

## THE EAGLE CYCLONE E-VAC PUMP

The **Cyclone E-Vac Pump System** represents a true advancement in down-hole pump technology. Sand, grit, iron sulfide, and other fines which normally contaminate the produced oil and water can now quickly pass through the pump assembly. No longer are residual concentrations of these particulates allowed to collect between barrel and plunger.

Clearance between conventional pump plungers and barrels permit some fluid bypass, or slippage between these surfaces. Within this void space, sand, formation fines, and other particulates can accumulate. During the normal up-and-down motions of the plunger, these accumulations cause rapid wear, usually in the form of vertical scoring, to both the plunger and barrel surfaces. Moreover, frictional forces generated by these accumulations cause excessive stresses to be generated throughout the pump and rod-string which often result in a stuck pump, automatic shut-down of the pumping unit, or a parted rod string.

Repairs necessitated by the above forms of damage, plus revenues lost during resulting downtime, cost the oil and gas industry tens of millions of dollars each year. By incorporating the **Cyclone E-Vac** within the pump assembly, stuck plungers and premature wear of barrel and plunger surfaces can be eliminated. Costly well servicing and pump replacements can be reduced to a minimum.

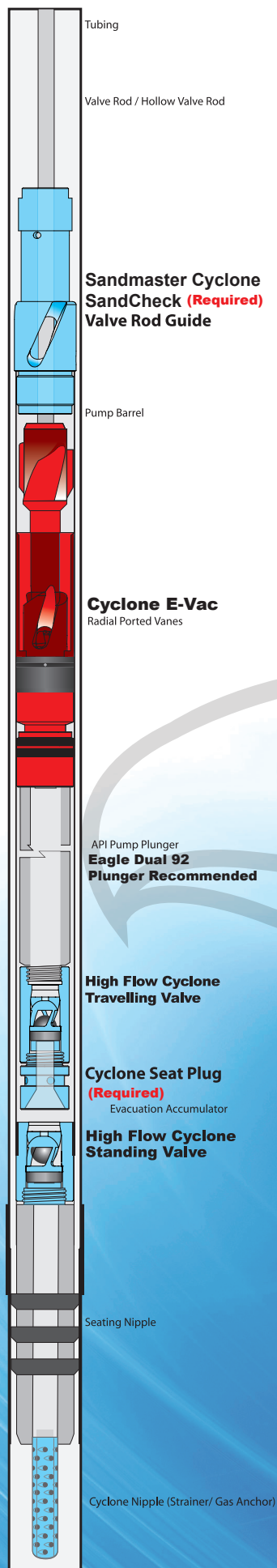
How is this possible? During the down-stroke the **Cyclone E-Vac**, along with the Cyclone Seat Plug forces any entrained particulates collected within the space between barrel and plunger inward through the axial evacuation ports and into the center of the plunger. Here, they commingle with other fluids entering the pump and are displaced into the tubing. Throughout the up-stroke particulates are also collected within the tapered neck of the **Cyclone E-Vac**, where, during the down-stroke, they are flushed upward and enter the tubing through the Cyclone section of the E-Vac.

Simultaneously with the above, the axial ported technology, incorporated within the **Cyclone E-Vac**, causes the fluid/particulates to constantly rotate. This rotation permits the pump barrel and plunger to wear more evenly, resulting in longer pump life and a more cost efficient pump assembly. While the pump is not operational, settling solids are redirected into the ID area of the plunger, reducing the possibility of stuck plungers and excessive barrel wear. This is done using the radial ported vane technology featured on the **Cyclone E-Vac**. For best results, the complete **Cyclone E-Vac Pump System** is recommended.

***\*Eagle's Cyclone E-Vac is NOT a barrel plunger. The Cyclone Adaptor is a solids remediation tool, only to be used in conjunction with a standard API plunger design.***

### BENEFITS INCLUDE:

- REDUCED STUCK PLUNGERS
- BETTER PUMP EFFICIENCY
- REDUCED BARREL WEAR
- REDUCED PLUNGER WEAR
- UNIFORM WEAR OF PLUNGER
- UNIFORM WEAR OF BARREL
- REDUCED DOWN TIME
- EXTENDED PUMP RUNS
- REDUCED COST OF OPERATION





