 (410)	8 (550)	10 (700)	12 (830)	14 (970)	15 (1000)	16 (1100)	18 (1200)	20 (1400)	22 (1500)	
.063 (1.60)	4.8	6.7	8.2	9.5	11	12	13	13	14	14	15	16	7
.075 (1.91)	6.8	9.6	12	14	15	17	18	19	19	20	21	22	10
.085 (2.16)	8.7	12	15	17	19	21	23	24	25	26	28	29	12
.095 (2.41)	11	15	19	22	24	27	29	30	31	33	33	36	15
.105 (2.67)	13	19	23	27	30	33	35	36	38	40	42	44	19
.125 (3.18)	19	27	33	38	42	46	50	52	53	56	60	62	27
.145 (3.68)	25	36	44	50	57	62	67	69	72	76	80	84	36
.165 (4.19)	33	46	56	66	73	80	87	90	93	98	104	109	46
.175 (4.45)	37	52	64	74	82	90	98	101					52
.190 (4.83)	43	61	75	87	97	106	115	119					61
.200 (5.08)	48	68	83	96	108	118	127	132					68
.215 (5.46)	56	79	96	111	124								78
.235 (5.97)	66	94	115	133	149								94
.250 (6.35)	75	106	130	150	168								106

WATERBLAST ACCESSORIES

EXTENSION NIPPLES

Durable Stainless Steel Construction

Maximize jet power and removal rates by placing nozzles close to the target surface. Extension nipples also enhance jet quality by improving upstream conditions. Standard lengths in stock for all StoneAge tools.

Custom lengths available.



SA 567-P4P2
Fits 1/4 npt ports

SA 356-P8P4
Fits 1/2 npt ports

SA 577-G12P4
Fits G12 ports

SA 569-G9S6
Fits G9 ports

NIPPLE EXTENSION SPECIFICATIONS

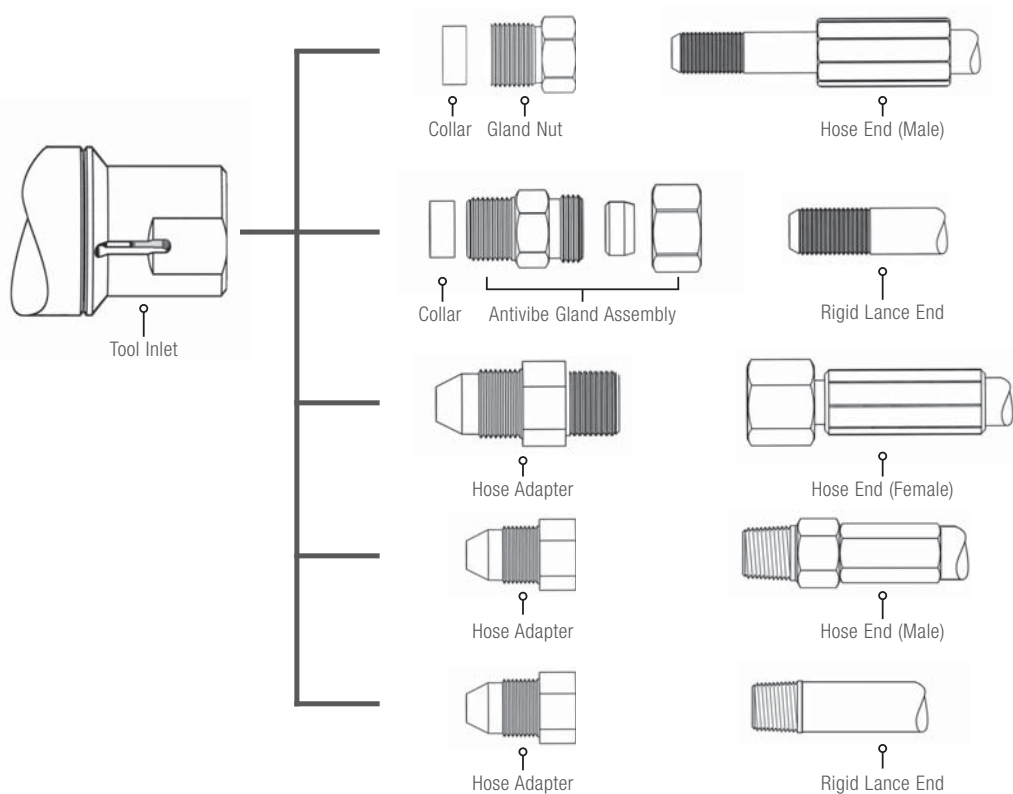
TYPE	PART NUMBER	MAWP	THREADS	OD	ID
9/16 MP Tubing	SA 567-P4P2*	22k psi (1500 bar)	1/4 NPTM x 1/8 NPTF	0.56 in. (14 mm)	0.31 in. (8 mm)
9/16 MP Tubing	SA 567-MP9P2	22k psi (1500 bar)	9/16 MP x 1/8 NPTF	0.56 in. (14 mm)	0.31 in. (8 mm)
9/16 MP Tubing	SA 567-MP9MP9	22k psi (1500 bar)	9/16 MP x 9/16 MP	0.56 in. (14 mm)	0.31 in. (8 mm)
1/2 Sched.160 Pipe	SA 356-P8P4**	15k psi (1000 bar)	1/2 NPTM x 1/4 NPTF	0.84 in. (21 mm)	0.47 in. (12 mm)
1/2 Sched.160 Pipe	SA 356-P8P8	15k psi (1000 bar)	1/2 NPTM x 1/2 NPTM	0.84 in. (21 mm)	0.47 in. (12 mm)
3/4 Sched.160 Pipe	SA 366-P12P12	15k psi (1000 bar)	3/4 NPTM x 3/4 NPTM	1.1 in. (27 mm)	0.61 in. (16 mm)
3/4 MP Tubing	SA 577-MP12LMP12L-19	22k psi (1500 bar)	3/4 MP x 3/4 MP	0.75 in. (19 mm)	0.44 in. (11 mm)
3/4 MP Tubing	SA 577-MP12LP4-10	22k psi (1500 bar)	3/4 MP x 1/4 NPTF	0.75 in. (19 mm)	0.44 in. (11 mm)
3/4 MP Tubing	SA 577-G12P4**	22k psi (1500 bar)	3/4 G12 x 1/4 NPTF	0.75 in. (19 mm)	0.44 in. (11 mm)
9/16 HP Tubing	SA 569-G9S6*	40k psi (2800 bar)	9/16 G9 x 3/8-24 F	0.56 in. (14 mm)	0.19 in. (5 mm)

HOSE FITTINGS & ADAPTERS

9/16 MP (13/16 THREAD)

TOOL MODELS:

