Banshee® 40 kpsi Tube Spinner (BN13, BN18, BN27)

The **Banshees** are self-rotating swivels designed for tube cleaning. Because of the straight flow through design, the jets are very powerful and can be placed in optimum locations for effective cleaning. The diameter of the tool and inlet nut connection determines the model and part number.

Nozzle Heads:

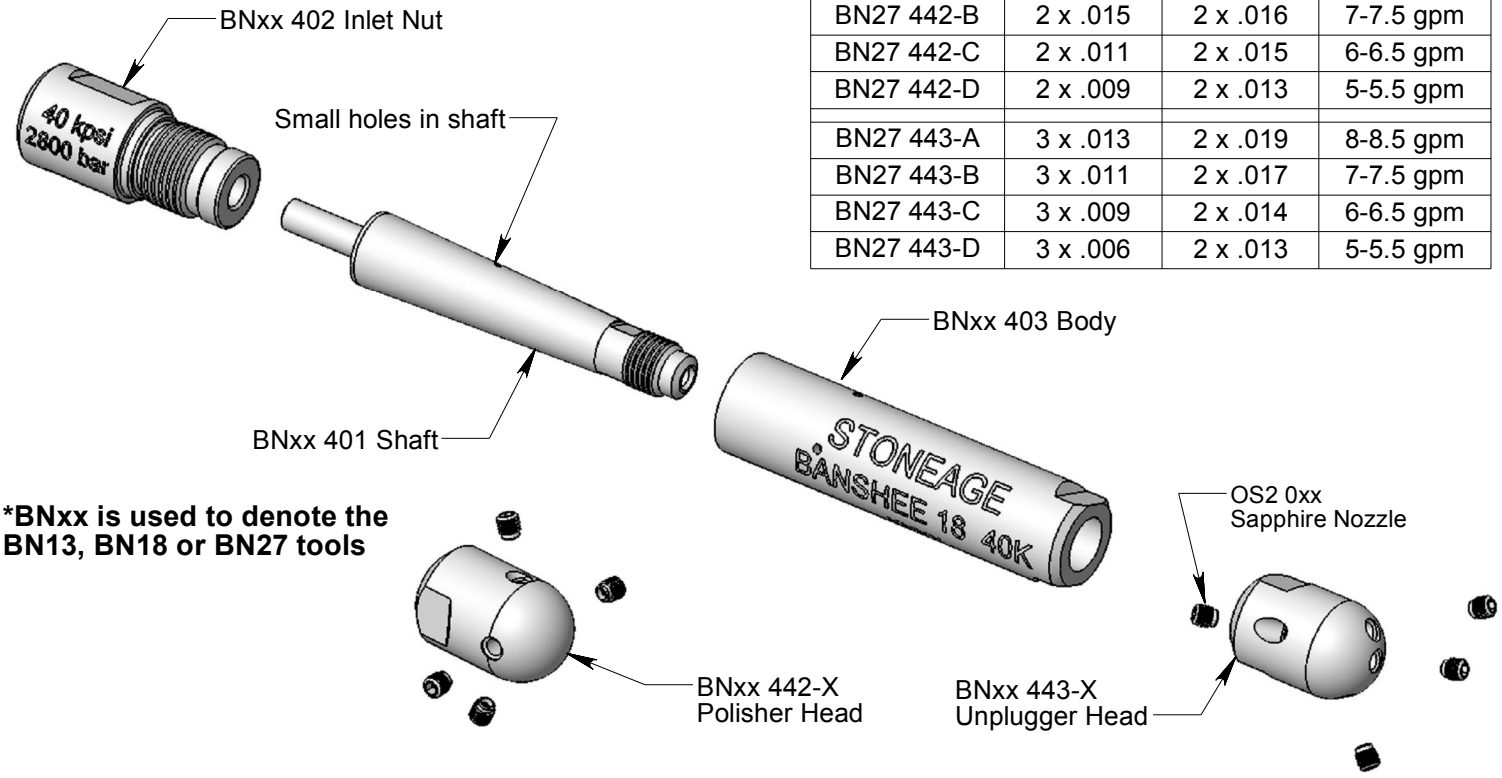
Two standard head designs are available; the **Unplugger** head **(443)** has three forward jets (15, 30, and 50 degrees) and two back jets (140 degrees). The **Polisher** head **(442)** has four jets at angles of 85 and 110 degrees. Each head can be used for a range of pressure from 25,000 to 40,000 psi; this results in the flow being a range as well. The pull of the standard heads ranges from 3.5 to 4 pounds. The heads have threaded replaceable sapphire nozzle inserts; use loctite 680 to retain and seal them. The nozzles seat against the bottom of the port; screw them in until they stop. To remove worn nozzle inserts, heat the head with a propane torch for about a minute; just enough to break down the loctite. The same head is used for both the C and D patterns; just the orifices can be changed to match either flow rate. The BN13 shaft has 13/64 in. or 5 mm wrench flats and the inlet nut has 7/16 in. flats; the BN18 shaft has 5/16 in. or 8 mm wrench flats and the inlet nut has 5/8 in. flats; the BN27 shaft has 1/2 in. or 13 mm wrench flats and the inlet nut has 15/16 in. flats; all of the nozzle inserts use a 5/64" allen wrench. These wrenches and the loctite are available from StoneAge.

