

ENGLISH



VERSION: 2309

ROTARY TOOLS

PL 014

STONEAGE[®]



INNOVATIVE, ROBUST WATERBLAST TOOLING AND EQUIPMENT

DELIVERED TO YOU WHEN YOU NEED IT

StoneAge products have been the industry leader for over 40 years. Our knowledgeable and experienced team will help you select and configure the right tool for the job, provide specialized technical support, deliver world-class training and, most importantly, help you get your job done safely and successfully.

YOU CAN RELY ON US.

At the bottom of many pages, you'll find QR codes that will take you directly to the appropriate product page on our website. Once on the website, you will find a variety of resources related to each product: videos, blog posts, manuals, specifications, related accessories, and training resources. Reach out to your StoneAge Representative for additional support.



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for the digital catalog. Bookmark it on your device for quick in-field access.

Under Pressure? **GET THE JOB DONE**

...on time, on budget, and as easy as possible!

Your job is difficult in the best of times - not to mention when you're facing additional challenges due to workforce shortages and increased safety requirements.

You deserve fast access to the equipment you need to get your waterblasting jobs done on time and as easily as possible. That's why we've expanded our **automated equipment rental fleet** and created simple payment options for every budget.



Remember that StoneAge stocks everything you need to get the job done. Tools, hoses, parts and accessories, and we'll work with you to minimize your downtime.

ROTARY TOOLS

1. TUBE CLEANING 2

Banshee	2
Beetle	6
Gopher	7

2. PIPE CLEANING 8

Curved Pipe	8
2" Badger	8
4" Badger	9
6" Badger	10
Beetle	11
Straight Pipe	12
BJVE	12
BJV	12
Raptor	15

3. SURFACE CLEANING 16

Spitfire	16
Barracuda	17

4. TANK CLEANING 18

BJVE	18
BJV	18
Speed Controlled Swivel	21
Torus	22
Positioning Booms	24

4. SWIVELS 26

Swivels	26
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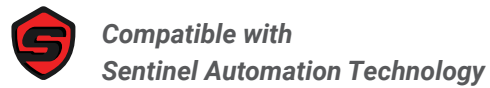
6. RESOURCES 28

Online Resources	28
StoneAge Training	30
Thread Abbreviations	32
Standard Unit Abbreviations	32
Measurement Conversions	32
Pressure and Flow Equations	33
Fitting Assembly Guidelines	34
StoneAge Swivel Basics	39
Maintenance Kits	40
Safety Information	41
Customer Service	42
Terms & Conditions	43

BANSHEE NOZZLES

High pressure water acts 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.

- ✓ 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
- ✓ Banshee Beetle models are designed to work around tight radiused bends



Tube cleaning tools may look similar on the outside, but it's the engineering on the inside that matters. The patented StoneAge Banshee is the only tool in the industry with a direct path for water flow which is critical to reduce pressure loss and deliver more cleaning power.

For information on compatible Automated Equipment options, please refer to the Automated Equipment Catalog

UP TO 44K PSI (3000 BAR)



BN33 1.5-2.4 in. I.D. Tubes (38-60 mm)



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



BN24 1.1-1.8 in. I.D. Tubes (28-46 mm)



BN18 44K 0.87-1.3 in. I.D. Tubes (22-33 mm)



BN18 0.87-1.3 in. I.D. Tubes (22-33 mm)



BN15 0.75-1.2 in. I.D. Tubes (19-30 mm)



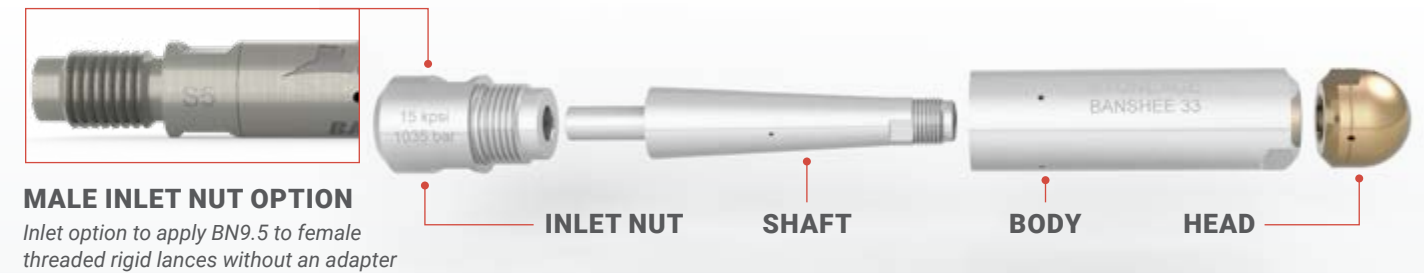
BN13 44K 0.60-1.0 in. I.D. Tubes (15-25 mm)



BN13 0.60-1.0 in. I.D. Tubes (15-25 mm)



BN9.5 0.47-0.63 in. I.D. Tubes (12-16 mm)



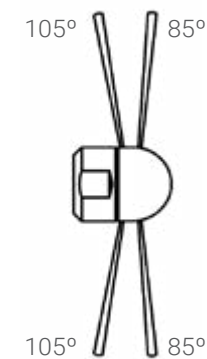
MALE INLET NUT OPTION
Inlet option to apply BN9.5 to female threaded rigid lances without an adapter

The Stoneage Banshee has only four parts. Each part can be replaced individually to maximize the life of your tool.

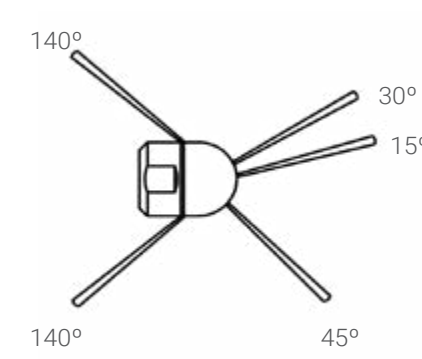
BANSHEE SPECIFICATIONS 22K PSI (1500 BAR)

	TUBE I.D. 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, 5/16" Male	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
BN15	0.75-1.2 in. 19-30 mm	22k psi 1500 bar	18k psi 1250 bar	8-10 gpm 30-38 l/min	1/8" NPT, 1/8" BSPP, 3/8" LH/RH	0.6 in. 15 mm	3.0 in. 76 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
BT25	1.2-3.0 in. 30-76 mm	8-22k psi 550-1500 bar	N/A	8-20 gpm 30-76 l/min	1/8" NPT, 1/4" NPT, 1/4" BSPP, 3/8"-28 LH/RH, 9/16"-18 LH/RH	1.0 in. 26 mm	1.9 in. 48 mm

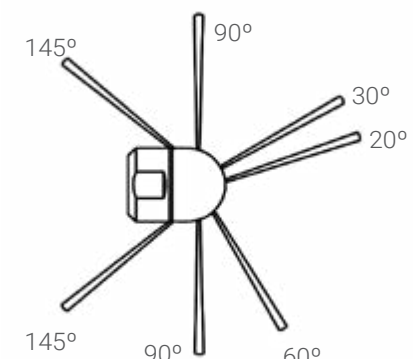
See page 38 in the References Section for more information about Thread Size Coding



POLISHER
4 Ports: 2 @ 85°, 2 @ 105°



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



UNIVERSAL (for up to 22k)
7 Ports: 1 @ 20°, 1 @ 30°
1 @ 60°, 2 @ 90°, 2 @ 145°

CUSTOM HEADS AVAILABLE UPON REQUEST

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BANSHEE

22K (1500 BAR) HEAD OPTIONS

BN9.5 HEAD SELECTION				
PRESSURE	PART #	STYLE	FLOW RANGE	
			GPM	LPM
10-15k psi (700-1000 bar)	BN9.5 042-A	Polisher	4.5-5.5	17-21
	BN9.5 043-A	Unplugger	5-6	19-23
15-22k psi (1000-1500 bar)	BN9.5 042-B	Polisher	5-6	19-23
	BN9.5 043-B	Unplugger	5.5-6.5	21-25
	BN9.5 044-1	Universal	7.0-8.0	27-30

BN15 HEAD SELECTION				
PRESSURE	PART #	STYLE	FLOW RANGE	
			GPM	LPM
10-15k psi (700-1000 bar)	BN15 042-A	Polisher	7-9	27-34
	BN15 043-A	Unplugger	7-9	27-34
	BN15 044-A	Universal	8-10	30-38
PRESSURE	PART #	STYLE	FLOW RANGE	
			GPM	LPM
15-22k psi (1000-1500 bar)	BN15 042-C	Polisher	7-9	27-34
	BN15 043-C	Unplugger	7-9	27-34
	BN15 044-C	Universal	8-10	30-38

BN24 HEAD SELECTION				
PRESSURE	PART #	STYLE	FLOW RANGE	
			GPM	LPM
10-15k psi (700-1000 bar)	BN24 042-A	Polisher	20-25	76-95
	BN24 042-B	Polisher	15-19	57-72
	BN24 042-C	Polisher	12-14	43-53
	BN24 043-A	Unplugger	19-24	72-91
	BN24 043-B	Unplugger	14-18	53-68
	BN24 043-C	Unplugger	11-13	42-49
	BN24 044-A	Universal	20-25	76-95
	BN24 044-B	Universal	15-19	57-72
15-22k psi (1000-1500 bar)	BN24 044-C	Universal	12-14	45-53
	BN24 042-D	Polisher	18-21	68-80
	BN24 042-E	Polisher	15-17	57-64
	BN24 042-F	Polisher	12-14	45-53
	BN24 043-D	Unplugger	17-20	64-76
	BN24 043-E	Unplugger	14-16	53-61
	BN24 043-F	Unplugger	11-13	42-49
	BN24 044-D	Universal	18-21	68-80
	BN24 044-E	Universal	15-17	57-64
	BN24 044-F	Universal	12-14	45-53

BN13 HEAD SELECTION				
PRESSURE	PART #	STYLE	FLOW RANGE	
			GPM	LPM
10-15k psi (700-1000 bar)	BN13 042-A	Polisher	7-9	27-34
	BN13 043-A	Unplugger	7-9	27-34
	BN13 044-A	Universal	8-10	30-38
15-22k psi (1000-1500 bar)	BN13 042-C	Polisher	7-9	27-34
	BN13 043-C	Unplugger	7-9	27-34
	BN13 044-C	Universal	8-10	30-38

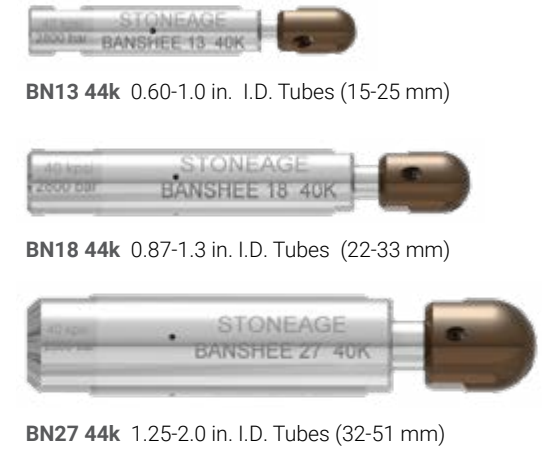
BN18 HEAD SELECTION				
PRESSURE	PART #	STYLE	FLOW RANGE	
			GPM	LPM
10-15k psi (700-1000 bar)	BN18 042-A	Polisher	11-14	42-53
	BN18 042-B	Polisher	8-10	30-38
	BN18 043-A	Unplugger	11-14	42-53
	BN18 043-B	Unplugger	8-10	30-38
	BN18 044-A	Universal	11-14	42-53
	BN18 044-B	Universal	8-10	30-38
15-22k psi (1000-1500 bar)	BN18 042-C	Polisher	11-14	42-53
	BN18 042-D	Polisher	8-10	30-38
	BN18 043-C	Unplugger	11-14	42-53
	BN18 043-D	Unplugger	8-10	30-38
	BN18 044-C	Universal	11-14	42-53

BN33 HEAD SELECTION				
PRESSURE	PART #	STYLE	FLOW RANGE	
			GPM	LPM
10-15k psi (700-1000 bar)	BN33 044-A	Universal	40-49	150-190
	BN33 044-B	Universal	33-39	130-150
	BN33 044-C	Universal	26-32	98-120
	BN33 044-D	Universal	20-25	76-95
	BN33 044-E	Universal	15-19	57-72
15-22k psi (1000-1500 bar)	BN33 044-F	Universal	22-26	83-98
	BN33 044-F-1	Universal	22	83
	BN33 044-G	Universal	18-21	68-80
	BN33 044-H	Universal	15-17	57-64
	BN33 044-I	Universal	12-14	45-53

BANSHEE

44K (3000 BAR) HEAD OPTIONS

BANSHEE SPECIFICATIONS 44K PSI (3000 BAR)			
MODEL	BN13	BN18	BN27
TUBE I.D. 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
MAX. PRESSURE	44k psi, 3000 bar	44k psi, 3000 bar	44k psi, 3000 bar
FLOW RANGE	4.5-6 gpm, 17-23 lpm	5-8.5 gpm, 19-32 lpm	5-8.5 gpm, 19-32 lpm
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 44k 0.60-1.0 in. I.D. Tubes (15-25 mm)

BN18 44k 0.87-1.3 in. I.D. Tubes (22-33 mm)

BN27 44k 1.25-2.0 in. I.D. Tubes (32-51 mm)

* When cleaning 5/8" diameter tubes at 44k psi please contact our Technical Support team for hose specifications.