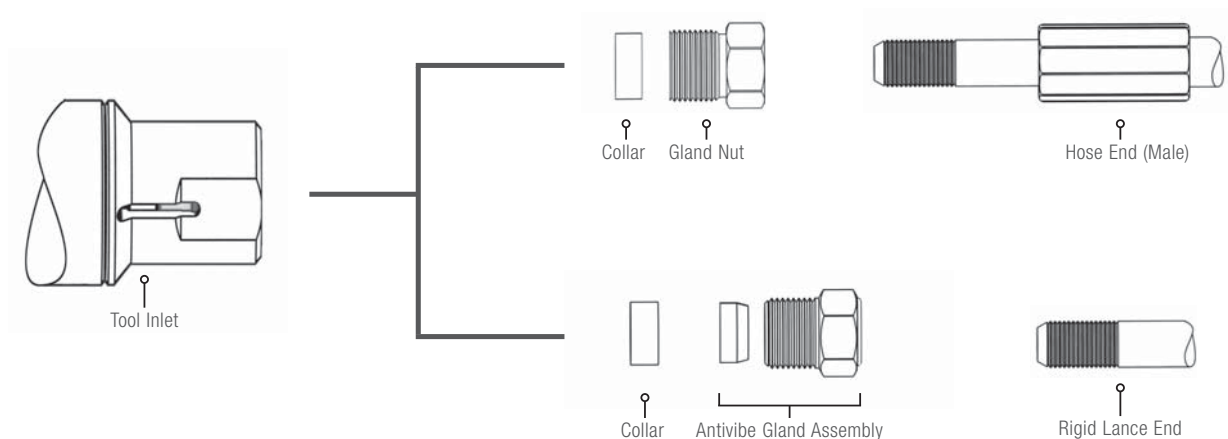
- BA-MP9
- BC-K
- BC-K-P2
- BN33-MP9
- GO-MP9
- RPT-MP9-F
- RPT-MP9-S
- SL-MP9AV9
- SPFR-MP9



Hose End	LH Collar	Gland Nut	Adapter
9/16-18 LH	AF 071-MP9	AF 070-MP9	
M14 LH	AF 071-MPM14L	AF 070-MP9	
M24 Female			GP 255-MP9M24L
1/2 NPT Male			AF 065-MP9P8
3/8 NPT Male			AF 065-MP9P6
9/16-18 Type M			AF 060-MP9
3/4-16 Type M			AF 061-MP9
Lance End	LH Collar	AV Gland Nut	Adapter
9/16-18 LH	AF 071-MP9	AF 072-MP9	
M14 LH	AF 071-MPM14L	AF 072-MP9	
1/2 NPT Male			AF 065-MP9P8
3/8 NPT Male			AF 065-MP9P6

HOSE FITTINGS & ADAPTERS

9/16 HP (1-1/8 UNF)



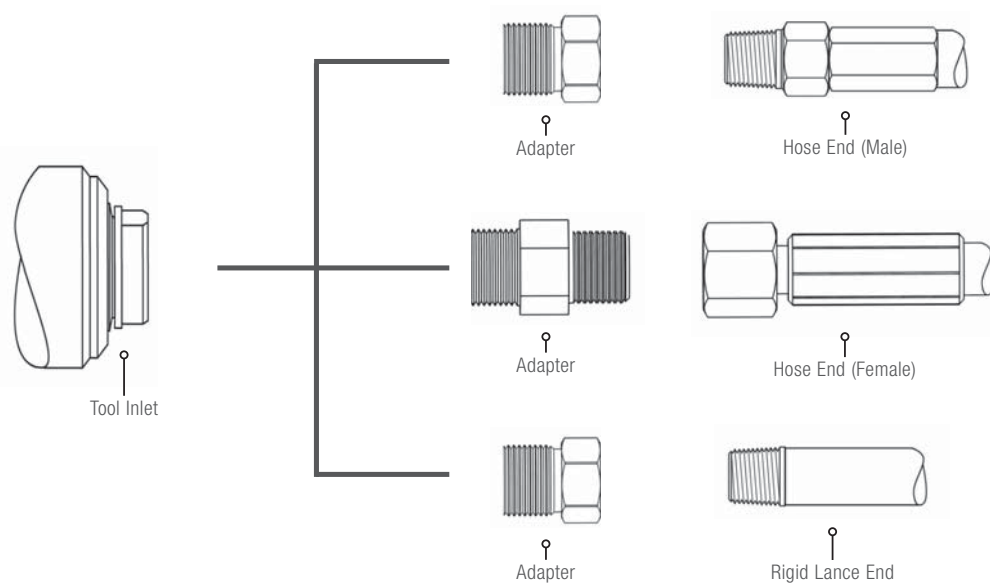
TOOL MODELS:

- BC-H9-C
- BC-H9LF-C
- BC-H9XXLF-C-TI
- BJV-H9-F
- BJV-H9-S
- GO-H9-C
- UH-40-H9H9-0
- UH-40-H9H9-90
- UH-50-H9H9-0
- UH-50-H9H9-90
- UH-H9G12
- UH-H9G12-90
- UH-H9H6
- UH-H9H6-90
- UHS-H9H9

Hose End	LH Collar	Gland Nut
9/16-18 LH Male	AF 071-H9	AF 070-H9
M14 LH Male	AF 071-HM14L	AF 070-H9
Lance End	LH Collar	AV Gland Nut
9/16-18 LH Male	AF 071-H9	AF 072-H9
M14 LH Male	AF 071-HM14L	AF 072-H9

HOSE FITTINGS & ADAPTERS

P12 (3/4 NPT)



TOOL MODELS:

- BJV-P12-F
- BJV-P12-S
- SG-30-P12-0-18
- SG-30-P12-0-24
- SG-30-P12-90-18
- SG-30-P12-90-24
- SG-40-CCN-P12K-0-2
- SG-40-CCN-P12K-90-2
- SG-50-CCN-P12K-0-2
- SG-50-CCN-P12K-90-2
- SG-CCN-P12K-0
- SG-CCN-P12K-90
- SG-E60-P12K-0-5
- SG-E60-P12K-0-60
- SG-E60-P12K-90-5
- SG-E60-P12K-90-60
- SG-E70-P12K-0-5
- SG-E70-P12K-0-60
- SG-E70-P12K-90-5
- SG-E70-P12K-90-5
- SG-P12K-62-0
- SG-P12P12-62-0
- SG-P12P12-62-90
- TR 230-P12