Tool Specs

Part Number	Inlet Connection	Max Presure
BN13-H4L	1/4-28 L.H. High Pressure	40,000 psi (2800 bar)
BN13-H6L	3/8-24 L.H. High Pressure	40,000 psi (2800 bar)
BN18-H6L	3/8-24 L.H. High Pressure	40,000 psi (2800 bar)
BN18-HM14L	M14x1.5 L.H. High Pressure	40,000 psi (2800 bar)
BN27-H9L	9/16-18 L.H. High Pressure	40,000 psi (2800 bar)
BN27-HM14L	M14x1.5 L.H. High Pressure	40,000 psi (2800 bar)

Head Options

Part	Front Jets	Back Jets	Flow
BN13 442-C	2 x .014	2 x .015	5.5-6 gpm
BN13 442-D	2 X .010	2 X .014	4.5-5 gpm
BN13 443-C	3 x .010	2 x .016	5.5-6 gpm
BN13 443-D	3 x .009	2 x .015	4.5-5 gpm
BN18 442-A	2 x .020	2 x .017	8-8.5 gpm
BN18 442-B	2 x .018	2 x .017	7-7.5 gpm
BN18 442-C	2 x .015	2 x .015	6-6.5 gpm
BN18 442-D	2 x .010	2 x .014	5-5.5 gpm
BN18 443-A	3 x .014	2 x .020	8-8.5 gpm
BN18 443 B	3 x .013	2 x .019	7-7.5 gpm
BN18 443-C	3 x .011	2 x .016	6-6.5 gpm
BN18 443-D	3 x .009	2 x .014	5-5.5 gpm
BN27 442-A	2 x .018	2 x .018	8-8.5 gpm
BN27 442-B	2 x .015	2 x .016	7-7.5 gpm
BN27 442-C	2 x .011	2 x .015	6-6.5 gpm
BN27 442-D	2 x .009	2 x .013	5-5.5 gpm
BN27 443-A	3 x .013	2 x .019	8-8.5 gpm
BN27 443-B	3 x .011	2 x .017	7-7.5 gpm
BN27 443-C	3 x .009	2 x .014	6-6.5 gpm
BN27 443-D	3 x .006	2 x .013	5-5.5 gpm



***BNxx is used to denote the BN13, BN18 or BN27 tools**

Warning: Use correctly sized open end wrench to fit flats provided on the Inlet Nut when attaching tool to lance. Do not use Pipe Wrench or pliers with teeth as this can crush and crack the hardened steel body, leading to tool breakage in operation.