# THE EAGLE CYCLONE E-VAC PUMP SYSTEM

## UP STROKE:

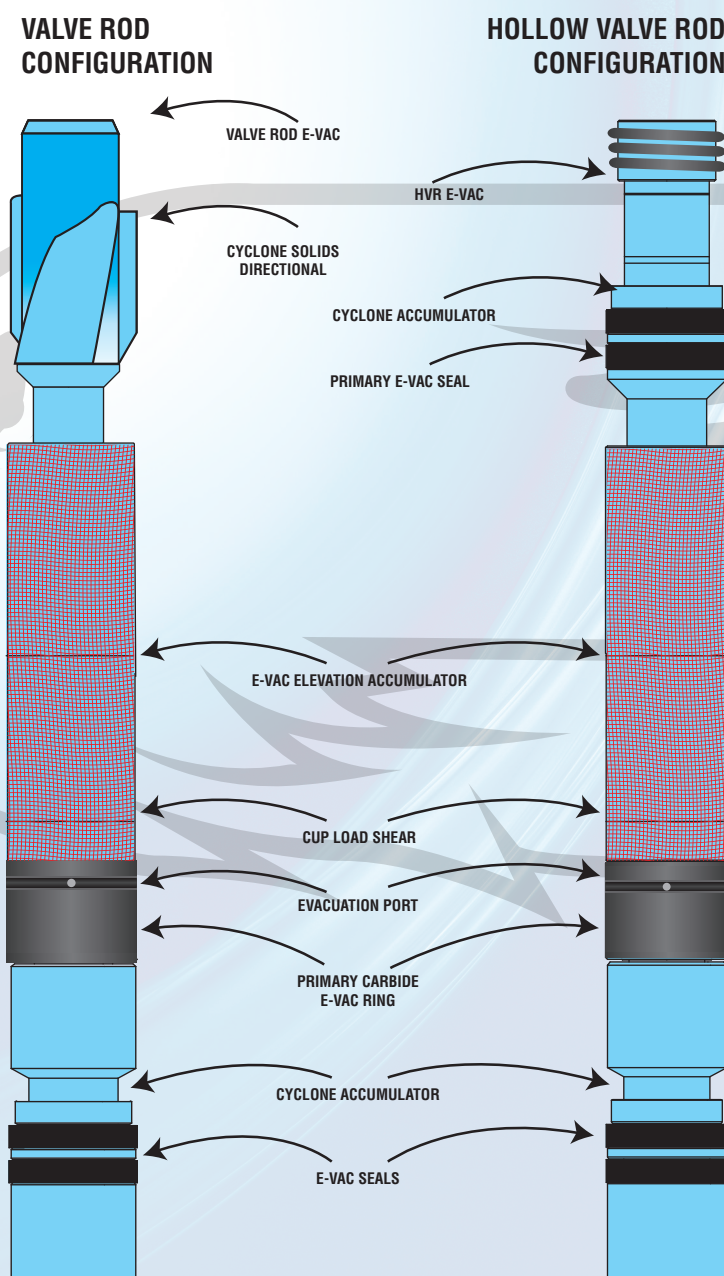
Throughout the up-stroke particulates such as sand, silt, and iron sulfide residing above the plunger are swept inward and away from the inside surface of the barrel and are redirected into the chamber of the E-Vac. The Cyclone E-Vac patented taper technology hydraulically forces residual particulates inwardly to the ID of the plunger. This feature virtually eliminates stuck plungers and excessive barrel damage.

## DOWN STROKE:

During the down-stroke, these same particulates which were collected in the E-Vac's chamber are flushed away and enter the produced well stream. In turn, particulates entering the barrel/plunger void from below the plunger are pulled inward through the radially located evacuation vanes and are also flushed from the pump by the produced well stream. In each situation, residual build-up of damaging fines between barrel and plunger are eliminated, greatly prolonging the run-times of barrel and plunger surfaces.

## STOPPED:

While the pump is not operational, particulates such as sand and iron sulfide will settle/concentrate. The Cyclone's patented E-Vac chamber along with the radial ported vane design redirects the solids inward into the plunger ID. This keeps the solids concentration from wedging between the plunger OD and the pump barrel, eliminating additional damage and/or stuck plungers.



### Material Construction:

17-4 Stainless Steel  
High Density Fiber  
Carbide

US and Canada Patents  
World Wide Patents Pending



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## CYCLONE E-VAC PUMP SYSTEM

The answer for **pumping wells** with **damaging solids**

### Please read before installation!

*All assembly thread connections should be tightened to API torque specifications using a pump friction wrench as close to pump vice as possible. Doing so will prevent damage to the API Plunger Pin.*

Your Cyclone E-Vac System components are shipped hand-tight only. These components are the Sandmaster SandCheck, Cyclone E-Vac, and the Cyclone Seat Plug. It is very important that the setup design and these instructions be closely followed for your Cyclone E-Vac System to function properly. Failure to do so may result in poor performance as well as premature plunger/barrel wear.