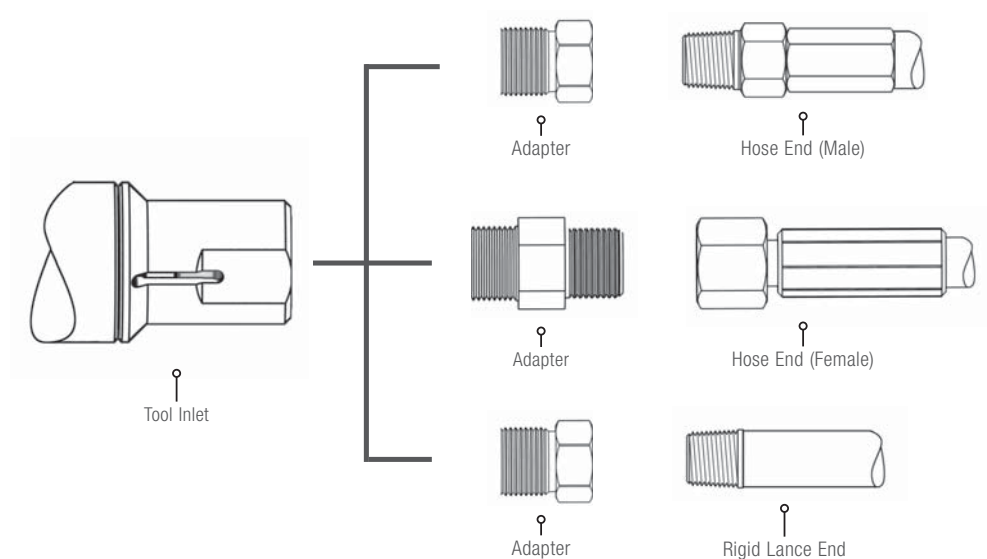
Hose End	Adapter
1/2 NPT Male	GP 051-P8P12
M24 Female	GP 255-P12M24C
M36 Female	GP 255-P12M36C
Lance End	Adapter
1/2 NPT Male	GP 051-P8P12

HOSE FITTINGS & ADAPTERS

P8 (1/2 NPT)

TOOL MODELS:

- BA-P8-R21
- BA-P8-R31
- BA-P8-R40
- BN33-P8
- RPT-P8-F
- RPT-P8-S
- SG-P8P8-0
- SG-P8P8-90
- SH-P8P8-0
- SH-P8P8-90
- SL-P8P4-0
- SL-P8P4-90
- SPFR-P8-B
- SPFR-P8-S



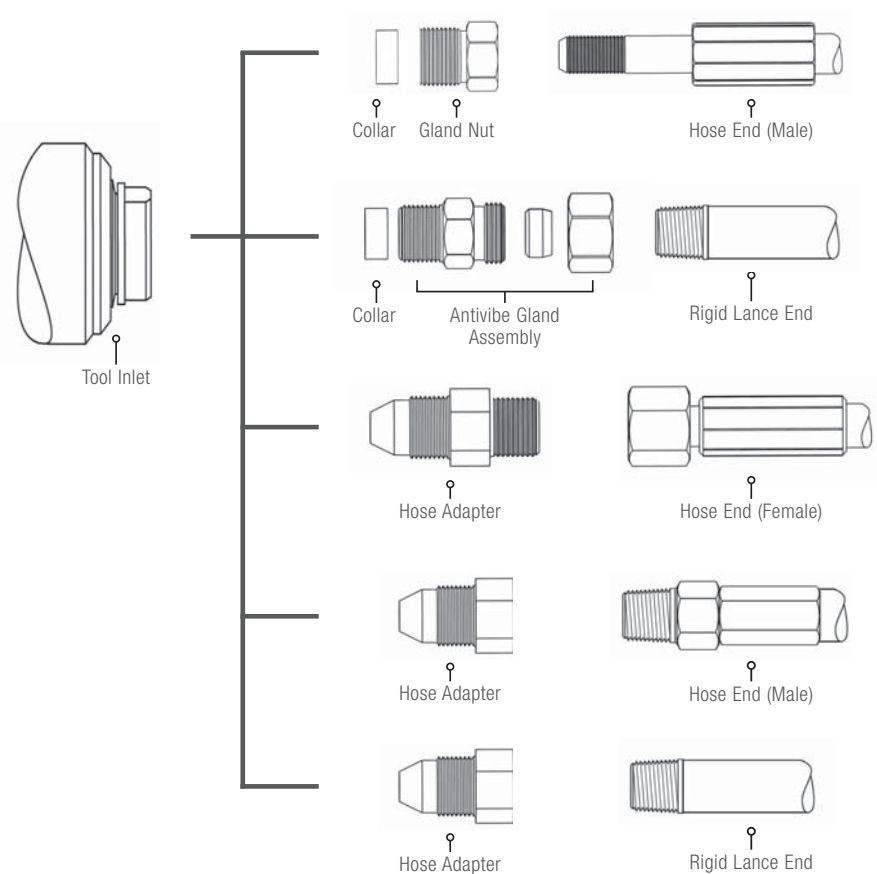
Hose End	Adapter
1/4 NPT Male	GP 051-P4P8
3/8 NPT Male	GP 051-P6P8
9/16-18 Type M Female	AF 060-P8
3/4-16 Type M Female	AF 061-P8
1-12 Type M Female	AF 063-P8
Lance End	Adapter
1/4 NPT Male	GP 051-P4P8
3/8 NPT Male	GP 051-P6P8

HOSE FITTINGS & ADAPTERS

3/4 MP (3/4-14 NPSM)

TOOL MODELS:

- BJV-MP12-F
- BJV-MP12-S
- SG-30-MP12-0-18
- SG-30-MP12-0-24
- SG-30-MP12-90-18
- SG-30-MP12-90-24
- SG-40-CCN-MP12K-0-2
- SG-40-CCN-MP12K-90-2
- SG-50-CCN-MP12K-0-2
- SG-50-CCN-MP12K-90-2
- SG-E60-MP12K-0-5
- SG-E60-MP12K-0-60
- SG-E60-MP12K-90-5
- SG-E60-MP12K-90-60
- SG-E70-MP12K-0-5
- SG-E70-MP12K-0-60
- SG-E70-MP12K-90-5
- SG-E70-MP12K-90-5
- SG-MP12-62-90
- SG-MP12AV12-0
- SG-MP12AV12-90
- SG-MP12K-62-0
- TR 230-MP12



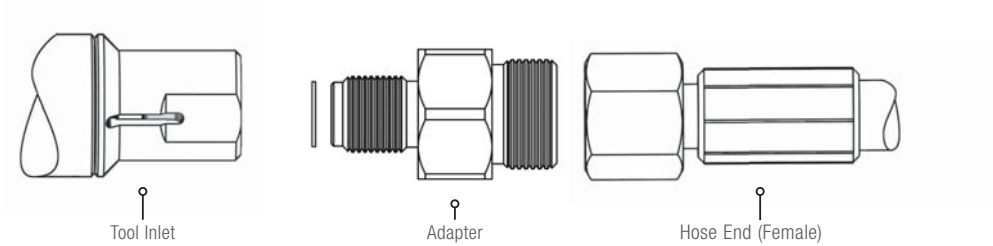
Hose End	LH Collar	Gland Nut	Adapter
3/4-16 LH Male	AF 071-MP12	AF 070-MP12	
9/16-18 Type M			AF 060-MP12
3/4-16 Type M			AF 061-MP12
1-12 Type M			AF 063-MP12
1/2 NPT Male			AF 065-MP12P8
3/4 NPT Male			AF 065-MP12P12
Lance End	LH Collar	AV Gland Nut	Adapter
3/4-16 LH	AF 071-MP12	AF 072-MP12	
1/2 NPT Male			AF 065-MP12P8
3/4 NPT Male			AF 065-MP12P12