BN13 44K HEAD SELECTION				
PRESSURE	PART #	STYLE	FLOW RANGE	
			GPM	LPM
30-44k psi (2100-3000 bar)	BN13 442-C	Polisher	5.5-6	21-23
	BN13 442-C-1	Polisher	3.9-4.4	15-17
	BN13 442-D	Polisher	4.5-5	17-19
	BN13 443-C	Unplugger	5.5-6	21-23
	BN13 443-D	Unplugger	4.5-5	17-19
	BN13 433-D-1	Unplugger	3.4-3.9	13-15

BN18 44K HEAD SELECTION				
PRESSURE	PART #	STYLE	FLOW RANGE	
			GPM	LPM
30-44k psi (2100-3000 bar)	BN18 442-A	Polisher	8-8.5	30-32
	BN18 442-B	Polisher	7-7.5	27-28
	BN18 442-C	Polisher	6-6.5	23-25
	BN18 442-D	Polisher	5-5.5	19-21
	BN18 443-A	Unplugger	8-8.5	30-32
	BN18 443-B	Unplugger	7-7.5	27-28
	BN18 443-C	Unplugger	6-6.5	23-25
	BN18 443-D	Unplugger	5-5.5	19-21

BN27 44K HEAD SELECTION				
PRESSURE	PART #	STYLE	FLOW RANGE	
			GPM	LPM
30-44k psi (2100-3000 bar)	BN27 442-A	Polisher	8-8.5	30-32
	BN27 442-B	Polisher	7-7.5	27-28
	BN27 442-C	Polisher	6-6.5	23-25
	BN27 442-D	Polisher	5-5.5	19-21
	BN27 443-A	Unplugger	8-8.5	30-32
	BN27 443-B	Unplugger	7-7.5	27-28
	BN27 443-C	Unplugger	6-6.5	23-25
	BN27 443-D	Unplugger	5-5.5	19-21

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.

ASK YOUR STONEAGE REPRESENTATIVE ABOUT OUR SPECIALIZED BANSHEE WRENCHES

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BEETLE™

BT25, BT18, BT12, BT9.5

The small diameter and short length of the Beetle models make them ideal for cleaning process piping, drain lines, u-tube bundles and other small ID tubes with bends and elbows that may have been inaccessible in the past.

- ✔ Navigates tight curves in small diameter pipes
- ✔ Low cost, low maintenance design
- ✔ Easy to pair with automated flex lance machines



BT25

BT18

BT12

BT9.5

BEETLE BT9.5
Designed specifically for cleaning curved tubes/pipes from 0.37 in. (9.5 mm) I.D.

For information on compatible Automated Equipment options, please refer to the Automated Equipment Catalog

	BT25	BT18	BT12	BT9.5
TUBE ID RANGE	1.2–3.0 in. (30–76 mm)	0.9–1.3 in. (22–33 mm)	0.6–1.0 in. (15–25 mm)	0.47–0.63 in. (2–16 mm)
PRESSURE RANGE	8–22k psi (550–1500 bar)	8–22k psi (550–1500 bar)	8–22k psi (550–1500 bar)	8–15k psi 550 (1035 bar) 8–22k psi 550 (1500 bar)
FLOW RANGE	8–20 gpm (30–76 l/min)	8.5–11 gpm (32–42 l/min)	6.5–8.5 gpm (25–32 l/min)	5–6 GPM (19–23 l/min)
INLET CONNECTIONS	1/8" NPT, 1/4" NPT, 1/4" BSPP, 3/8"-28 LH/RH, 9/16"-18 LH/RH	P1, P2, BSPP2, MP6L, MP6R, MP4L, MP4R	P1, M7, MP4L, MP4R	P1, M7
DIAMETER	1.0 in. (26 mm)	0.7 in. (18 mm)	0.5 in. (12 mm)	0.37 in. (9.5 mm)
LENGTH	1.9 in. (48 mm)	1.5 in. (39 mm)	1.3 in. (39 mm)	1.4 in. (35 mm)

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).

- ✔ Head rotation provides complete internal coverage while speed control delivers optimum jet dwell time
- ✔ Two head options available: 7 port unplugging option for forward hitting power and a 6 port polishing head for IRIS inspection polishing
- ✔ Easily re-jet the Gopher for more pulling force or forward hitting power depending on the needs of the job



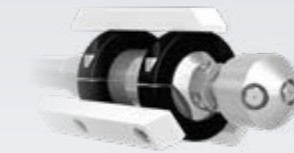
For information on compatible Automated Equipment options, please refer to the Automated Equipment Catalog

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



GO 075 SKID CENTRALIZERS

PIPE SIZE	CENTRALIZER	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



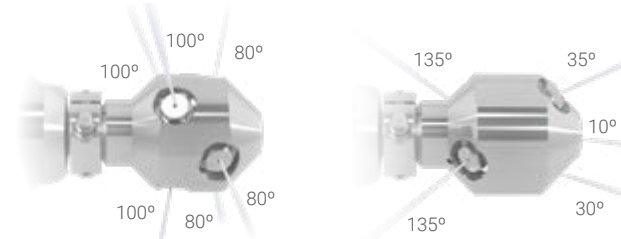
GO 070 SKID CENTRALIZERS

PIPE SIZE	CENTRALIZER	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



POLISHER JETS

6 Ports: 3 @ 80°, 3 @ 100°

UNPLUGGER JETS

5 Ports: 1 @ 10°, 1 @ 30°, 1 @ 35°, 2 @ 135°

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



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STONEAGE RENTS
Rely on us to meet your surge capacity needs

STONEAGE DEMO TRAILER
Experience the power of StoneAge equipment at your location

STONEAGE TRAINING
Expert training for the safe and effective use of waterjetting equipment

WARRANTY
StoneAge warranties its products to be free from defects in workmanship and material for a period of one (1) year from the date of purchase

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2" BADGER

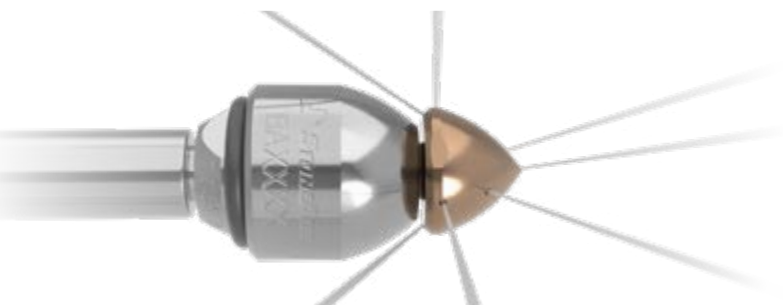
The 2" Badger is a self-rotating tool designed for cleaning 2–4 in. (51–102 mm) pipes with bends and long radius elbows such as U-Tubes and process lines.

- ✓ Engineered for long term service with low cost head replacements and no bearings, seals or lubricants to maintain
- ✓ New, replaceable drilled heads improve reliability over jet inserts while delivering the same power and life
- ✓ Three pre-drilled heads available – covering all of the pressure and flow configurations that contractors require



For information on compatible Automated Equipment options, please refer to the Automated Equipment Catalog

TOOL MODEL	PRESSURE RANGE	FLOW RANGE	INLET CONNECTION	WEIGHT	MAX. WATER TEMPERATURE
BA-LKD-P4 BA-LKD-BSPP4	8–15k psi 552–1034 bar	7–16 gpm 26–61 LPM	1/4" NPT or 1/4" BSPP	0.45 lb 0.20 kg	250 °F 120 °C
BA-LKD-MP6R BA-LKD-MP9RL BA-LKD-MP9R	15–22k psi 1034–1500 bar	9.5–18.5 gpm 36–70 LPM	9/16" MP, 3/8" MP	0.45 lb 0.20 kg	250 °F 120 °C



2" BADGER JETS

7 Ports: 1 @ 15°, 1 @ 30°, 1 @ 45°, 2 @ 90°, 2 @ 132°

TOOL	TOOL KIT	MANUAL
2" Badger	BA 612-LK	PL 593



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. **For use with a 5mm or 6mm hose.**

4" BADGER

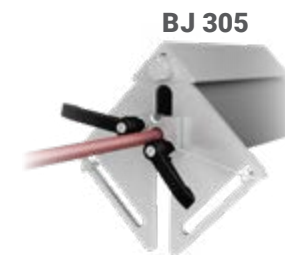
The 4" Badger is a compact self-rotary nozzle with adjustable speed control capable of navigating 90 degree elbows in pipes as small as 4" (102 mm) in diameter.

- ✓ 5X longer run time
- ✓ New MP9R inlet reduces length for better navigation of bends
- ✓ Higher flow at 20K increases cleaning power
- ✓ Redesigned shape reduces hang-ups in the pipe
- ✓ Simple overhaul and assembly



For information on compatible Automated Equipment options, please refer to the Automated Equipment Catalog

TOOL MODEL	PRESSURE RANGE	FLOW RANGE	INLET CONNECTION	ROTATION SPEED	WEIGHT
BAE-P6	5–15k psi 345–1034 bar	13–27 gpm 50–102 LPM	3/8" NPT	20–100 rpm (Slow Fluid) 75–250 rpm (Fast Fluid)	3.0 lbs 1.4 kg
BAE-BSPP6, BAE-MP9R, BAE-M24	5–22k psi 345–1500 bar	12–25 gpm 45–95 LPM	3/8" BSPP, 9/16" MP9L, 9/16" MP9R, M24	20–100 rpm (Slow Fluid) 75–250 rpm (Fast Fluid)	3.0 lbs 1.4 kg
BA-H6	22–44k psi 1500–3000 bar	4.5–12 gpm 17–45.5 l/min	3/8" HP Female	100–400 rpm	4.0 lbs 1.8 kg



BACKOUT PREVENTERS

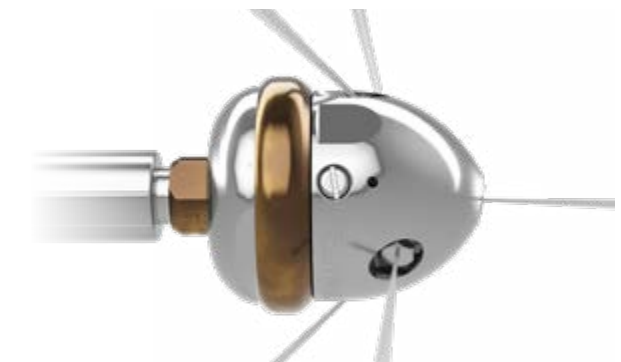
Increase safety by keeping the tool from backing out of the pipe. Several options are available including fixtures for small diameter pipes, pipes with various flange bolt circle diameters and adapters for pipes with no-flange entry.



