

### **INSTALLATION INSTRUCTIONS FOR LOBESTAR® SHEAR/MIXER**

#### **LOBESTAR Mixing and Shearing Eductor Unit Model No. V VE-U-1S, V VE-U-1S/D with 1" HOUSING and 1" NOZZLE INSERT 1" DIFFUSER/PRESSURE RECOVERY TUBE**

1. **Installation:** Survey piping. For maximum performance downstream of the Eductor, piping should have as few elbows as possible; this should be taken into consideration when designing the piping system and retrofitting older systems.
2. Downstream pipe should always be as large or larger than the pipe diameter of the MIXING EDUCTOR.
3. Maintain Minimum FT/HD.
4. Install the Eductor on a level, flat surface.
5. Secure skid base to deck.

#### **Installation considerations:**

1. Inspect the Vortex Ventures Inc. equipment prior to installation, compare the equipment to the drawings provided, any questions should be directed to Vortex Ventures Inc. tollfree at 888-869-0069.
2. Check to see that the pressure side of the centrifugal pump is connected to the Jet Nozzle end of the Eductor.
3. The pipe or hose size should be as large or larger than the model size of the eductor. Model V VE-U-1 has a 1" discharge. The downstream pipe must be 1" or larger.
4. Avoid placing obstructions in the downstream pipe. Valves, elbows or any reduction in pipe diameter will cause a reduction in stream line flow and efficiency loss.
5. When installing elbows or valves in the downstream pipe, the first elbow or valve must be a least (6) six pipe diameters from the discharge end of the eductor. Example a 1" eductor will have a 6" extension before installing the first elbow or valve.
6. Verify that the pump chosen for this service is sized properly for the intended density of the slurry, that it will deliver the minimum pressure energy required to maintain a high velocity stream from minimum to maximum viscosity.
7. If installed, proper venting of the surge tank is required during Eductor operation. Failure to do so will cause low product induction and may cause the surge tank to collapse. It is critical that the system have unobstructed vent piping sized properly to prevent a buildup of vacuum on the surge tank.
8. All fasteners should be installed with anti-seize compound to prevent galling of the stainless steel components.
9. When installing victaulic gaskets always thoroughly clean them, spray them with WD 40(or equivalent) after cleaning and prior to installation.
10. Make sure that the grooved pipes and victaulic couplings fit securely. The victaulic valves should clamp flush one to the other without pinching the gasket.
11. Inspect the Hopper and insure that no foreign objects are in the Hopper or 4" throat after installation.

#### **Lobestar Mixing Eductor Operational Guide:**

The Lobestar Shear/Mixer is a Venturi device designed on the Bernoulli Principle of "when velocity is high, pressure is low and inversely when pressure is high, velocity is low".

In operation, a centrifugal pump is used to deliver the pressure energy to the Lobestar Shear/Mixer. The pressurized liquid is converted into a high velocity stream as it passes through the converging shape of the jet nozzle. The resulting high velocity stream generates a low-pressure region around the issuing jet stream producing a strong suction. Powders, granular materials and other chemical additives dosed in through the Hopper are drawn-in by the suction and pre-wet under a high "G" force generated in the Radial Premixer. The slurry then enters the mixing chamber of the Lobestar Eductor to be dynamically sheared and dispersed. The blended slurry travels through the diffuser (pressure recovery tube) to gradually convert the high velocity back into pressure at the Eductor discharge with as efficient pressure recovery as possible.

The Lobestar Shear/Mixer has no moving parts. The four (4) major components of the Lobestar Shear/Mixer are: (1) Hopper, (2) Valve, (3) Radial Premixer, and (4) Lobestar Mixing Eductor. The Lobestar Mixing Eductor is composed of: (1) Jet Nozzle, (2) Suction Inlet, (3) Mixing Chamber and a (4) Conical Diffuser.

The orientation of the Lobestar Shear/Mixer is an important consideration for suitable performance. The direction of flow is from the Jet Nozzle inlet end to the diffuser discharge end. The pressure line (hose or pipe) from the centrifugal pump is connected to the Jet Nozzle end of the Eductor. The Diffuser end of the Eductor is connected to the downstream hose or pipe that is routed to the active fluids system.

The Lobestar Shear/Mixer is designed around a *streamline* flow stream. A *streamline* flow is based on a constant uninterrupted flow. This means that any downstream obstruction will decrease the Eductor efficiency.

#### **Before Operation:**

1. Make sure that there are no valves closed downstream from the SHEAR/MIXER. Start at the pit and work your way back to the SHEAR/MIXER.
2. Close all of the suction and RADIAL PREMIXER valves. On a single suction model close the Hopper suction and RADIAL PREMIXER valves.
3. Check the gauges for visibility.
4. Inspect the site glasses for cleanliness and visibility.
5. Visually verify that all fittings and flanges appear to be tight.
6. If installed, verify that the surge tank is properly vented to the atmosphere.

#### **Operation:**

1. Start the centrifugal pump to pressurize the mixer and begin stream line flow, you must always follow your company safety procedures for protective equipment and clothing use.
2. Check inlet for proper pressure and vacuum.
3. When the proper vacuum is achieved, open the Hopper feed valve to mix sack material (NOTE IT IS NORMAL FOR VACUUM TO FALL TO 0 INCHES HG) The Hopper suction will be very strong, care should be taken when mixing chemical, keep hands away from the suction throat of the Hopper.
4. Prior to mixing or hydration of materials, it is always a good operational choice to take advantage of the Shear/Mixers ability to clean itself internally, proceed by slowly opening the RADIAL PREMIXER valve to 50% allow the system to recirculate in a closed loop for 15 minutes, the additional high volume flow will clean the mixing chamber of the eductor.
5. Close the RADIAL PREMIXER valve then open it back up to 25% open.
6. Open the Hopper suction valve and look into the Hopper throat adjust the RADIAL PREMIXER flow to develop a strong vortex in the RADIAL PREMIXER.
7. The RADIAL PREMIXER should always be used while mixing chemicals and Bentonite.
8. The RADIAL PREMIXER should be closed when not in use.
9. When Mixing Barite use the above cleaning procedure then close the Radial Premixer inlet valve prior to opening the surge tank suction valves.
10. When Mixing barite with all other suction valves closed on the eductor open the 6" surge tank suction valve on the dust free assembly then proceed to open the 4" suction valve on the eductor, vacuum will constantly vary during operation from 5" to 27", observe the site glass to see your conveying rate.
11. It should be noted that Viscosity over 750 centipoises will significantly reduce suction flow, care must be taken when hydrating Gel so that the eductor maintains stream line flow, **DO NOT FORCE FEED THE EDUCTOR** allow the suction to control the rate and amount of feed mix.
12. Shutting down the Mixing or Hydrating operations, you **MUST** always CLOSE THE EDUCTOR SUCTION VALVES PRIOR TO STOPPING THE PUMP OR CLOSING ANY VALVES DOWN STREAM OF THE EDUCTOR this will prevent back flow into the surge tank or Hopper.