HOSE FITTINGS & ADAPTERS

BSPP6 (3/8 BSPP)

TOOL MODELS:

- BA-BSPP6-R16-F
- BA-BSPP6-R16-S
- BA-BSPP6-R22-F
- BA-BSPP6-R22-S
- BN24-BSPP6



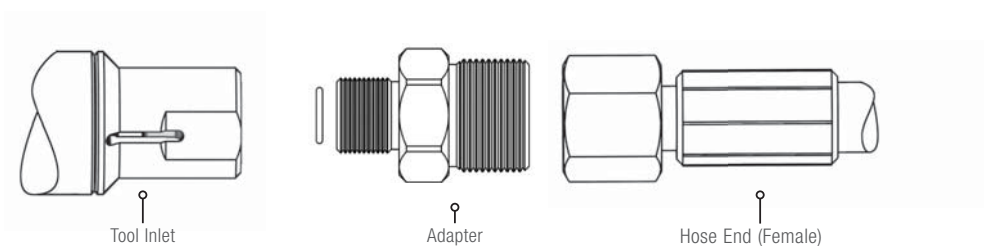
Hose End	Adapter	Copper Washer*
1/4 BSP Female	GP 255-BSPP6-BSPP4C	GP 200-BSPP6
1/2 BSP Female	GP 255-BSPP6-BSPP8C	GP 200-BSPP6
M24 Female	GP 255-BSPP6-M24C	GP 200-BSPP6

*Included with adapter

M24X1.5

TOOL MODELS:

- BA-M24-R21
- BA-M24-R31
- BA-M24-R40
- BJ 286-L-M24
- BJ 286-M-M24
- BJ 286-S-M24
- BJ 288-M-M24
- BJ 288-S-M24
- BJV-M24-F
- BJV-M24-S
- RPT-M24-F
- RPT-M24-S
- TR 230-M24



Hose End	Adapter	O-Ring*
1/2 BSP Female	GP 255-M240BSPP8C	GP 259
3/4 BSP Female	GP 255-M240BSPP12C	GP 259
M24 Female	GP 255-M240M24C	GP 259
M36 Female	GP 255-M240M36C	GP 259

*Included with adapter

TECHNICAL REFERENCE

STANDARD THREAD ABBREVIATIONS

NPT = National Pipe Thread	MP = Medium Pressure Cone & Thread Connection	G9 = 9/16 Thread with O-ring Groove Face Seal
NPTM = National Pipe Thread Male	HP = High Pressure Cone & Thread Connection	G12 = 3/4 Thread with O-ring Groove Face Seal
NPTF = National Pipe Thread Female	LH = Left-hand Direct Tube-end Thread Connection	G16 = 1-12 UNF Thread with O-Ring Face Seal
BSPP = British Standard Parallel Pipe	RH = Right-hand Direct Tube-end Thread Connection	K = 1-1/8 Thread with O-ring Groove Face Seal

STANDARD UNIT ABBREVIATIONS

Pressure	Flow	Distance	Weight	Temperature
psi = pounds per square inch	gpm = gallons per minute	in. = inches	lb = pounds	°F = degree Fahrenheit
b = bar	l/min = liters per minute	ft = feet	kg = kilograms	°C = degree Celsius
	Cv = flow coefficient	mm = millimeters		
	Cd = discharge coefficient	cm = centimeters		
		m = meters		

MEASUREMENT CONVERSIONS

From	To	Multiply By
meters (m)	feet (ft)	3.281
feet (ft)	meters (m)	0.3048
millimeters (mm)	inches (in.)	0.0394
inches (in.)	millimeters (mm)	25.4
l/min	gpm (US)	0.2642
l/min	gpm (Brit)	0.2200
gpm (US)	l/min	3.785
gpm (Brit)	l/min	4.546
gpm (US)	gpm (Brit)	0.8327
gpm (Brit)	gpm (US)	1.201
bar	psi	14.5
psi	bar	0.0689
kilograms (kg)	pounds (mass) (lb)	2.205
pounds (mass) (lb)	kilograms (kg)	0.4536
newtons (N)	pounds (force) (lb)	0.2248
pounds (force) (lb)	newtons (N)	4.448
kilowatts (kW)	horsepower (hp)	1.341
horsepower (hp)	kilowatts (kW)	0.7457

TECHNICAL REFERENCE

PRESSURE AND FLOW EQUATIONS

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 = Horsepower	$Hp = .0174 \times d^2 \times P^{3/2} \times Cd, \approx P \times Q/1714$
Cv = Flow Coefficient	$Cv = Q/\Delta P^{1/2}, = 53 \times (D^{2.5}/L^{1/2})$
ΔP = Pressure Drop	$\Delta P = (Q/Cv)^2$
F = Thrust in lb	$F = \pi/2 \times d^2 \times P \times Cd, = .052 \times P^{1/2} \times Q, \approx .0018 \times (Q/D)^2 \times Cd$
ΔT = Temp Change °F	$\Delta T = \Delta P/337.6$

For all equations:

- L = Tube length in feet
- D = Tube ID in inches
- d = Orifice diameter in inches
- Cd = Discharge Coefficient
 - Cd = 0.90 for long cone orifice
 - Cd = 0.70 for drilled steel orifice
 - Cd = 0.65 for sapphire orifice

FITTING ASSEMBLY GUIDELINES

Understanding the proper preparation and assembly of high pressure fittings and components is critical to the safe operation and longevity of your tools and equipment.

TAPERED PIPE THREADS

Tapered pipe threads (NPT) seal by contact of threads. A paste type anti-seize compound such as Parker Thread-Mate™ along with thread sealing tape works most effectively with NPT threads.

- Use anti-seize compound on male thread, then 2–3 wraps of Teflon® tape (if larger than 3/4 NPT, use 3–4 wraps).
- Prepared fittings should engage about 2 turns by hand and at least 5–6 turns before reaching the recommended torque. Failure to reach minimum engagement usually indicates poorly formed or damaged threads.