AF 061-MP9R

BAE 3/4" TYPE-M ADAPTER

This adapter allows the 4" Badger to be used on either a 9/16" RH tube nipple fitted flex lance or on a 3/4" or 1" Type-M swivel fitted lance/hose. **Only compatible with the MP9R inlet.**



4" BADGER JETS

5 Ports: 1 @ 15°, 2 @ 100°, 2 @ 135°

NOZZLES AND PLUGS

The 4" Badger can be jetted in different configurations depending on the application. The image above 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
BA-P6 BAE-BSPP6 BAE-MP9R BAE-M24	Slow	BA 602	BAE 600-S	BAE 610-S	BAE 604	BAE 612
	Fast	BAE 602	BAE 600-F	BAE 610-F	BAE 604	BAE 612
BA-H6	N/A	N/A	BAE 600-H6	BA 610-H6	N/A	BA 612-H6

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6" BADGER

The 6" Badger is a compact self-rotary nozzle with adjustable speed control capable of navigating 90 degree elbows in pipes as small as 6" (152 mm) in diameter.

- ✓ Different jetting configurations allow for more or less pull and forward hitting power
- ✓ Navigates elbows down to 6 in. (152 mm)
- ✓ Speed controlled rotary tools provide complete internal cleaning coverage and 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



For information on compatible Automated Equipment options, please refer to the Automated Equipment Catalog

TOOL MODEL	PRESSURE RANGE	FLOW RANGE	ROTATION SPEED	INLET CONNECTION	WEIGHT	MAX. OPERATING TEMPERATURE
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
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

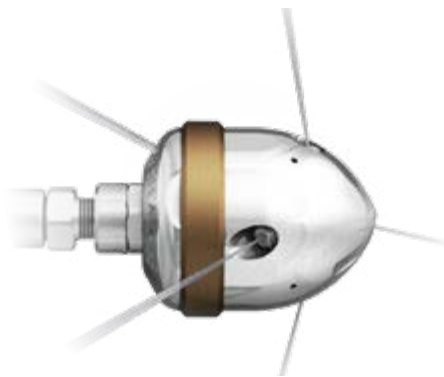


Adjustable from 6-10" (150-250 mm)

BA 385 M9/P8

OPTIONAL CENTRALIZERS

Helps 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.

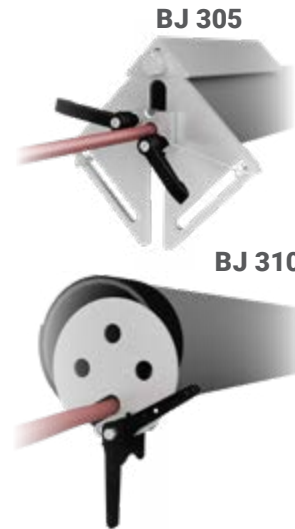


6" BADGER JETS

5 Ports: 1 @ 15°, 2 @ 100°, 2 @ 135°

NOZZLES AND PLUGS

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

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

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BEETLE™ BT25, BT18, BT12, BT9.5

The small diameter and short length of the Beetle models make them ideal for cleaning process piping, drain lines, u-tube bundles and other small ID tubes with bends and elbows that may have been inaccessible in the past.

- ✓ Navigates tight curves in small diameter pipes
- ✓ Low cost, low maintenance design
- ✓ Easy to pair with automated flex lance machines

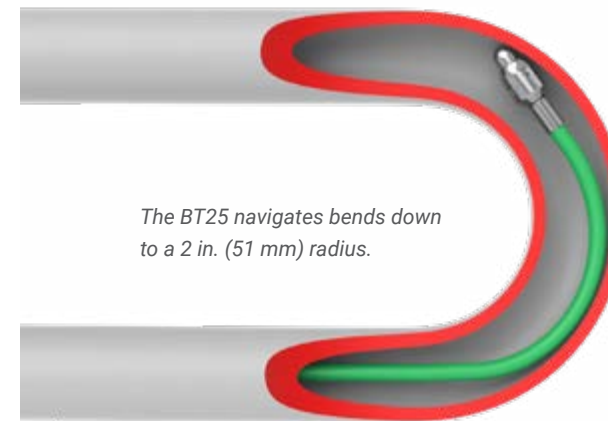


BT25

BT18

BT12

BT9.5



The BT25 navigates bends down to a 2 in. (51 mm) radius.

BEETLE BT9.5
Designed specifically for cleaning curved tubes/pipes from 0.37 in. (9.5 mm) I.D.

	BT25	BT18	BT12	BT9.5
TUBE ID RANGE	1.2-3.0 in. (30-76 mm)	0.9-1.3 in. (22-33 mm)	0.6-1.0 in. (15-25 mm)	0.47-0.63 in. (2-16 mm)
PRESSURE RANGE	8-22k psi (550-1500 bar)	8-22k psi (550-1500 bar)	8-22k psi (550-1500 bar)	8-15k psi 550 (1035 bar) 8-22k psi 550 (1500 bar)
FLOW RANGE	8-20 gpm (30-76 l/min)	8.5-11 gpm (32-42 l/min)	6.5-8.5 gpm (25-32 l/min)	5-6 GPM (19-23 l/min)
INLET CONNECTIONS	1/8" NPT, 1/4" NPT, 1/4" BSPP, 3/8"-28 LH/RH, 9/16"-18 LH/RH	P1, P2, BSPP2, MP6L, MP6R, MP4L, MP4R	P1, M7, MP4L, MP4R	P1, M7
DIAMETER	1.0 in. (26 mm)	0.7 in. (18 mm)	0.5 in. (12 mm)	0.37 in. (9.5 mm)
LENGTH	1.9 in. (48 mm)	1.5 in. (39 mm)	1.3 in. (39 mm)	1.4 in. (35 mm)

For information on compatible Automated Equipment options, please refer to the Automated Equipment Catalog



STONEAGE RENTS
Rely on us to meet your surge capacity needs



STONEAGE DEMO TRAILER
Experience the power of StoneAge equipment at your location



STONEAGE TRAINING
Expert training for the safe and effective use of waterjetting equipment



WARRANTY
StoneAge warranties its products to be free from defects in workmanship and material for a period of one (1) year from the date of purchase



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BJVE (UP TO 22K)

Designed for a wide range of pipe diameters, pressures, flows and configurations. BJVE controlled rotary nozzles are the industry standard for cleaning medium to large pipes and vessels.

- ✓ 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
- ✓ High pressure seal geometry extends service life and can be replaced in the field in under 3 minutes
- ✓ Inlet cartridge design enables quick change from 15k to 20k on the fly
- ✓ Multiple head options to allow for flush mounted nozzles, extension arms, plugs and pulling rings



SCAN HERE TO SEE
BJVE SERVICE VIDEO

For information on compatible Automated Equipment options, please refer to the Automated Equipment Catalog

TOOL MODEL	PRESSURE RANGE	FLOW RANGE	ROTATION SPEED	INLET CONNECTION	WEIGHT	MAX. WATER TEMPERATURE
BJVE-P16	2–10k psi (140–700 bar)	20–200 gpm (76–757 l/min)	25–95 rpm (Slow) 50–200 rpm (Medium) 85–300 rpm (Fast)	1" NPT	8.5 lbs (3.9 kg)	160 °F (70 °C)
BJVE-P12	2–15k psi (140–1000 bar)	12–100 gpm (45–380 l/min)	20–95 rpm (Slow) 40–190 (Medium) 70–275 rpm (Fast)	3/4" NPT	8.5 lbs (3.9 kg)	160 °F (70 °C)
BJVE-M24	2–22k psi (140–1500 bar)	12–100 gpm (45–380 l/min)	20–95 rpm (Slow) 40–190 (Medium) 70–275 rpm (Fast)	M24	(8.5 lbs (3.9 kg)	160 °F (70 °C)
BJVE-MP12	2–22k psi (140–1500 bar)	10–60 gpm (38–230 l/min)	20–95 rpm (Slow) 40–190 rpm (Medium) 70–275 rpm (Fast)	3/4" MP	8.5 lbs (3.9 kg)	160 °F (70 °C)

MAINTENANCE RESOURCES

TOOL	SERVICE KIT	SEAL KIT	OVERHAUL KIT	TOOL KIT	LUBRICANT
BJVE-P16		BJVE 602	BJVE 610	BJVE 612	
BJVE-P12		BJVE 602	BJVE 610	BJVE 612	
BJVE-M24		BJVE 602	BJVE 610	BJVE 612	
BJVE-MP12		BJVE 602	BJVE 610	BJVE 612	

BJV (UP TO 40K)

TOOL MODEL	PRESSURE RANGE	FLOW RANGE	ROTATION SPEED	INLET CONNECTION	WEIGHT	MAX. WATER TEMPERATURE
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)

MAINTENANCE RESOURCES

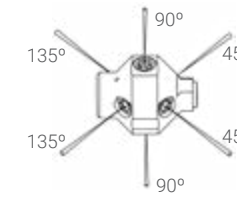
TOOL	SERVICE KIT	SEAL KIT	OVERHAUL KIT	TOOL KIT	LUBRICANT
BJV-H9	BJ 600-H9-X	BJ 602-H9	BJ 610-H9-X	BJ 612-H9	BJ 048-X



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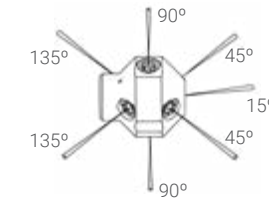
HEAD OPTIONS PER SWIVEL TYPE:

There are four standard head configurations, with custom heads available on request. The correct head specification is based on the pressure and flow of the pump and the required port size. Heads with P8 or G12 ports require extension arms or plugs.



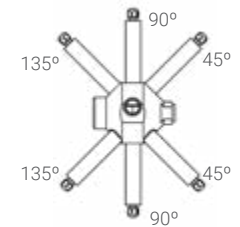
BJ 144-P4-6-RXX

6 Port: 2 @ 45°
2 @ 90°
2 @ 135°



BJ 144-P4-7-RXX

7 port: 1 @ 15°
2 @ 45°
2 @ 90°
2 @ 135°



BJ 145-G12-6-RXX
or
BJVE 145-P8-6-RXX

6 Port: 2 @ 45°
2 @ 90°
2 @ 135°

PACKAGE HEAD OPTIONS

The following table shows head selection by desired flow for each package:

PRESSURE	PACKAGE	FLOW	R-VALUE	HEAD
10K PSI 700 BAR	BJVE-P16-P4-6-PKG	15–25 gpm 57–95 LPM	R60	BJ 144-P4-6-R60
		20–45 gpm 76–170 LPM	R35	BJ 144-P4-6-R35
		35–80 gpm 133–303 LPM	R20	BJ 144-P4-6-R20
		55–140 gpm 208–530 LPM	R12	BJ 144-P4-6-R12
	BJVE-P16-P4-7-PKG	15–25 gpm 57–95 LPM	R60	BJ 144-P4-7-R6
		20–45 gpm 76–170 LPM	R35	BJ 144-P4-7-R35
		35–80 gpm 133–303 LPM	R20	BJ 144-P4-7-R20
		55–140 gpm 208–530 LPM	R12	BJ 144-P4-7-R12
15K PSI 1000 BAR	BJVE-P12-P4-6-PKG	10–20 gpm 38–76 LPM	R60	BJ 144-P4-6-R60
		20–40 gpm 76–151 LPM	R35	BJ 144-P4-6-R35
		30–70 gpm 114–265 LPM	R20	BJ 144-P4-6-R20
		50–120 gpm 189–454 LPM	R12	BJ 144-P4-6-R12
	BJVE-P12-P4-7-PKG	10–20 gpm 38–76 LPM	R60	BJ 144-P4-7-R6
		20–40 gpm 76–151 LPM	R35	BJ 144-P4-7-R35
		30–70 gpm 114–265 LPM	R20	BJ 144-P4-7-R20
		50–120 gpm 189–454 LPM	R12	BJ 144-P4-7-R12
22K PSI 1500 BAR	BJVE-MP12-P4-6-PKG	10–20 gpm 38–76 LPM	R60	BJ 144-P4-6-R60
		20–35 gpm 76–133 LPM	R35	BJ 144-P4-6-R35
		30–65 gpm 114–246 LPM	R20	BJ 144-P4-6-R20
		50–110 gpm 189–416 LPM	R12	BJ 144-P4-6-R12
	BJVE-MP12-P4-7-PKG	10–20 gpm 38–76 LPM	R60	BJ 144-P4-7-R6
		20–35 gpm 76–133 LPM	R35	BJ 144-P4-7-R35
		30–65 gpm 114–246 LPM	R20	BJ 144-P4-7-R20
		50–110 gpm 189–416 LPM	R12	BJ 144-P4-7-R12
	BJVE-M24-P4-6-PKG	10–20 gpm 38–76 LPM	R60	BJ 144-P4-6-R60
		20–35 gpm 76–133 LPM	R35	BJ 144-P4-6-R35
		30–65 gpm 114–246 LPM	R20	BJ 144-P4-6-R20
		50–110 gpm 189–416 LPM	R12	BJ 144-P4-6-R12
	BJVE-M24-P4-7-PKG	10–20 gpm 38–76 LPM	R60	BJ 144-P4-7-R6
		20–35 gpm 76–133 LPM	R35	BJ 144-P4-7-R35
		30–65 gpm 114–246 LPM	R20	BJ 144-P4-7-R20
		50–110 gpm 189–416 LPM	R12	BJ 144-P4-7-R12
44K PSI 3000 BAR	BJV-H9-S6-8-PKG	6–10 gpm 23–38 LPM	R40	BJ 444-S6-R40
		9–17 gpm 34–64 LPM	R25	BJ 444-S6-R25



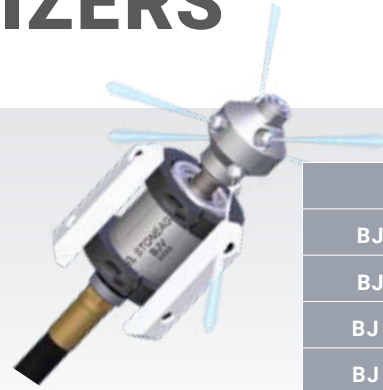
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BJV CENTRALIZERS

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

STRAIGHT PIPE 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

CURVED PIPE CENTRALIZER

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.



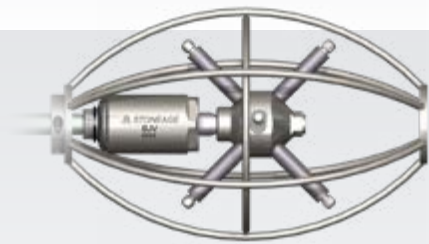
CENTRALIZER SIZES (DIAMETER)	WEIGHT
BJ 288-S 16-21 in. 410-530 mm	12 lb 5.5 kg
BJ 288-M 22-29 in. 560-740 mm	13 lb 5.9 kg
BJ 288-L 30-37 in. 770-940 mm	16 lb 7.3 kg

CAGE-STYLE CENTRALIZERS

Stainless steel centralizers are used when negotiating complex piping arrangements and removing built-up debris while maintaining jet rotation.

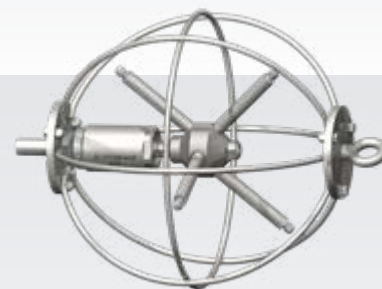
Only available for BJV tools. Not BJVE.

Tool not included.



Different inlet plates are available for all models. Different collar sizes are available for all models.

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



BJ 100-SS
BJ 100-SS-MP

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

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RAPTOR

SMALL TO MEDIUM PIPES 2-6" (51-152 MM) IN DIAMETER

The versatile Raptor combines slower rotation speeds from 15-250 rpm with a flow range up to 60gpm (230 lpm) to effectively remove difficult deposits in straight pipe and process drains.

Easily customizable heads and accessories also make the Raptor ideal for cleaning totes, closed head drums, water well screens, ducts and exhaust stacks.

- ✓ High flow range aids in removing thick, tough deposits
- ✓ Controlled rotation for longer jet dwell times help remove hard material
- ✓ Multiple head and jetting options enable flexible customization to optimize cleaning
- ✓ Optional pulling connection aids in jobs where tool needs to be pulled through the pipe
- ✓ Optional centering devices available to optimize stand-off distance



For information on compatible Automated Equipment options, please refer to the Automated Equipment Catalog

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 075
For 3" or 4.5" pipes.



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



RAPTOR 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 the 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.

	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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SPITFIRE

The Spitfire rotary shotgun tool is engineered for rotation speeds up to 5000 rpm and is ideal for removing thin hard coatings like epoxy, paint or rust. The extra lightweight Spitfire requires little maintenance, reducing down time and increasing productivity.

- ✔ Handles a wide range of pressure ratings from 2–22k psi (140–1500 bar)
- ✔ High speed rotation 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 – reduced costs and maintenance downtime
- ✔ Short overall tool length and light weight makes for easy handling, reducing operator fatigue
- ✔ External shield option protects the tool from damage caused by lateral impacts



SHIELDED HEAD OPTION

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



BUMPER HEAD OPTION

Alternative head for jobs when debris gets lodged in the shield, preventing head rotation, inexpensive bumper protects tool and is easily replaceable

For information on compatible Automated Equipment options, please refer to the Automated Equipment Catalog

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)	250 °F 120 °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



HIGH SPEED ROTATION

Excellent for removing hardened paint and thin coatings



ANGLED JETS

AP2 nozzles provide more effective cleaning of large surfaces and odd shapes

BARRACUDA

The Barracuda is a speed controlled rotary shotgun tool designed for speeds ranging from 1000 to 2000 rpm, making it ideal for cleaning thick, hard-to-remove materials like coke or rubber. The Barracuda can be used on automated and hands-free equipment.

- ✔ Handles a wide range of pressure ratings from 2–44k psi (140–3000 bar)
- ✔ Simple maintenance for long term use
- ✔ New cartridge seal doubles runtime
- ✔ Can be configured for 2 or 4 port application
- ✔ Angled jets allow for broader impact for quicker, more effective cleaning of large surfaces and odd shapes



TOOL MODEL	PRESSURE RANGE	FLOW RANGE	ROTATION SPEED	INLET CONNECTION	WEIGHT	MAX. WATER TEMP.
BC-K	2–22k psi (140–1500 bar)	4.4–13.3 gpm (17–50 l/min)	1000-2000 rpm	9/16" MP	2.7 lb (1.2 kg)	160 °F (70 °C)
BC-K-P2	5–22k psi (340–1500 bar)	4.3–12.1 gpm (16–46 l/min)	1000-2000 rpm	9/16" MP	2.7 lb (1.2 kg)	160 °F (70 °C)
BC-H9-C	20–44k psi (1400–3000 bar)	5.6–8.8 gpm (21-23 l/min)	1000-2000 rpm	9/16" HP	2.9 lb (1.3 kg)	160 °F (70 °C)
BC-H9LF-C	20–44k psi (1400–3000 bar)	4.3–6.7 gpm (16-25 l/min)	1000-2000 rpm	9/16" HP	2.9 lb (1.3 kg)	160 °F (70 °C)
BC-H9XLF-C	20–44k psi (1400–3000 bar)	3.5–5.6 gpm (13-21 l/min)	1000-2000 rpm	9/16" HP	2.9 lb (1.3 kg)	160 °F (70 °C)
BC-H9XXLF-C-TI	20–44k psi (1400–3000 bar)	2.3–3.8 gpm (9-14 l/min)	1000-2000 rpm	9/16" HP	3.2 lb (1.45 kg)	160 °F (70 °C)

For information on compatible Automated Equipment options, please refer to the Automated Equipment Catalog



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).

NOZZLES AND PLUGS

Come in 2-port and 4-port configurations. Two jets deliver more concentrated power for heavy, thick deposits while four jets are ideal for removing thin, hard deposits.

IMPACT RESISTANT SHIELD

Inexpensive and easily replaceable shield protects working parts of the tool from debris and impacts.

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-H9XLF-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

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BJVE (UP TO 22K)

Designed for a wide range of pipe diameters, pressures, flows and configurations. BJVE controlled rotary nozzles are the industry standard for cleaning medium to large pipes and vessels.

- ✓ 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
- ✓ High pressure seal geometry extends service life and can be replaced in the field in under 3 minutes
- ✓ Inlet cartridge design enables quick change from 15k to 20k on the fly
- ✓ Multiple head options to allow for flush mounted nozzles, extension arms, plugs and pulling rings



SCAN HERE TO SEE
BJVE SERVICE VIDEO

For information on compatible Automated Equipment options, please refer to the Automated Equipment Catalog

TOOL MODEL	PRESSURE RANGE	FLOW RANGE	ROTATION SPEED	INLET CONNECTION	WEIGHT	MAX. WATER TEMPERATURE
BJVE-P16	2–10k psi (140–700 bar)	20–200 gpm (76–757 l/min)	25–95 rpm (Slow) 50–200 rpm (Medium) 85–300 rpm (Fast)	1" NPT	8.5 lbs (3.9 kg)	160 °F (70 °C)
BJVE-P12	2–15k psi (140–1000 bar)	12–100 gpm (45–380 l/min)	20–95 rpm (Slow) 40–190 (Medium) 70–275 rpm (Fast)	3/4" NPT	8.5 lbs (3.9 kg)	160 °F (70 °C)
BJVE-M24	2–22k psi (140–1500 bar)	12–100 gpm (45–380 l/min)	20–95 rpm (Slow) 40–190 (Medium) 70–275 rpm (Fast)	M24	(8.5 lbs (3.9 kg)	160 °F (70 °C)
BJVE-MP12	2–22k psi (140–1500 bar)	10–60 gpm (38–230 l/min)	20–95 rpm (Slow) 40–190 rpm (Medium) 70–275 rpm (Fast)	3/4" MP	8.5 lbs (3.9 kg)	160 °F (70 °C)

MAINTENANCE RESOURCES

TOOL	SERVICE KIT	SEAL KIT	OVERHAUL KIT	TOOL KIT	LUBRICANT
BJVE-P16		BJVE 602	BJVE 610	BJVE 612	
BJVE-P12		BJVE 602	BJVE 610	BJVE 612	
BJVE-M24		BJVE 602	BJVE 610	BJVE 612	
BJVE-MP12		BJVE 602	BJVE 610	BJVE 612	

BJV (UP TO 40K)

TOOL MODEL	PRESSURE RANGE	FLOW RANGE	ROTATION SPEED	INLET CONNECTION	WEIGHT	MAX. WATER TEMPERATURE
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)

MAINTENANCE RESOURCES

TOOL	SERVICE KIT	SEAL KIT	OVERHAUL KIT	TOOL KIT	LUBRICANT
BJV-H9	BJ 600-H9-X	BJ 602-H9	BJ 610-H9-X	BJ 612-H9	BJ 048-X

EXTENSION ARMS

Add custom length extension arms to reduce stand off distance and deliver maximum cleaning power in any size tank or vessel.

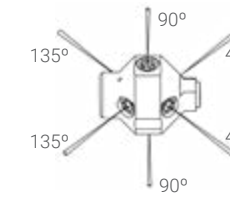


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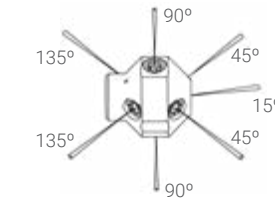
HEAD OPTIONS PER SWIVEL TYPE:

There are four standard head configurations, with custom heads available on request. The correct head specification is based on the pressure and flow of the pump and the required port size. Heads with P8 or G12 ports require extension arms or plugs.