STONEAGE® WATERBLAST TOOLS

Banshee® 40 kpsi Tube Spinner (BN13, BN18, BN27)

Operation:

The entire system should be flushed out before installing the Banshee on the end of the hose or stinger. The swivels require a clean water supply for reliable operation; filtration of 5 micron or better is recommended. Next install the Banshee and place it down an open tube while the operating pressure is being set. When the swivel is at operating pressure, the water exiting the tool through the leak paths will keep external debris from entering the tool. If the tool is not under pressure, it should not be left inside a plugged tube, which might allow debris to enter and prevent rotation or cause tool damage. If the swivel does not rotate when the dump valve is closed, the operator should try closing the dump valve slowly, to build up pressure slowly for a few times, until normal operation is achieved again. This allows debris to be flushed out of the tool. If the tool stops spinning, do not continue to use the tool. The life of the sapphire nozzle inserts depends on water filtration. If any particle hits the sapphire, it will be instantly ruined. With clean water and proper care, they can last for several hundred hours.

When using rotating nozzles in plugged tubes, the head must not be forced into the deposit, as this will stop the rotation of the tool and impede the cutting ability. When the tool contacts the deposit, allow it to cut away the material and advance at it's own rate. If it stops advancing, pull back slightly on the hose to pull the head slightly away from the deposit, in case it is being stopped from rotating by the deposit. This also allows the angled jets to attack the deposit at different places. The hose should be gradually fed back, allowing time for the jets to do their work. This may need to be repeated if the material is particularly difficult in some spots.
When polishing tubes with scale, it is possible to allow the nozzle to pass through the tube at incredibly fast rates (operators have been observed passing through a 50 foot long scaled tube in 10 seconds). Unless the deposit is very easy to remove, this will not completely remove the scale. The operator needs to be trained to feed the nozzle through the tube at a rate sufficient to clean the tube.

Maintenance:

The swivels have a tapered shaft that fits into a tapered body; under operating conditions these surfaces do not touch. Do not pull out on the head/shaft and try to rotate the swivel, it will lock up and get wedged. If this happens, tap the head/shaft on a surface to knock it free. The operators should be cautioned not to pry sideways on the tool, as it may break the shaft just behind the head, particularly if a rigid stinger is being used in the inlet. Check the nozzle orifices in the head for plugging; if one becomes plugged the swivel will likely not rotate. If this does not solve the problem, the swivel should be disassembled and inspected. There are two small holes exiting the tapered portion of the shaft; these need to be checked for debris and cleaned out, like a nozzle orifice. Blow out the body and wipe off the shaft to remove any debris. Between jobs, the swivel should be blown out and filled with light oil, such as WD-40, to prevent corrosion pitting, which will cause the parts to crack. It is best to store the tool in clean oil between jobs.

Repair and replacement of components: Spare and replacement parts are not recommended due to unknown condition and fit of original parts.

Recommended equipment:

Pressure Dump

The most important safety device when flex lancing is the pressure dump mechanism. The operator nearest the nozzle should have control of the dump valve. If multiple operators will be used, each must have his own dump valve.

Hose

The high pressure hose should be as large as possible to minimize the pressure loss thru the hose. The high pressure hose and end fitting should be no larger than the tool to be used on the end of it; if a larger end is used, there is an increased risk of hydraulicking when cleaning plugged tubes.

Stinger

A stinger is a rigid piece of pipe or tubing used between the end of the hose and the nozzle. It is typically 2 feet in length, and is primarily a safety device for hand flex lancing. When using stingers, the operator should be trained not to use it as a pry-bar or to bang on the deposit, particularly with rotating tube nozzles, as they may be broken and at the very least will not rotate while forced against the deposit. The coupling connecting the hose to the stinger should be of the slim-line type, and no larger in diameter than the nozzle body; a larger coupling diameter increases the chances of material catching on the coupling and causing hydraulicking to occur.

PPE

When working at operating pressures above 20,000 psi, the water temperature exiting the nozzles can be as high as 200° F, which can scald the operator and cause burns. Always use face shields, suits and gloves to protect the operator from splashback. Also available is water jet resistant armor that will protect the operator from being cut by the waterjets.

Anti-Withdrawal Device

An anti-withdrawal device should be used when flex lancing. These devices provide a mechanical stop to prevent the waterjet tool from exiting the tube and injuring the operator during cleaning operations.

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