Thread Size	Recommended Torque	
1/16 NPT	4–5 Nm	3–4 ft-lb
1/8 NPT	20–23 Nm	15–17 ft-lb
1/4 NPT	24–29 Nm	18–21 ft-lb
3/8 NPT	27–34 Nm	20–25 ft-lb
1/2 NPT	54–61 Nm	40–45 ft-lb
3/4 NPT	88–102 Nm	65–75 ft-lb
1 NPT	129–163 Nm	95–120 ft-lb
1-1/4 NPT	176–203 Nm	130–150 ft-lb

BSPP THREADS

British Standard Parallel Pipe threads (BSPP) seal with the use of a bonded or metal seal that is crushed between the male and female thread at either the face or the shoulder, they do not seal on the threads. A paste type anti-seize compound such as Swagelok Blue Goop® works most effectively with BSPP threads.

- Use anti-seize compound on male thread.
- Prepared fittings should engage fully by hand.

Thread Size	Recommended Torque	
1/8 BSPP	20–22 Nm	15–16 ft-lb
1/4 BSPP	30–35 Nm	22–26 ft-lb
3/8 BSPP	40–50 Nm	30–37 ft-lb
1/2 BSPP	55–65 Nm	41–50 ft-lb
3/4 BSPP	90–100 Nm	66–74 ft-lb
1 BSPP	135–160 Nm	100–118 ft-lb
1-1/4 BSPP	200–230 Nm	150–170 ft-lb

METRIC THREADS

Metric threads with cone seal (M36, M24, M7) seal with the use of an angled male and female conical surface, they do not seal on the threads. A paste type anti-seize compound such as Swagelok Blue Goop® works most effectively with metric cone seal threads.

- Use anti-seize compound on male thread.
- Prepared fittings should engage fully by hand.

Thread Size	Recommended Torque	
M7	18–20 Nm	13–15 ft-lb
M24	90–105 Nm	66–77 ft-lb
M36	190–220 Nm	140–162 ft-lb

FITTING ASSEMBLY GUIDELINES

TYPE M SWIVEL

Type M swivel nut threads (TM12, AF 060-XX, AF 061-XX, AF 062-XX, AF 063-XX) seal with the use of an angled male and female cone, they do not seal on the threads. Designed for fast, simple connections of waterblast hoses and waterblast equipment. A paste type anti-seize compound such as Swagelok Blue Goop® works most effectively with metric cone seal threads.

- Use anti-seize compound on male thread.
- Prepared fittings should engage fully by hand.

Thread Size	Recommended Torque	
9/16	46–52 Nm	34–38 ft-lb
3/4	75–81 Nm	55–60 ft-lb
7/8	102–109 Nm	75–80 ft-lb
1	122–135 Nm	90–100 ft-lb
1-5/16	176–203 Nm	130–150 ft-lb

SAPPHIRE NOZZLES

Sapphire Nozzle threads (OS4, OS6, OS7) seal with the use of an angled male and female seat, they do not seal on the threads. A paste type anti-seize compound such as Swagelok Blue Goop® works most effectively with seat seal threads.

- Use anti-seize compound on male thread.
- Prepared fittings should engage fully by hand.

Thread Size	Recommended Torque	
1/4-28 OS4	6–7.5 Nm	4.5–5.5 ft-lb
3/8-24 OS6	19–22 Nm	14–16 ft-lb
7/16-20 OS7	34–37 Nm	25–27 ft-lb

SAPPHIRE/M3 NOZZLES

Sapphire and M3 Nozzle threads (OS2, OD3M) seal with the use of a thread sealing compound. Loctite® 680 is applied to the male thread. This type of thread needs to have a curing time of 24 hours before water pressure is applied.

- Use thread sealing compound on male thread.
- Prepared fittings should engage fully by hand.

Thread Size	Recommended Torque	
M3 Drilled Nozzle	6–7.5 Nm	4.5–5.5 ft-lb
6-40 UNF Sapphire Nozzle	19–22 Nm	14–16 ft-lb

FITTING ASSEMBLY GUIDELINES

STONEAGE PROPRIETARY

StoneAge proprietary threads (G9, G12, G16, K) seal with the use of an O-Ring on the male thread and a flat face at the bottom of the female thread, they do not seal on the threads. A paste type anti-seize compound such as Swagelok Blue Goop® works most effectively with these StoneAge propriety threads.

- Use anti-seize compound on male thread.
- Prepared fittings should engage fully by hand.

Thread Type	Recommended Torque	
G9	46–52 Nm	34–38 ft-lb
G12	75–81 Nm	55–60 ft-lb
G16	105–115 Nm	80–90 ft-lb
K	122–135 Nm	90–100 ft-lb

MEDIUM & HIGH PRESSURE FITTINGS

These “cone and thread” fittings use straight threads and seal on a tapered cone. There are two pressure ranges for this type of connection: medium pressure up to 22,000 psi, and high pressure up to 40,000 psi. The traditional design consists of pressure containing tubing with a cone on one end and a left-hand thread for a collar, and a larger gland nut with right-hand threads. Fitting sizes are indicated by tubing O.D.

Anti-vibe, an additional feature typically included, consists of a split tapered collet that grips the tubing in support to prevent cracking at the left-hand thread.

Variations of these fittings are made where the entire geometry is reproduced in one piece, and where the tubing itself is directly threaded into a port with either left or right hand threads.

Female ports have a weep hole that will leak if the fitting is not tightened, if the cone surface is damaged, or if the collar is not threaded on far enough to allow contact of the cone to the seat. If a connection leaks along the tubing through the inside of the gland nut, inspect for a crack in the tubing threads.

Gland and Collar Assemblies

- Inspect cone surface for damage.
- Use Swagelok Blue Goop® on all male threads.
- Slide gland nut onto tubing, then thread on collar until one thread shows between collar and cone.
- Tighten medium pressure anti-vibe nut last while holding other flats.

One Piece Connections

- Inspect cone surface for damage.
- Use Swagelok Blue Goop® on male threads.