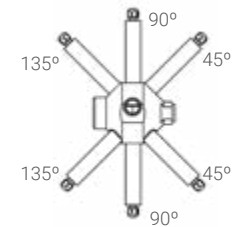
BJ 144-P4-6-RXX

6 Port: 2 @ 45°
2 @ 90°
2 @ 135°



BJ 144-P4-7-RXX

7 port: 1 @ 15°
2 @ 45°
2 @ 90°
2 @ 135°



BJ 145-G12-6-RXX
or
BJVE 145-P8-6-RXX

6 Port: 2 @ 45°
2 @ 90°
2 @ 135°

PACKAGE HEAD OPTIONS

The following table shows head selection by desired flow for each package:

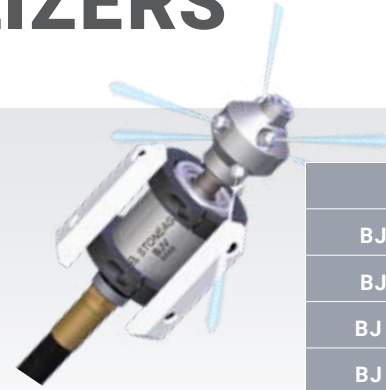
PRESSURE	PACKAGE	FLOW	R-VALUE	HEAD
10K PSI 700 BAR	BJVE-P16-P4-6-PKG	15–25 gpm 57–95 LPM	R60	BJ 144-P4-6-R60
		20–45 gpm 76–170 LPM	R35	BJ 144-P4-6-R35
		35–80 gpm 133–303 LPM	R20	BJ 144-P4-6-R20
		55–140 gpm 208–530 LPM	R12	BJ 144-P4-6-R12
	BJVE-P16-P4-7-PKG	15–25 gpm 57–95 LPM	R60	BJ 144-P4-7-R6
		20–45 gpm 76–170 LPM	R35	BJ 144-P4-7-R35
		35–80 gpm 133–303 LPM	R20	BJ 144-P4-7-R20
		55–140 gpm 208–530 LPM	R12	BJ 144-P4-7-R12
15K PSI 1000 BAR	BJVE-P12-P4-6-PKG	10–20 gpm 38–76 LPM	R60	BJ 144-P4-6-R60
		20–40 gpm 76–151 LPM	R35	BJ 144-P4-6-R35
		30–70 gpm 114–265 LPM	R20	BJ 144-P4-6-R20
		50–120 gpm 189–454 LPM	R12	BJ 144-P4-6-R12
	BJVE-P12-P4-7-PKG	10–20 gpm 38–76 LPM	R60	BJ 144-P4-7-R6
		20–40 gpm 76–151 LPM	R35	BJ 144-P4-7-R35
		30–70 gpm 114–265 LPM	R20	BJ 144-P4-7-R20
		50–120 gpm 189–454 LPM	R12	BJ 144-P4-7-R12
22K PSI 1500 BAR	BJVE-MP12-P4-6-PKG	10–20 gpm 38–76 LPM	R60	BJ 144-P4-6-R60
		20–35 gpm 76–133 LPM	R35	BJ 144-P4-6-R35
		30–65 gpm 114–246 LPM	R20	BJ 144-P4-6-R20
		50–110 gpm 189–416 LPM	R12	BJ 144-P4-6-R12
	BJVE-MP12-P4-7-PKG	10–20 gpm 38–76 LPM	R60	BJ 144-P4-7-R6
		20–35 gpm 76–133 LPM	R35	BJ 144-P4-7-R35
		30–65 gpm 114–246 LPM	R20	BJ 144-P4-7-R20
		50–110 gpm 189–416 LPM	R12	BJ 144-P4-7-R12
	BJVE-M24-P4-6-PKG	10–20 gpm 38–76 LPM	R60	BJ 144-P4-6-R60
		20–35 gpm 76–133 LPM	R35	BJ 144-P4-6-R35
		30–65 gpm 114–246 LPM	R20	BJ 144-P4-6-R20
		50–110 gpm 189–416 LPM	R12	BJ 144-P4-6-R12
BJVE-M24-P4-7-PKG	10–20 gpm 38–76 LPM	R60	BJ 144-P4-7-R6	
	20–35 gpm 76–133 LPM	R35	BJ 144-P4-7-R35	
	30–65 gpm 114–246 LPM	R20	BJ 144-P4-7-R20	
	50–110 gpm 189–416 LPM	R12	BJ 144-P4-7-R12	
44K PSI 3000 BAR	BJV-H9-S6-8-PKG	6–10 gpm 23–38 LPM	R40	BJ 444-S6-R40
		9–17 gpm 34–64 LPM	R25	BJ 444-S6-R25

BJV CENTRALIZERS

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

STRAIGHT PIPE 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.

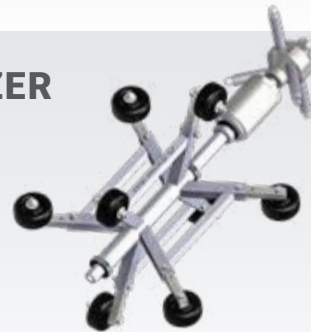


CENTRALIZER SIZES (DIAMETER)	WEIGHT
BJ 286-S 9-18 in. 230-460 mm	20 lb 9 kg
BJ 286-M 13-40 in. 330-1000 mm	32 lb 15 kg
BJ 286-L 16-60 in. 410-1500 mm	40 lb 18 kg

CURVED PIPE CENTRALIZER

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.

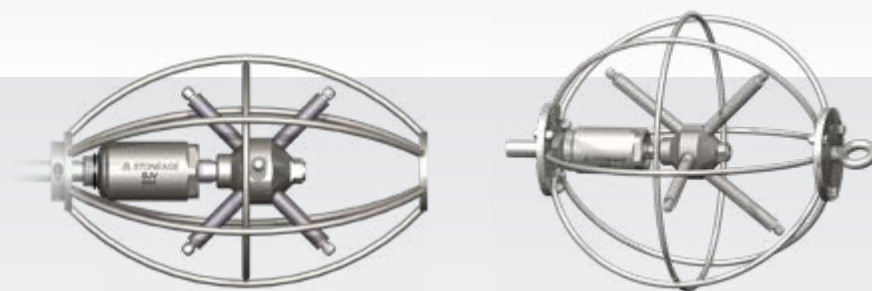


CENTRALIZER SIZES (DIAMETER)	WEIGHT
BJ 288-S 16-21 in. 410-530 mm	12 lb 5.5 kg
BJ 288-M 22-29 in. 560-740 mm	13 lb 5.9 kg
BJ 288-L 30-37 in. 770-940 mm	16 lb 7.3 kg

CAGE-STYLE CENTRALIZERS

Stainless steel centralizers are used when negotiating complex piping arrangements and removing built-up debris while maintaining jet rotation.

Tool not included.



Different inlet plates are available for all models. Different collar sizes are available for all models.

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

BJ 100-SS
BJ 100-SS-MP

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

SPEED CONTROLLED SWIVEL (SCS)

The StoneAge SCS High Flow Tank Cleaner is engineered to deliver extremely high flow while maintaining slow controlled rotation for optimal cleaning of difficult deposits in medium to large tanks and vessels.

The SCS allows the operator to adjust rotation speed from 5-60 rpm while delivering up to 300 gpm (1136 lpm).

This combination of high flow and slow rotation is ideal for removing difficult materials such as coke or refractory. The SCS High Flow Tank Cleaner can be customized with several head options to adapt for large pipe cleaning, tunnel cleaning or stack cleaning. We also offer newly designed high flow nozzles with unique flow straighteners to increase the precision and power of the jets.

- ✓ High flow, slow rotation
- ✓ Adjustable speed control
- ✓ Multiple head options
- ✓ Uniquely designed high flow nozzles with flow straighteners
- ✓ Adaptable to large pipe cleaning, tunnel cleaning or stack cleaning



TOOL MODEL	PRESSURE RANGE	FLOW RANGE	INLET CONNECTION	ROTATION SPEED	WEIGHT
SCS-100	10-22k psi 700-1500 bar	10-300 gpm 151-1136 lpm	1" MP (MP16), 1" NPT (P16), 1.25" NPT (P20)	5-50 rpm	12lbs (5 kg) Swivel only, no head



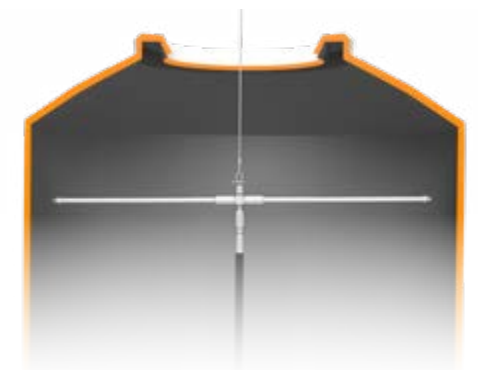
CONTROLLED ROTATION

Rotation speed is controlled by a combination of viscous fluid and a speed control adjustment



MULTIPLE HEAD OPTIONS

Allow the SCS to be customized to adapt to multiple applications



EXTENSION ARMS

Optional extension arms allow the standoff distance to be customized for specific tank size

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TORUS

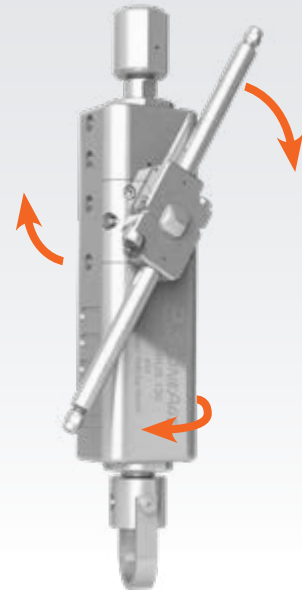
The Torus is a powerful and highly adaptable 3-D cleaning tool designed to easily adjust to a wide range of pump capacities, working pressures, and cleaning applications.

- ✔ Small entry diameter enables access to more tanks and vessels
- ✔ If the arms hit an internal obstruction while in operation, the Torus 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 Torus on different pumps ranging from 10k psi (700 bar) to 20k psi (1500 bar)
- ✔ Wide range of accessories are available including positioning devices, cage centralizers and extensions help adapt the Torus to specific needs and jobs

For information on compatible Automated Equipment options, please refer to the Automated Equipment Catalog

TORUS TR-130

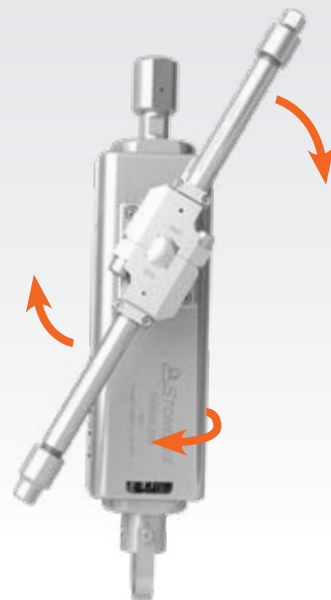
The Torus TR-130 is a powerful and highly adaptable 3-D cleaning tool designed to easily adjust to a wide range of pump capacities, working pressures and cleaning applications. The body of the TR-130 rotates in one axis while the arms rotate in another, providing full cleaning coverage of all tank surfaces without requiring operator entry.



MODEL	TR-130
PRESSURE RANGE	2-22k psi (138-1500 bar)
FLOW RANGE	10-81 gpm (38-307 l/min)
TOTAL WEIGHT	35 lbs (16 kg)
TOOL WIDTH	130 mm

TORUS TR-200

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. Ideal for cleaning hard applications such as large tanks and difficult materials such as coke deposits.



MODEL	TR-200
PRESSURE RANGE	8-15k psi (550-1000 bar)
FLOW RANGE	50-220 gpm (190-830 l/min)
TOTAL WEIGHT	100 lbs (45 kg)

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TORUS ACCESSORIES

TR130 408-SS – CAGE CENTRALIZER

The Torus TR-130 cage-style centralizer. Ideal for applications where debris or internal structures may interfere with the cleaning operation. Shorter nipples 2" (51 mm) in length must be used with the cage centralizer.



