

## Description and Overview of The iBall Instruments Cavicator™ Sample Gas Extractor



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## Overview

Typically sample extractors employed today use 120/240 volt AC induction motors that is tied into the drilling rigs' AC power source. The iBall Instruments Cavitator uses low-voltage 24 volt Direct Current from a simple AC to DC power supply. The supply is fully isolated and low voltage eliminating the shock hazard to personnel. This accomplishes two things that make the system superior to any AC powered device. First it permits us to use lightweight low voltage electrical cable going out to the Cavitator. This common cable is safe, easy to run, and connect.



The advantage of a sealed DC motor system became evident when it was discovered that one of the Cavitator Systems had spent a few hours running submersed in mud. The Cavitator system was quickly and safely pulled up and re-clamped to the side of the shaker without any shocking service interruption. This picture shows a mud covered DC motor assembly.

With the addition of an iBall Instruments mud-blocking filter at the extractor, no sample lines are contaminated or changed.

The heart of the Cavitator™ system is a very powerful 24VDC permanent magnet motor assembly with balanced cavitation forks. The inexpensive motor assembly is easily replaced in the event of end-of-life, failure, or external damage.

## The iBall Instruments Cavitator™ system is comprised of:

- Main Body Structure
- Motor Assembly
- Extension Arm Assembly
- Clamp Assembly
- Mud Blocking Filter
- Power Supply
- Power Cable

## Main Body Structure



The main tubing pieces are made from very robust 0.100" thick 2" OD tubing. This is the same material that racecar roll cages are made from. The extraction chamber is constructed from 0.200" thick steel 4" OD tubing that should last for years. This design allows for the efficient extraction of gasses and control of the sample chamber. This is an improvement over other extractors that act much as a centrifugal pump and spit drilling mud from the side. The long vertical tubing also acts as a condensation tower that helps eliminate much of the water vapor in the extracted sample.

The Cavitator also has a 4" long by 3/4" diameter vent hole attached to the extraction chamber that allows for atmosphere to be drawn in and for atmospheric pressure equalization. This vent is shielded from wind by welding it at an angle of roughly twenty-five (25) degrees. A simple and inexpensive rubber cap blocks the upper condensation tube opening. The upper cap is pierced and the sample extraction tubing is inserted. Clean up is easily facilitated by just removing the rubber cap and rinsing with pressurized water.

Rock cuttings do not pose an occlusion problem in the extraction tube because if any buildup accumulates above a certain point in the tubing it will just slide back down into the main chamber due to gravity. Sample extraction is enhanced by the Cavitator's smaller main chamber design. This also helps eliminate sample dilution.

The smaller design has also allowed this extraction system to attach directly to smaller shakers.

### Motor Assembly



The motor assembly is a light weight, high power permanent magnet DC motor that is attached through an ABS plastic cap. The shaft of the motor is attached to a balanced custom fork assembly that is tested and can spin at over 4000 rpm. The normal voltage that the motor assembly runs at is 24 VDC but it can also operate at a slower rate at 12VDC as well.

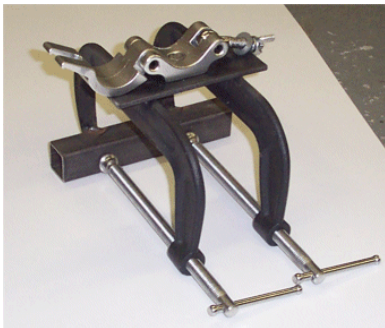
Four (4) self drilling and self tapping screws is all that is needed to attach the motor assembly to the main body structure. This makes for quick and easy service or replacement of the motor assembly.

### Extension Arm Assembly



The extension arm assembly holds the main extraction tube assembly away from the double steel clamp assembly. It includes an attached 1000 lb cast aluminum pipe clamp for quick and easy adjustments and a rubber pipe cap to keep rain water out of the tubing assembly. Some customers buy two or three of these and do not bother putting the double C-clamp on the vibrating possum belly (spoil extractor) - but rather install them on a more stable, non-vibrating attachment point. The standard part is 1 and 1/2 feet long but custom lengths are available.

### Clamp Assembly



Includes (2) 8" C clamps welded in a triangulated box shape and (1) 1000 lb cast aluminum tubing clamp. Welded construction and assembly assures long life along with tight, quick and secure connection to the shaker system.

## Mud Blocking Filter



Through trial and error, we have found the right filter with no vacuum pressure drop. Placing one of these at the extractor end of the sample line saves hours of aggravation. Sample gasses make it though, water and water vapor go through it, but with this filter in line and if your extractor falls into the mud the mud, stops at this filter. This simple filter can save hours cleaning or changing mud contaminated lines and equipment.

Made for interference fit with 1/4" ID hoses.

## Power Supply



This universal power supply has over and under voltage protection, automatic overload and short circuit protection, and internal reset.

The automatic cooling fan turns on when the environment starts to heat up.

The low voltage Cavitator system assures that there is no possibility of electric shock when servicing the extractor and comes complete with AC power cord and water proof case.

OUTPUT: 24 VDC 10 AMPS. INPUT: Universal 90 to 250 VAC 48 to 62 Hz operation.

## Power Cabling

The power cabling is sized according to the job at hand.

If the distance between the power supply and Cavitator is under 200 ft, then 14 gauge cable is ok.

If the distance between the power supply and Cavitator is over 200 ft then 12 gauge cable should be used.

If the distance between the power supply and Cavitator is over 500 ft then 10 gauge cable should be used.

If using smaller gauge wire over long distances, the voltage to the cavitator will start to fall and the high speed forks will not run at the desired 4000+ RPM.