Thread Size	Recommended Torque	
1/4-28 Left Hand	6.5 Nm	5 ft-lb
1/4-28 Right Hand	6.5 Nm	5 ft-lb
1/4 Gland and Collar 7/16-20	24 Nm	18 ft-lb
3/8-24 Left Hand	22 Nm	16 ft-lb
3/8-24 Right Hand	22 Nm	16 ft-lb
3/8 Gland and Collar 9/16-18	38 Nm	28 ft-lb
9/16-18 Left Hand	47 Nm	34 ft-lb
9/16-18 Right Hand	47 Nm	34 ft-lb
9/16 Gland and Collar 13/16-16	68 Nm	50 ft-lb
3/4-16 Left Hand	70 Nm	50 ft-lb
3/4-16 Right Hand	70 Nm	50 ft-lb
3/4 Gland and Collar 3/4-14 NPSM	102 Nm	75 ft-lb
1-12 Left Hand	98 Nm	70 ft-lb
1-12 Right Hand	98 Nm	70 ft-lb
1 Gland and Collar 1-3/8-12	135 Nm	100 ft-lb

TECHNICAL REFERENCE

STONEAGE THREAD SIZE CODING

We use several codes in StoneAge Part IDs to indicate relevant thread sizes:

NPT Thread Size	StoneAge Code
1/16 NPT	P1
1/8 NPT	P2
1/4 NPT	P4
3/8 NPT	P6
1/2 NPT	P8
3/4 NPT	P12
1 NPT	P16
1-1/4 NPT	P20
1-1/2 NPT	P24
BSPP Thread Size	StoneAge Code
1/8 BSPP	BSPP2
1/4 BSPP	BSPP4
3/8 BSPP	BSPP6
1/2 BSPP	BSPP8
3/4 BSPP	BSPP12
1 BSPP	BSPP16
1-1/4 BSPP	BSPP20
Metric Thread Size	StoneAge Code
M3 x .5	M3
M7 x 1	M7
M24 x 1.5	M24
M36 x 2	M36
Straight Thread Size	StoneAge Code
M3 x .5 Drilled Nozzle	OD3M
6-40 UNF Sapphire Nozzle	OS2
1/4-28 UNF Sapphire Nozzle	OS4
3/8-24 UNF Sapphire Nozzle	OS6
7/16-20 UNF Sapphire Nozzle	OS7

FOR EXAMPLE:

BN9.5-P1 is the Part ID for a Banshee swivel. The **P1** indicates 1/16 NPT inlet thread.

The same applies for nipples/lances: **SA 356-P8P4-12** is the Part ID for an extension nipple. The **P8P4** indicates 1/2 NPT one end and 1/4 NPT other end. The **-12** indicates overall length in inches.

For metric threads:

BN9.5-M7 is the Part ID for a Banshee swivel. The **M7** indicates M7 x 1 inlet thread.

The same applies for adapters:

GP 255-M240M24C is the Part ID for a hose adapter. The **M24** indicates M24 x 1.5 thread on one side. The **O** designates an o-ring seal. The second **M24** indicates M24 x 1.5 thread on the other side, with the **C** designating an internal cone to suit a standard M24 Female hose end.

TECHNICAL REFERENCE

STONEAGE THREAD SIZE CODING

MP Thread Size	StoneAge Code
1/4-28 Left Hand	MP4L
1/4-28 Right Hand	MP4R
1/4 Gland and Collar 7/16-20	MP4
3/8-24 Left Hand	MP6L
3/8-24 Right Hand	MP6R
3/8 Gland and Collar 9/16-18	MP6
9/16-18 Left Hand	MP9L
9/16-18 Right Hand	MP9R
9/16 Gland and Collar 13/16-16	MP9
3/4-16 Left Hand	MP12L
3/4-16 Right Hand	MP12R
3/4 Gland and Collar 3/4-14 NPSM	MP12
M14 x 1.5 Left Hand	MPM14L
1-12 Left Hand	MP16L
1-12 Right Hand	MP16R
1 Gland and Collar 1-3/8-12	MP16
HP Thread Size	StoneAge Code
1/4-28 Left Hand	H4L
1/4-28 Right Hand	H4R
1/4 Gland and Collar 9/16-18	H4
3/8-24 Left Hand	H6L
3/8-24 Right Hand	H6R
3/8 Gland and Collar 3/4-16	H6
9/16-18 Left Hand	H9L
9/16-18 Right Hand	H9R
9/16 Gland and Collar 1-1/8-12	H9
M14x1.5 Left Hand	HM14L
StoneAge Thread Size	StoneAge Code
9/16-18 UNF O-Ring Face	G9
3/4-16 UNF O-Ring Face	G12
1-12 UNF O-Ring Face	G16
1 1/8-12 UNC O-Ring Face	K
3/4 Type M Male	TM12

FOR EXAMPLE:

BN18-MP9L is the Part ID for a Banshee swivel. The **MP9L** indicates 9/16-18 UNF left hand thread. So this tool would fit directly to a 9/16-18 LH hose or lance end.

BN33-MP9 is the Part ID for a Banshee swivel. The **MP9** indicates a 9/16 MP inlet that requires a gland and collar, and the actual thread size is 13/16-16 UNF right hand. Check the fittings and adapters section for the correct selection of gland nut and collar or other adapter.

BJV-MP12-S is the Part ID for a BJV swivel. The **MP12** indicates a 3/4 MP inlet that requires a gland and collar, and the actual thread size is 3/4-14 NPSM right hand. Check the fittings and adapters section for the correct selection of gland and collar or other adapter.

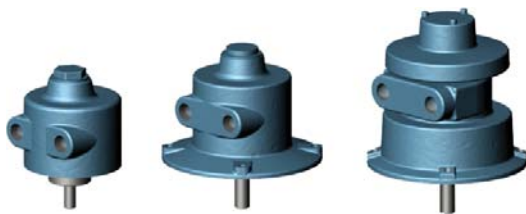
BN13-H4L is the Part ID for a Banshee swivel. The **H4L** indicates 1/4-28 UNF left hand thread. The tool would fit directly to a 1/4-28 LH hose or lance end.

BC-H9-C is the Part ID for a Barracuda tool assembly. The **H9** indicates a 9/16 HP inlet that requires a gland and collar, and the actual thread size is 1 1/8-12 right hand. Check the fittings and adapters section for the correct selection of gland and collar.

SERVICE & SUPPLIES

AIR MOTORS

Our most commonly used air motors are listed below. Use the information in the chart to the right to plan your compressed air requirements.



SG 055

LM 016-4

LM 016-6

MODEL	SG 055 & LM 016-4		LM 016-6	
At Peak				
Rotation Speed	3000 rpm		3000 rpm	
Power	1.7 HP	1.3 kW	4.0 HP	3.0 kW
Torque	36 in-lb	4.1 Nm	84 in-lb	9.5 Nm
Air Consumption	72 cfm	120 m ³ /hr	130 cfm	220 m ³ /hr
Air Pressure	100 psi	7 bar	100 psi	7 bar
At Minimum				
Rotation Speed	600 rpm		600 rpm	
Power	0.35 HP	0.26 kW	0.75 HP	0.56 kW
Torque	32 in-lb	3.6 Nm	68 in-lb	7.7 Nm
Air Consumption	16 cfm	27 m ³ /hr	27 cfm	46 m ³ /hr
Air Pressure	60 psi	4.1 bar	60 psi	4.1 bar

HYDRAULIC MOTORS LM 121 & LM 122

Use the information in the chart to the right to help you plan oil pumping and control requirements. Available with either 0° (LM 121) or 90° (LM 122) ports.