EXTENSION NIPPLES

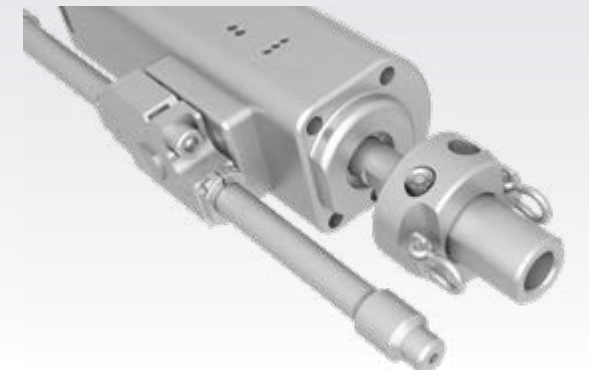
The Torus 130 comes standard with two 6" nipples. The Torus 200 is supplied two standard 8" (203 mm) extension nipples. Torus extensions with flow straighteners are available up to 8 inches.

Longer extension nipples are stocked and custom lengths are available on request.



LIFTING ASSEMBLY

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



MAINTENANCE RESOURCES

TOOL	SERVICE KIT	SEAL KIT	OVERHAUL KIT	MANUAL
TR-130	TR130 600	TR 602	TR130 610	PL 556
TR-200	TR200 600	TR200 602	TR200 610	PL 557



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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 positioning booms that pair with our 3D tools to clean tanks without requiring operator entry.

The use of a positioning boom allows you to safely place the tool closer to the surface to be cleaned and away from obstructions for optimal results.



SIMPLE BOOMS

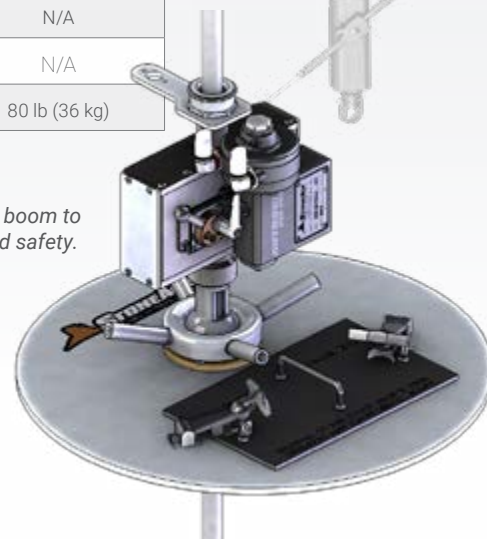
Positioners provide up to 19 ft (5.8 m) of reach for the Torus 3-D tank cleaner in addition to tilt and rotation adjustments. Intended for vertical or near vertical applications.

- ✓ 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. (610 mm) aluminum mounting plate secures to the vessel during cleaning operation, increasing operator safety
- ✓ Inspection hatch allows for line of sight placement of cleaning head to check cleaning progress
- ✓ Portable and easy setup; no special tools required to position head

	SB-H	SB-P16
MAX. PRESSURE	N/A	10k psi (700 bar)
MAX. FLOW	50 gpm (190 l/min)	150 gpm (570 l/min)
INLET CONNECTIONS	3/4" NPT or 1-12 "M"	1" NPT
MAX. HOSE I.D.	0.5 in. (13 mm)	N/A
MAX. END FITTING	1.5 in. (38 mm)	N/A
WEIGHT	80 lb (36 kg)	80 lb (36 kg)

HANDS-FREE OPTION

Add a Pro-Drive tractor to the simple boom to automate the hose feed for increased safety.



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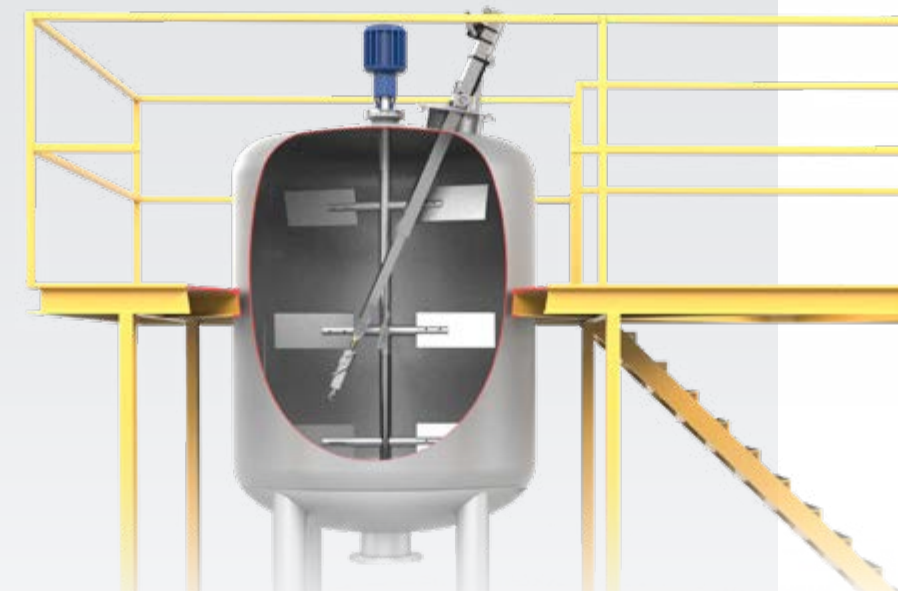


TORUS sold separately

TELEBOOM

The TeleBoom is designed to hold and position most types of waterblast cleaning nozzles. It is particularly useful for placing rotary nozzle heads inside tanks and vessels. It is intended only for vertical or near vertical applications.

- ✓ Lightweight and compact for portability
- ✓ Three positioning functions: Telescope, Angle and Rotate
- ✓ All of the functions are driven by hand operated wheel cranks
- ✓ Attaches to various size manway openings by means of custom made adapter plates



MODEL	TB-6-TR	TB-8-TR	TB-10-TR
MAX. PRESSURE	22k psi 1500 bar	22k psi 1500 bar	22k psi 1500 bar
MAX. 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
MAX. HOSE I.D.	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
MAX. 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

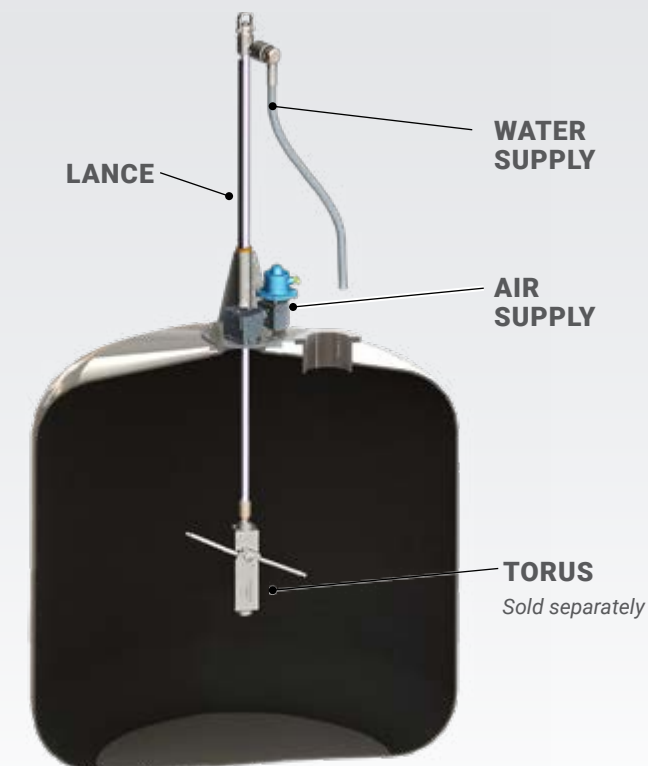
EXTENSION BOOM

This Extension Boom allows the operator to raise and lower a 3D tool at different speed rates. The EB-100 boom utilizes a durable rack and pinion drive to position the vertical lance. The lance can be stopped at any height and offers a maximum stroke length of 12 feet, and the mounting flange can be customized to fit your tank opening.

OPTIONAL CONTROL BOX

We also offer a dual function Control Box which manages the air supply to the boom. The CB-2S™ controls the vertical position and linear speed of the lance. This Control Box can be modified to fit your specific application.

	EB-100
MAX. PRESSURE	12k psi (830 bar)
LINEAR SPEED	8-45 in./min (0.2-1.1 m/min)
MAX. STROKE LENGTH	12 ft (3.7 m)
INLET CONNECTION	3/4" NPT



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ROTARY SWIVELS

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

- ✓ 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

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



EXTERNAL GREASE FITTINGS
Easy maintenance

LEAK-FREE SEAL DESIGN
Requires very little torque for rotation

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

SG SWIVEL

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
MAX. 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
MAX. 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	3/4" NPT	3/4" MP	1" MP	3/4" NPT	3/4" MP
SHAFT CONNECTION	1/2" NPT	3/4" NPT	3/4" MP	1" MP	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

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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
MAX. PRESSURE	40k psi 2800 bar	44k psi 3000 bar
MAX. FLOW	10 gpm 38 l/min	20 gpm 76 l/min
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

SM SWIVEL

HIGH FLOW ROTATION

Built to handle up to 3500 hp. Stainless steel, heavy duty bearings and long lasting seals make SM Swivels excellent for boilers, tube bundles, large tank and vessel cleaning applications. 0° or 90° inlet connections are available.

	SM-P16	SM-P20
MAX. PRESSURE	12k psi 830 bar	10k psi 700 bar
MAX. FLOW	300 gpm 1100 l/min	600 gpm 2300 l/min
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. 89 mm	3.5 in. 89 mm
LENGTH	7.3 in. 190 mm	*7.3 in. *190 mm
WEIGHT	10 lb 4.5 kg	*11 lb *5.0 kg



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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
MAX. PRESSURE	15k psi 1000 bar	22k psi 1500 bar
MAX. 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

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.

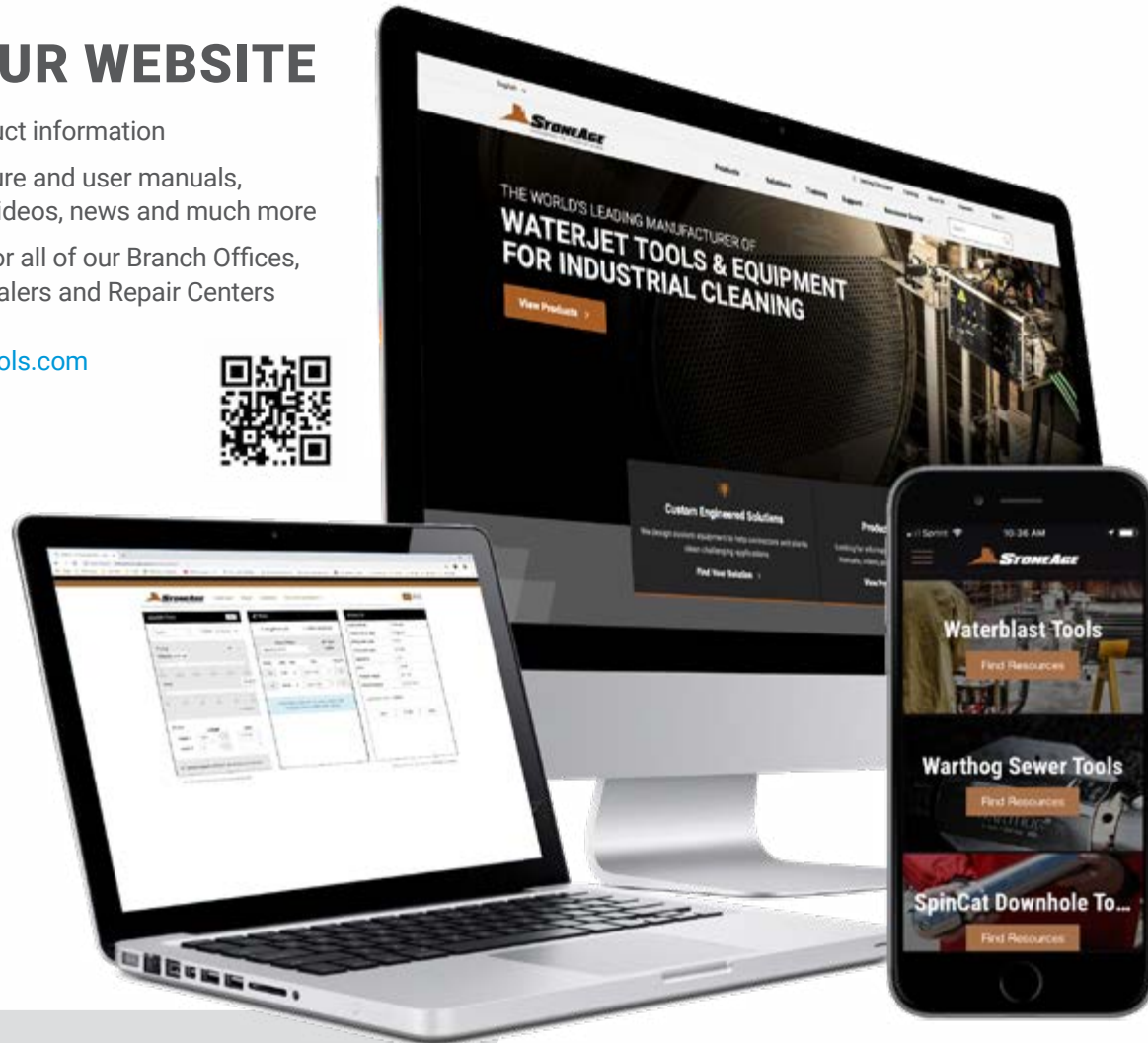
	SH-P8P8
MAX. PRESSURE	15k psi 1000 bar
MAX. FLOW	50 gpm 190 l/min
ROTATION SPEED	0-250 rpm
INLET CONNECTION	1/2" NPT
SHAFT CONNECTION	1/2" NPT
DIAMETER	2.25 in. 57 mm
LENGTH	4.13 in. 105 mm
WEIGHT	1.9 lb 0.86 kg