1. Assemble Cyclone Valve Rod Guide/SandCheck to standard API pump procedure/torque specifications.
2. Assemble Cyclone E-Vac Adapter to standard API pump procedure/torque specifications. Mount on top of API Plunger.
3. Assemble Pressure Actuated Rings for desired well depth and fluid conditions. (Consult Eagle Representative)
4. Assemble Cyclone Set Plug to traveling valve cage to standard API pump procedure/torque specifications.
5. It is **not permissible** to run barrel extensions with your Cyclone E-Vac System. It has been established that the Cyclone E-Vac is most effective when maintained within the barrel and used in conjunction with the Cyclone SandCheck and the Cyclone Seat Plug. Allowing the Cyclone E-Vac to stroke out into barrel extensions may result in poor performance as well as premature E-Vac/plunger/barrel failure.

*\*ARP Ultra Torque Anti-Seize recommended for all thread connections during installation.*

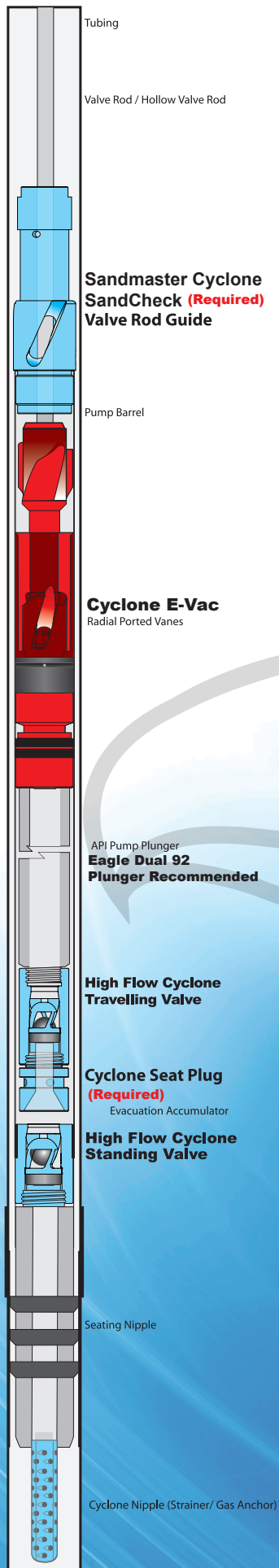
*\*Cyclone E-Vac System is also available for tubing pump applications*

Thank you for purchasing what we at Eagle believe to be one of our most innovative and truly cost saving piece of equipment available to the oil industry today. Eagle's Cyclone E-Vac Pump System.

*\*Eagle's Cyclone E-Vac is **NOT** a barrel plunger. The Cyclone Adaptor is a solids remediation tool, only to be used in conjunction with a standard API plunger design.*

For more information refer to Instruction Manual or contact your local sales representative.

US and Canada Patents  
World Wide Patents Pending



ITEM	DESCRIPTION	Insert Pump	Traveling Barrel Pump	Tubing Pump
1	CAGE, TOP OPEN			
2	BALL & SEAT			
3	PLUNGER, PIN-END			
4	CAGE, CLOSED PLUNGER			
5	PULLER, STANDING VALVE			
6	COUPLING, TUBING EUE 8R			
7	NIPPLE, LIFT			
8	COUPLING BARREL			
9	BARREL, HEAVY WALL			
10	NIPPLE SEATING 2-CUP			
11	CAGE, STANDING VALVE			
12	NIPPLE EXTENSION			
13	BODY, HOLD-DOWN 2-CUP			
14	CUP, SEATING			
15	SPACER			
16	LOCKNUT			
17	COUPLING			
18	CAGE, OPEN PLUNGER			
19	PLUNGER			
20	COUPLING, PULL TUBE			
21	TUBE, PULL			
22	CONNECTOR, BARREL			
23	COUPLING EXTENSION			
24	BARREL			
25	PLUG			
26	MANDREL			
27	BUSHING, VALVE ROD			
28	ROD VALVE			
29	PLUG SEAT			
30	CYCLONE SANDCHECK GUIDE			
31	CAGE CLOSED BARREL			
32	VALVE ROD CONNECTION			
33	CYCLONE E-VAC ADAPTER			
34	CYCLONE SEAT PLUG			
35	CYCLONE TPA-MALE SANDCHECK			
36	CYCLONE E-VAC 6" COUPLER ACCUMULATOR			
37	CYCLONE E-VAC 3" COUPLER ACCUMULATOR			

Diagram of Insert Pump assembly showing components 1 through 37. The assembly includes a cage, plunger, puller, coupling, nipple, barrel, and various adapters and accumulators. The diagram shows the internal structure of the pump and the flow path of the fluid.

Diagram of Traveling Barrel Pump assembly showing components 1 through 37. The assembly includes a cage, plunger, puller, coupling, nipple, barrel, and various adapters and accumulators. The diagram shows the internal structure of the pump and the flow path of the fluid.

Diagram of Tubing Pump assembly showing components 1 through 37. The assembly includes a cage, plunger, puller, coupling, nipple, barrel, and various adapters and accumulators. The diagram shows the internal structure of the pump and the flow path of the fluid.