LM 121 & 122	CONTINUOUS	INTERMITTENT
Maximum Rotation Speed	1960 rpm	2430 rpm
Minimum Rotation Speed	50 rpm	N/A
Power	2.3 HP 1.7 kW	3.5 HP 2.6 kW
Torque	95 in-lb 4.1 Nm	135 in-lb 10.0 Nm
Oil Flow	4.2 gpm 1 m ³ /hr	5.3 gpm 1.2 m ³ /hr
Oil Pressure	1450 psi 100 bar	2000 psi 140 bar

LUBRICANTS

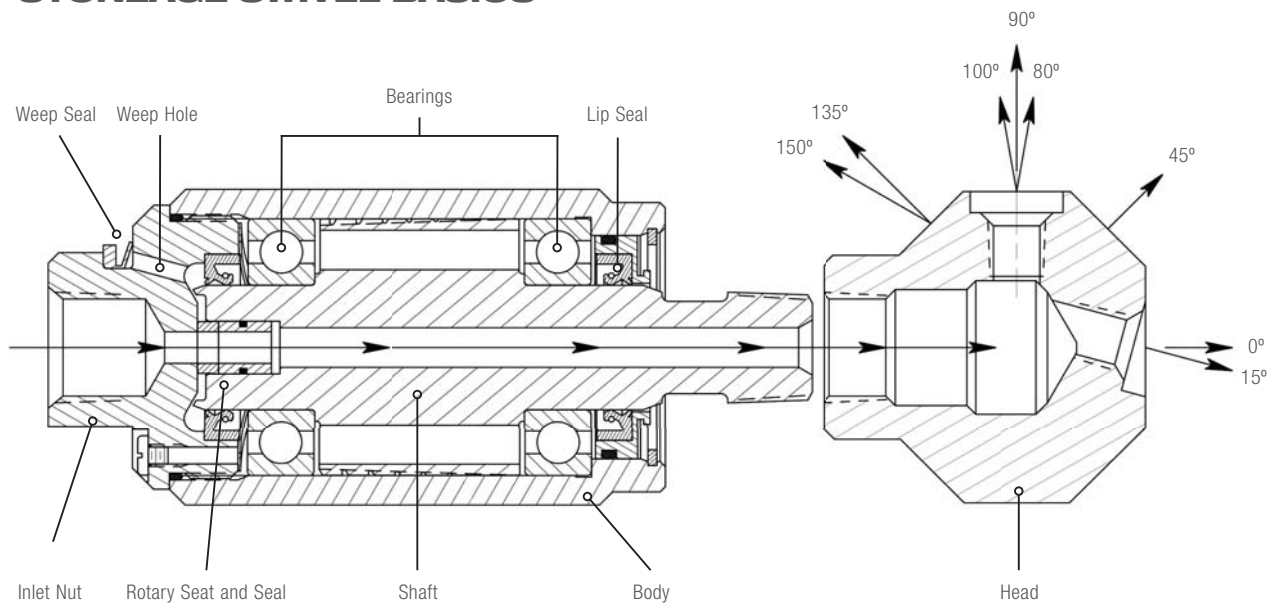
MSDS sheets are available for all lubricants.



LUBRICANT	PART NUMBER	QTY	SOURCE	SPECIFICATION
Viscous Fluid	BJ 048-X	6 oz.	STONEAGE®	Synthetic Silicone Lubricant
Air Motor Oil	GP 041	32 oz.	Mobil	Almo 525/ISO 46/SAE 10
Auto Trans. Fluid	GP 042	32 oz.	NAPA®	Mercon®/Dexron® ATF
Anti-Seize	GP 043	2 oz.	Swagelok	Blue Goop®
Motor Oil	GP 044	32 oz.	NAPA®	10W-40
Gearbox Lube	GP 046	32 oz.	NAPA®	80W-85W-90
Thread Sealant	GP 047	4 oz.	Parker	ThreadMate®
Grease	GP 048	14 oz.	Mobil	Synthetic Grease SHC 100

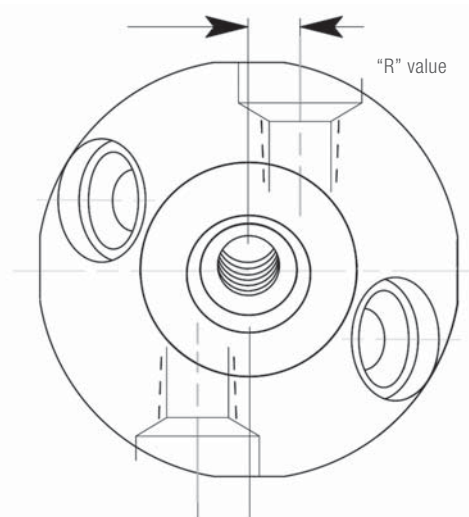
TECHNICAL REFERENCE

STONEAGE SWIVEL BASICS



StoneAge swivels are designed for optimal delivery of high pressure water for cleaning applications:

- Water flows in a direct path through the tool from the inlet
- Weep seals keep contaminants out of the high pressure seat area
- Weep holes allow water that may leak past the high pressure seat to escape – if a seat leaked and the nut was unable to release pressure, it could “wash out” the viscous fluid or even blow the inlet nut off the end of the tool!
- In our rotary seat and seal design, brass or carbide seats seal against inlet nut. The plastic seal under the seat “swells” and rotates with the shaft and against the seat so the seat does not rotate against the nut
- Lip seals seal in governor fluid (the fluid helps to control rotation speed) and keep contaminants out
- Jet ports are called by degree, zero being in a straight line with the inlet side of the tool



- The “R” value on our heads is the offset at 90°, even if the head has no ports there.

! WARNING !

Operations with waterblast equipment can be potentially hazardous. Caution **MUST** be exercised prior to and during machine and water jet tool use.

Please read and follow all of these instructions, in addition to the guidelines in the WJTA Recommended Practices handbook, available online at www.wjta.org. Deviating from safety instructions and recommended practices can lead to severe injury and/or death.

- Do not exceed the maximum operating pressure specified for any component in a system.
- The immediate work area **MUST** be marked off to keep out untrained persons.
- Inspect the equipment for visible signs of deterioration, damage, and improper assembly. Do not operate if damaged, until repaired.
- Make sure all threaded connections are tight and free of leaks.
- Always de-energize the system before opening a door to service or replace any parts. Failure to do so can result in severe injury and/or death.

Pre-Run Safety Check

Install mechanical stops, stingers and back out preventers as appropriate when doing any tube, pipe or vessel cleaning. See the WJTA-IMCA's Recommended Practices for the use of high-pressure water jetting equipment and/or the water jetting association's, WJA Code of Practice for additional safety information.