STAY INFORMED WITH EASY ONLINE RESOURCES

VISIT OUR WEBSITE

- Updated product information
- Service literature and user manuals, instructional videos, news and much more
- Contact info for all of our Branch Offices, Authorized Dealers and Repair Centers

www.stoneagetools.com



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- Find pricing, availability, order & invoice history, and shipment tracking details
- Find part numbers, product manuals and tool talks easier than ever

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- Optimize your StoneAge Tool for faster cleaning
- Configure jetting, flow and pressure loss
- Dial in the exact working configurations for your nozzle

jetting.stoneagetools.com



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We gladly respond to inquiries and provide advice on your cleaning challenges.*



STONEAGE TRAINING

FOR INDUSTRIAL CLEANING PROFESSIONALS



COURSE OVERVIEW

HYDROBLASTING TRAINING & CERTIFICATION

The WJTA's Hydroblaster Training & Certification Program is the first step to becoming compliant in the use of high-pressure water. For new hires and tenured employees alike, certification helps integrate best practices and implement most effective means within all operations, no matter how complex.

Communication is key to safety. Training provides the foundation to communicate. We all recognize that safe success within a project or turnaround depends on all parties being on the same page. Assumptions and inconsistencies are dangerous.

We present a standardized model that brings safe and effective communication into all phases of hydroblasting configuration, planning, and execution.

WATERJETTING SCIENCE & TECHNIQUE

Deepen your understanding of the physics and technology behind high-pressure waterjet cleaning.

ACCREDITED INDUSTRY TRAINING

StoneAge is an accredited training provider for industry partners Water Jetting Association (WJA) and Waterjet Technology Association (WJTA).



PERMIT ISSUER/PERMIT AUDITOR/HSE PROFESSIONAL SESSIONS

Safe industrial cleaning depends on the shared responsibility between asset owners, cleaning contractors, and equipment manufacturers. All parties must exhibit a sense of ownership in completing the project within specified parameters without incident or injury.

StoneAge Training and the WJTA have had many successful sessions both virtually and in-person with Asset Owners and their Service Providers to establish the standard of What Right Looks Like!

Our sessions equip Operators, Permit Auditors, and HSE Professionals with the knowledge to identify current best practices and compliance.

Visit our website for up-to-date information about our course offerings.

BE THE SAFEST, BE THE BEST

StoneAge offers several training programs at our facilities where we impart 40+ years of technical and engineering expertise to operators, supervisors, asset owners and process engineers. Our goal is to help industry professionals become proficient and highly skilled.

Through training, we can bolster and grow the use of high-pressure water as a safe, environmentally friendly and effective method of cleaning across a wide range of industries.



As a ratifying member and founding leader of the Global Industrial Cleaning Coalition, StoneAge's mission is to contribute towards the creation and adoption of basic industrial cleaning principles around the world. For more information and resources, visit www.globalindustrialcleaningcoalition.org. StoneAge training is aligned with the waterjetting safety, practical, and examination requirements of global industry associations and training partners with the goal of supporting a safer, more productive industry.



TECHNICAL REFERENCES

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

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 I.D. 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

OPERATING WATERBLASTING EQUIPMENT CAN BE POTENTIALLY HAZARDOUS.



See page 41 for important safety information

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

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, O.D.3M) 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 SIZE	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	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

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.

FITTING ASSEMBLY GUIDELINES

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.

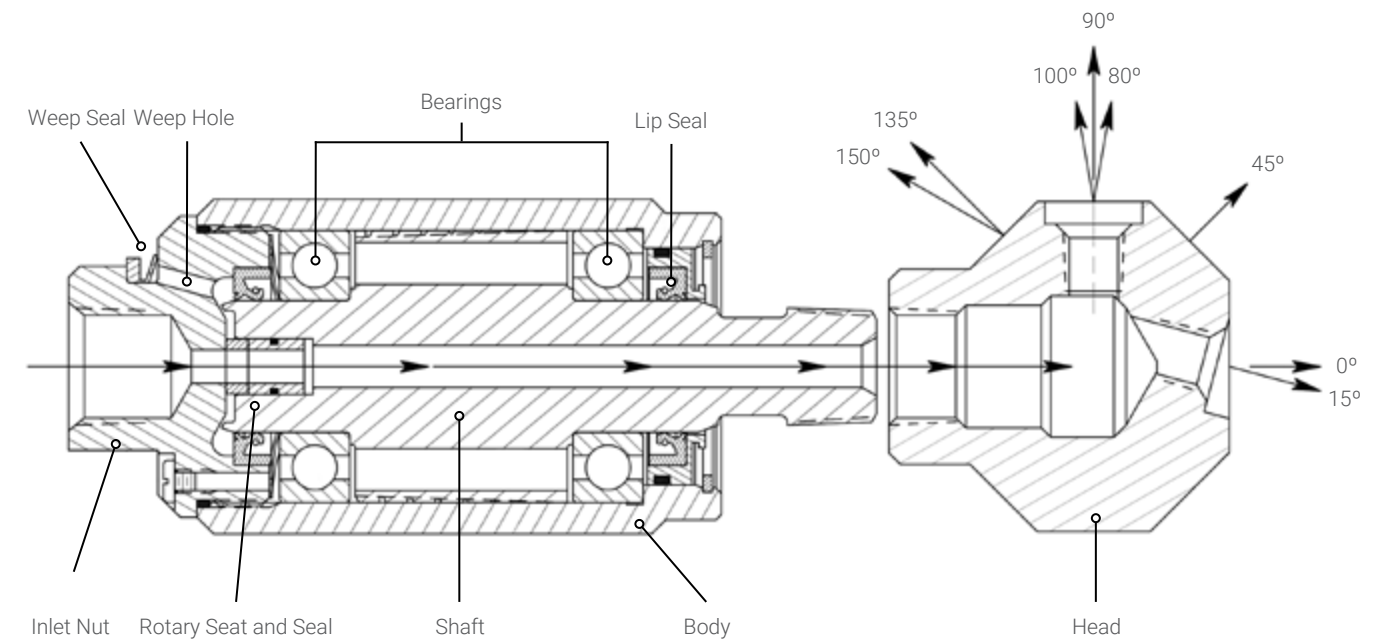
BJV-MP12-S is the Part ID for a BJV swivel. The **MP12** indicates a 3/4" MP inlet that requires a gland and collar and the actual thread size is 3/4"-14 NPSM right hand. Check the fittings and adapters section for the correct selection of gland and collar or other adapter.

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.

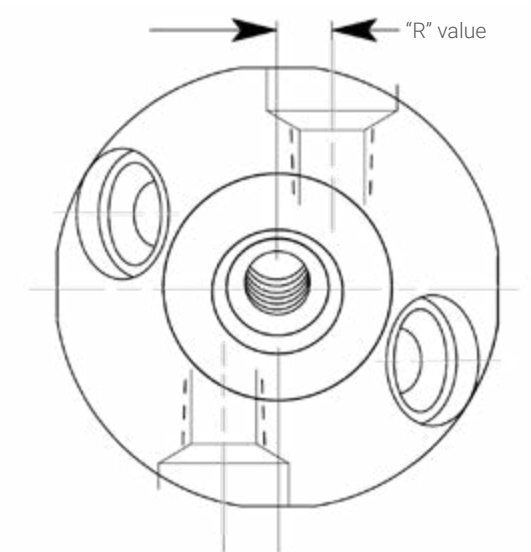
TECHNICAL REFERENCE

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 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.**

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
BJVE-P12		BJVE 602	BJVE 610	BJVE 612	
BJVE-M24		BJVE 602	BJVE 610	BJVE 612	
BJVE-P16		BJVE 602	BJVE 610	BJVE 612	
BJVE-20K		BJVE 602	BJVE 610	BJVE 612	
BJV-H9	BJ 600-H9-X	BJ 602-H9	BJ 610-H9-X	BJ 612-H9	BJ 048-X
GOPHER - GO-MP9 - 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	
BADGER - 20K PSI	BAE 600-X	BAE 602	BAE 610-X	BAE 612	
BADGER - BA-P8 & BA-MP9	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-130	TR130 600	TR130 602	TR130 610		GP 048
TORUS TR-200	TR200 600	TR200 602	TR200 610		GP 048
SL-P8P4	SL 600-P		SL 610-P	SL 612	GP 048
SL-MP9AV9	SL 600-K		SL 610-K	SL 612	GP 048
SG-P8P8 & SG-MP12MP12	SG 600		SG 610	SG 612	GP 048
SG-P12P12-62 & SG-M16M16	SG 600-62		SG 610-62	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
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.

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 or visit our website 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 or visit our website 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 or visit our website 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 or visit our website for specific details regarding individual tool kits.

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

⚠ 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 DOES 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 applicable 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.**

CUSTOMER SERVICE

CALL US: +1 970-259-2869

SALES@STONEAGETOOLS.COM

HOURS: 8:00 AM - 5:00 PM MONDAY - FRIDAY (USA MOUNTAIN TIME)

TECHNICAL SUPPORT

For Technical Support in North America, please contact StoneAge. Outside of North America, please visit our website at www.stoneagetools.com

MANUALS

Operator's manuals and repair videos for all equipment are available online. They illustrate tools, identify parts and detail maintenance and overhaul procedures.

REPAIRS

Repair & Maintenance Service is available by the same technicians who build and test our tools. We try to complete repairs and test every tool within three days of receipt. You must call StoneAge for an RMA number prior to sending your tool in for repair.

SEND TOOL TO: StoneAge Inc. Attention Repairs, 466 S. Skylane Dr., Durango CO 81303, USA

Serial Number Database is maintained on all equipment sold. If a serial number is provided when ordering parts, we can verify that the right parts are specified.

LEAD TIME

Parts and Service Kits are available to ship same day as ordered. Standard tools can usually be shipped the next day. Custom porting of heads usually requires 3-4 days to schedule through the factory. More complicated systems like Lancing Machines are built when ordered, which can take several weeks depending on factory backlog. Check availability and place orders early enough to avoid scheduling conflicts.