- Complete a job specific risk assessment and act on the resulting actions.
- Adhere to all site specific safety procedures.
- Ensure the waterblasting zone is properly barricaded and that warning signs are posted.
- Ensure the work place is free of unnecessary objects (e.g. loose parts, hoses, tools).
- Ensure all Operators are using the correct Personal Protective Equipment (PPE).
- Check that the air hoses are properly connected and tight.
- Check all hoses and accessories for damage prior to use. Do not use damaged items. Only high quality hoses intended for waterblast applications should be used as high-pressure hoses.
- Check all high-pressure threaded connections for tightness.
- Operate the high-pressure water at full pressure and use the Pneumatic Foot Pedal Dump Control to verify that the dump valve is working properly.
- Ensure that Operators never connect, disconnect, or tighten hoses, adapters, or accessories with the high-pressure water pump unit running.
- Ensure no personnel are in the hydroblasting zone.

Personal Protective Equipment

Use of Personal Protective Equipment (PPE) is dependent on the working pressure of water and the cleaning application. Managers, Supervisors, and Operators **MUST** carry out a job specific risk assessment to define the exact requirements for PPE. See Protective Equipment for Personnel (Section 6) of WJTA-IMCA's Recommended Practices For The Use Of High-pressure Water jetting Equipment for additional information.

- Hygiene—Operators are advised to wash thoroughly after all waterjetting operations to remove any waterblast residue which may contain traces of harmful substances.
- First aid provision—users **MUST** be provided with suitable first aid facilities at the operation site.

PPE MAY INCLUDE:

- Eye protection: Full face visor
- Foot protection: Kevlar® brand or steel toe capped, waterproof, non-slip safety boots
- Hand protection: Waterproof gloves
- Ear protection: Ear protection for a minimum of 85 dBA
- Head protection: Hard hat that accepts a full face visor and ear protection
- Body protection: Multi-layer waterproof clothing approved for water jetting
- Hose protection: Hose shroud
- Respiratory protection: May be required; refer to job specific risk assessment

StoneAge has designed and manufactured this equipment considering all hazards associated with its operation. StoneAge assessed these risks and incorporated safety features in the design. StoneAge WILL NOT accept responsibility for the results of misuse.

- IT IS THE RESPONSIBILITY OF THE INSTALLER/OPERATOR to conduct a job specific risk assessment prior to use. Job specific risk assessment **MUST** be repeated for each different set up, material, and location.
- The risk assessment **MUST** conform to the Health and Safety at Work Act 1974 and other relevant Health and Safety legislation.
- The risk assessment **MUST** consider potential material or substance hazards including: **Aerosols, Biological and microbiological (viral or bacterial) agents, Combustible materials, Dusts, Explosion, Fibers, Flammable substances, Fluids, Fumes, Gases, Mists, Oxidizing Agents.**

MAINTENANCE KITS

STONEAGE TOOL	SERVICE KIT	SEAL KIT	OVERHAUL KIT	TOOL KIT	LUBRICANT
BARRACUDA - BC-K - 20K PSI	BC 600	BC 602	BC 610	BC 612	GP 042
BARRACUDA - BC-H9-C - 40K PSI	BC 600-H9-C	BC 602-H9-C	BC 610-H9-C	BC 612	GP 042
BJV-M	BJ 600-M-X	BJ 602-M	BJ 610-M-X	BJ 612	BJ 048-X
BJV-M24	BJ 600-M24-X	BJ 602-M	BJ 610-M24-X	BJ 612	BJ 048-X
BJV-P16	BJ 600-P16-X	BJ 602-P16	BJ 610-P16-X	BJ 612	BJ 048-X
BJV-20K	BJK 600-X	BJK 602	BJK 610-X	BJK 612	BJ 048-X
BJV-H9	BJ 600-H9-X	BJ 602-H9	BJ 610-H9-X	BJ 612-H9	BJ 048-X
GOPHER - GO-M9 - 20K PSI	GO 600	GO 602	GO 610	GO 612	GP 044
GOPHER - GO-H9-C - 40K PSI	GO 600-H9-C	BC 602-H9-C	GO 610-H9-C	GO 612	GP 044
RAPTOR - RPT	RPT 600-X	RPT 602	RPT 610-X	RPT 612	BJ 048-X
BADGER - 15K PSI	BA 600-X	BA 602	BA 610-X	BA 612	BJ 048-X
BADGER - 20K PSI	BA 600-20K-X	BA 602-20k	BA 610-20K-X	BA 612	BJ 048-X
BADGER - BA-P8 & BA-M9	BA 600-P8/M9	BA 602-P8/M9	BA 610-P8/M9	BA 612-P8/M9	BJ 048-F
BADGER - BA-40K	BA 600-H6	BA 602-H6	BA 610-H6	BA 612-H6	BJ 048-F
CST	CST 600		CST 610		GP 048
TORUS	TR 600	TR 602	TR 610		GP 048
TORUS TR-130	TR130 600	TR130 602	TR130 610		GP 048
TORUS TR-200	TR200 600	TR200 602	TR200 610		GP 048
SA 1900, SA 1909	HI 600		HI 610		GP 048
SL-P8P4	SL 600-P		SL 610-P	SL 612	GP 048
SL-M9AV9	SL 600-K		SL 610-K	SL 612	GP 048
SG-P8P8 & SG-M12M12	SG 600		SG 610	SG 612	GP 048
SG-P12P12-M & SG-M16M16	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		GP 048
SM-P20	SM 600-P20		SM 610-P20		GP 048
HI	HI 600		HI 610		GP 048
UH-H9H6	UH 600		UH 610	UH 612	GP 048
UHS-H9H9	UHS 600		UHS 610	UHS 612	GP 048

NOTE: X Indicates fast or slow rotation speeds available. Please specify when ordering.

MAINTENANCE KITS

STONEAGE SERVICE KITS CONTENTS

SERVICE KITS

Kits contain everything needed for routine maintenance, including: high pressure seals, critical o-rings, a seat for the high pressure seal (where applicable), 6 oz. of viscous fluid for rotation control (where applicable) and a fill tube or syringe. Call for specific details regarding individual service kits.

SEAL KITS

Identical to the Service Kits, but does not include viscous fluid, fill tube and syringe. These kits are for customers who already have these items. Call for specific details regarding individual seal kits.

OVERHAUL KITS

Kits contain normal wear items, including: a single high pressure seal and seat, shaft seals, bearings and 6 oz. of viscous fluid (where applicable). Call for specific details regarding individual overhaul kits.

TOOL KITS

These kits differ for every StoneAge tool. They contain special tools for seating shaft seals or performing other tool-specific maintenance. Call for specific details regarding individual tool kits.

LUBRICANTS

Lubricants are available in each manufacturer's packaging for your convenience.

PROUD DISTRIBUTOR OF **STONEAGE**[®] WATERBLAST TOOLS

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