ORDERING

Call or email your order to StoneAge or an authorized dealer with purchase order number, shipping and billing addresses and delivery date. Check datasheet to ensure specifications are complete. Advise whether we should hold shipment until all items are available.

SHIPPING

Shipping is pre-paid and invoiced with order but may be charged directly to the customer's account with selected courier by special instruction. Most orders are shipped via UPS or Fed Ex couriers; specify a preference if you wish. Larger equipment will be shipped by truck or air freight. Either party may make the arrangements. Airline counter-to-counter delivery is not reliable from our mountain location.

PAYMENT

Major credit cards or bank transfers are accepted. Pre-payment is required to ship custom equipment.

RETURNS

Any parts returned for credit or warranty must be accompanied by a StoneAge RMA number. Please contact a Customer Service Specialist or Authorized Dealer to obtain an RMA number. A minimum restocking fee of 15% applies to standard items returned unused. Returns will only be accepted on unused items returned 6 months or less from invoice date. All returns and restocking fees are subject to StoneAge final decision. Returns of custom products and obsolete items are not accepted.

TERMS & CONDITIONS

PRODUCTS SOLD BY SELLER ARE DESIGNED AND INTENDED TO BE USED AT HIGH PRESSURES AND SPEEDS AND MAY BE DANGEROUS IF OPERATED IMPROPERLY OR WITHOUT THE USE OF APPROPRIATE SAFETY DEVICES AND GUARDS. BUYER IS CAUTIONED TO CAREFULLY READ AND UNDERSTAND THESE TERMS AND CONDITIONS, AS THEY HAVE IMPORTANT LEGAL CONSEQUENCES.

1. Purchase Orders. Buyer shall order products in accordance with these Terms and Conditions. Orders for the purchase of products ("Purchase Order(s)") must be submitted to Seller by an authorized representative of Buyer by email. Each Purchase Order shall specify (i) the quantity of products being ordered, (ii) product prices, (iii) payment terms granted by Seller and (iv) a requested receipt date. Requested receipt dates must be during the term of the Waterblast Tool Reseller Agreement, except, in its sole discretion, Seller may elect to accept a Purchase Order with a requested receipt date after the expiration or termination of Waterblast Tool Reseller Agreement, in which case these Terms and Conditions shall apply to such shipment, but under no circumstances should such shipment be deemed to be or construed as being a renewal, amendment or extension of the Waterblast Tool Reseller Agreement. The Parties agree that these Terms and Conditions shall prevail over any conflicting terms and conditions in any Purchase Order, acknowledgment form, or other instrument. Any additional or different terms or conditions in any Purchase Order, acknowledgment form, or other instrument or response from Buyer shall be deemed rejected by Seller without need of any further or additional notice of rejection and such additional or different term shall be of no effect or in any way binding upon Seller. Seller assumes and shall have no liability for any delay in filling or shipping any Purchase Orders.

2. Acceptance of Purchase Order by Seller. Purchase Orders are subject to written acceptance by an authorized representative of Seller and such acceptance is made expressly conditional on assent by an authorized representative of Buyer to the Terms and Conditions. Seller reserves the unconditional right to reject any Purchase Order, in whole or in part. Purchase Orders submitted by Buyer shall not be binding on Seller until the earlier of written acceptance by Seller or shipment and acceptance by shipment shall only be binding as to the portion of the Purchase Order actually shipped by Seller. Any automatic or computer generated response to a Purchase Order by Seller's internal electronic data exchange system or otherwise shall not be deemed acceptance of a Purchase Order. Notwithstanding the foregoing, Seller reserves the right to refuse, cancel, modify or delay any Purchase Order placed by Buyer and accepted by Seller when Buyer is delinquent in payments or when Buyer has failed to perform any of its obligations under the Waterblast Tool Reseller Agreement.

3. Payment/Prices. Unless other arrangements have been made in writing between Seller and Buyer, payment for product delivered shall be made upon receipt of invoice. The prices shown on the face hereof are those currently in effect. Prices invoiced shall be per pricelist in effect at the time of shipment. Prices are subject to increase for inclusion of any and all taxes which are applicable and which arise from the sale, delivery or use of Seller's products or services and for the collection of which Seller is or may be responsible to any governmental authority unless acceptable exemption certificates are provided by Buyer in accordance with law. Buyer shall pay all charges for transportation and delivery and all excise, order, occupation, use or similar taxes, duties, levies, charges or surcharges applicable to the equipment or services being purchased, whether now in effect or hereafter imposed by any governmental authority, foreign or domestic.

4. Warranty. Subject to the limitations and conditions hereinafter set forth, Seller warrants to the original Buyer that its products are free from defects in workmanship and material for a period of one (1) year from shipment. Seller's obligation under this warranty shall be limited to repairing, replacing or issuing a credit for, at Seller's option, any products or services it finds to be defective in material or workmanship. In no event shall Seller be liable for any incidental, consequential or indirect damages of any kind. THIS WARRANTY SHALL BE IN LIEU OF ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY FOR MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. No statement or recommendation made by Seller or its representative to Buyer or User shall constitute a warranty by Seller or a waiver or modification to any of the provisions hereof or create any liability for Seller. All warranty claims are subject to the exclusions and limitations set forth below:

- The warranty shall not apply if the product or service (1) has been subject to misuse, negligence or accident; (2) has not been installed or operated in accordance with Seller's recommendations; (3) has been operated under more severe conditions than those specified for the particular product or service; (4) has been operated beyond the rated capacity of the product; or (5) has been repaired or altered outside Seller's facilities or in any way so as, in Seller's judgment, to affect its stability or reliability.
- Products that Seller furnishes, but does not manufacture, carry only the warranty of the manufacturer of such products. Where other manufacturers' or suppliers' products used in Seller's products or services prove defective, Seller's liability shall exist only to the extent that Seller is able to recover from such manufacturers or suppliers for such defects.
- Any warranty granted by Seller to the Buyer shall be deemed void if any goods covered by such warranty are used for any purpose not recommended or permitted. In addition, the Buyer shall indemnify Seller and hold Seller harmless from and against any and all claims, damages, losses, costs, expenses and other liability of whatever nature that Seller suffers or incurs by reason of any such unintended use.
- Notice of defective product or service must be given in writing to Seller by Buyer or User within fifteen (15) business days following receipt of goods. Buyer or User shall keep such products or services in an unaltered condition for examination by Seller's representative. No goods may be returned for credit or adjustment without prior written permission from Seller.

5. Product Liability. Buyer specifically acknowledges that the products being purchased may be operated at high speeds and/or pressures and that as such they may be inherently dangerous if not used correctly. Buyer shall be solely responsible for the safe operation of the products at all times and for determining the safety devices and guards that may be required for the safe operation of the products. Buyer shall undertake to specify and order all safety devices and guards necessary for the safe operation of the equipment covered. All safety devices and guards offered in Seller's quotations are recommended for purchase. Seller may provide necessary safety devices and guards not offered in this quotation at an extra price in accordance with the specifications of Buyer. Buyer shall at all times use and require its employees to use all necessary and appropriate safety devices, guards and proper safe operating procedures. Buyer shall not remove or modify any such devices, guards or

warning signs and shall insist on safe operating practices on the part of its personnel. In no event shall Seller be responsible for any injuries to persons or property caused by defects in any equipment, including by way of illustration and not limitation, any pumps, compressors, fittings, connections, components, piping or hoses up to the point that same are connected to the product. Buyer agrees to indemnify and to save Seller harmless from any and all liability or obligation incurred by or against Seller, including costs and attorneys' fees, to or by any persons injured directly or indirectly in the operation of the equipment furnished under the following conditions:

- if Buyer fails to purchase and use necessary and appropriate safety devices and guards as determined by Buyer and/or as recommended by Seller.
- if Buyer fails to maintain in good working order such safety devices and guards as are purchased from Seller;
- if Buyer adds, omits, repairs, modified, replaces or substitutes any components on the equipment without permission from Seller;
- if Buyer exceeds at any time the Max. safe loads, pressures or speeds recommended by Seller for the equipment furnished hereunder without the specific written consent of Seller; or
- if Buyer otherwise fails to operate the product or equipment in accordance with Seller's printed instructions or otherwise negligently operates the equipment.

6. Delivery. Shipment of products shall be F.O.B. the Seller's warehouse. Title and risk of loss will pass F.O.B. Seller's shipping point. Buyer will be responsible for and pay all freight, shipment and insurance charges associated with shipment of the products, even if the order is rejected upon delivery. Seller, in its sole discretion, will determine and arrange the means and manner of transportation of the products.

Seller shall use commercially reasonable effort to ship products to Buyer on or before the requested receipt date designated in a Purchase Order. The Parties agree, however, that shipment of any products ordered from Seller under these Terms and Conditions may be delayed for a period of time sufficient to allow Seller to manufacture and assemble or otherwise acquire the products for Buyer. The Parties further agree that Seller shall not be held liable to Buyer or any other party for any delay in shipment of any Purchase Order.

Order errors must be reported by Buyer within fifteen (15) business days from receipt of shipment to secure adjustment. No merchandise may be returned without securing written approval from Seller.

7. Seller's Right to Delay, Cancel, or Allocate. Notwithstanding the Seller's obligations under the Waterblast Tool Reseller Agreement, Seller reserves the right to refuse, cancel, modify or delay any shipment to Buyer when Buyer is delinquent in payments, when payment for shipment has not been arranged to Seller's reasonable satisfaction, or when Buyer has failed to perform any of its obligations under the Waterblast Tool Reseller Agreement. Should any Buyer Purchase Order for products exceed Seller's available inventory, Seller shall in its sole discretion determine how to allocate its current and anticipated inventory without liability to Buyer on account of the method of allocation determined or its implementation.

8. Technical Advice. All technical advice, recommendations and services of Seller are intended for use by persons having adequate skill, at their own risk and Seller assumes no responsibility and Buyer hereby waives all claims against Seller, for results obtained or damages incurred from the use of Seller's advice, recommendations and services.

9. Modification. These Terms and Conditions are intended by Seller and Buyer to constitute a final, complete and exclusive expression of agreement and cannot be supplemented or amended without Seller's prior written approval. Seller's waiver of any breach or failure to enforce any of the Terms and Conditions at any time, shall not in any way affect, limit or waive Seller's right thereafter to enforce and compel strict compliance with every Term and Condition thereof. If any provisions of these Terms and Conditions are held to be invalid or unenforceable, such invalidity or unenforceability shall not affect the validity or enforceability of the other portions hereof.

10. Disputes. Buyer and Seller shall attempt in good faith promptly to resolve any dispute arising under these Terms and Conditions by negotiations between representatives who have authority to settle the controversy. If unsuccessful, Buyer and Seller shall further attempt in good faith to settle the dispute by nonbinding third-party mediation, with fees and expenses of such mediation apportioned equally to each side. Any dispute not so resolved by negotiation or mediation may then be submitted to a court of competent jurisdiction in accordance with the terms hereof. These procedures are the exclusive procedures for the resolution of all such disputes between the parties.

All sales, agreements for sale, offers to sell, proposals, acknowledgments and contracts of sale, including, but not limited to, Purchase Orders accepted by Seller, shall be considered a contract under the laws of the State of Colorado and the rights and duties of all persons and the construction and effect of all provisions hereof shall be governed by and construed according to the laws of such state. A state or federal court located within the State of Colorado shall have sole and exclusive jurisdiction over any litigation concerning any such matters as well as any alleged defects of any products or equipment covered thereby or damages sustained as a result of such alleged defects.

If any litigation is commenced between Seller and Buyer, or their personal representatives, concerning any provision hereof, the party prevailing in the litigation shall be entitled, in addition to such other relief that is granted, to a reasonable sum as and for their attorneys' fees and costs in such litigation or arbitration.

STONEAGE TRADEMARK LIST

View the list of StoneAge's trademarks and service marks and learn how the trademarks should be used. Use of StoneAge trademarks may be prohibited, unless expressly authorized.

<http://www.stoneagetools.com/trademark-list>

STONEAGE PATENT DATA

View the list of StoneAge's current U.S. patent numbers and descriptions.

<http://www.sapatents.com>

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