

# Cheng Rotation Vane<sup>®</sup> Flow Conditioner Increases Efficiency & Cost Savings

The Cheng Rotation Vane (CRV<sup>®</sup>) provides a uniform velocity profile at the elbow outlet for better performance & eliminates the locally high velocity induced cavitation, turbulence & shed vortices, which produce damaging vibration & wear to pipes, seals, bearings, impellers, & pumps.

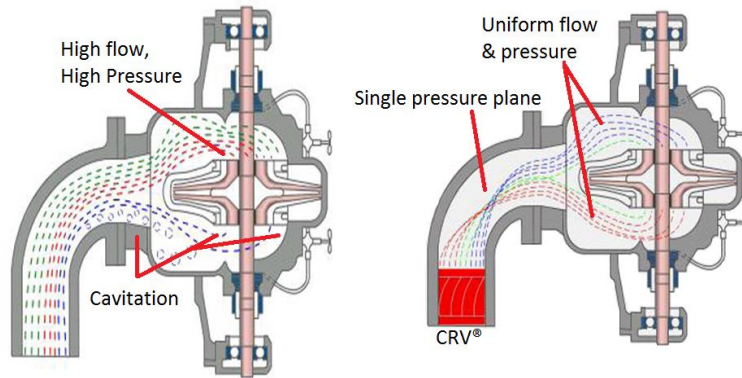


The following illustrates the effects of an improper suction line configuration and the CRV<sup>®</sup> fluid conditioning solution, which will **reduce the length of space required** to **eliminate the turbulence** downstream of an elbow and **increase efficiency of the pump** and all downstream equipment.

Three, Ingersoll Rand, Model S, Double Suction, 4x9, 3,550 rpm pumps were installed at the Seaford DuPont Plant with below suction piping configuration. The pumps have generated a **high noise level** and have experienced **numerous failures** since the initial start-up. Several attempts to **extend operating life** of the pump by altering seal and bearing designs have provided only marginal improvement.

The information presented in Figure 2A and 2B clearly illustrates the effect piping arrangements can have on the vibration and subsequent **maintenance** of a pump and that a solution does exist that **does not require the space of ten diameters**.

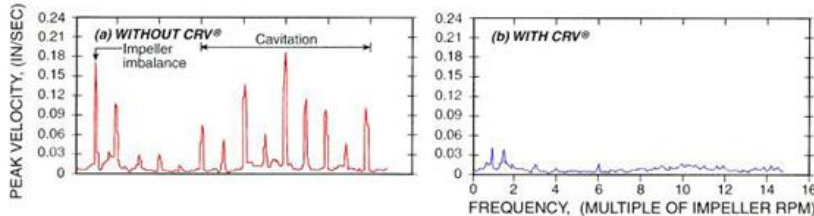
Below is a summary of the before CRV<sup>®</sup> and after CRV<sup>®</sup> installation with a typical pump in the Seaford DuPont plant.



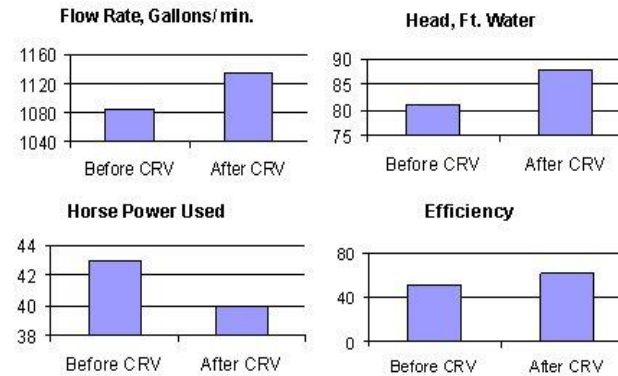
WITHOUT CRV<sup>®</sup>-Unbalanced Inlet

WITH CRV<sup>®</sup>-Balanced Inlet

Figure (a) illustrates a vibration spectrum analysis of the pump during this period. The unfiltered vibration of these three units has been measuring between 0.5 to 0.9 inches/second.



The CRV<sup>®</sup> flow conditioning solution, was installed immediately upstream of the elbow now attached to the suction flange of one of these pumps, and the **vibration and noise was significantly reduced**. Figure (b) illustrates the comparative “after installation” vibration analysis of the installation. The unfiltered vibration is now on the order of 0.05 to 0.1 inches/second.



The chart indicates the pump has not only **increased its efficiency** by 11.4%; it has **increased its capacity**, it has a **higher head**, and **requires less horse power** resulting in **less power consumption**.

	Before	After	Change
Flow Rate	1086 GPM	1135 GPM	+4.5%
Discharge	81 ft. Water	88 ft. Water	+8.64%
Pump Horsepower	43 hP	40 hP	-6.98%
Efficiency	51.8%	63.2%	+11.4%

Adding a CRV<sup>®</sup> shows that the **pumps performance can be improved significantly** by **solving the turbulence caused by the elbow**.

The key benefit, however, was **reduced vibration**, which **eliminated a frequent repair cost** of \$5,000 on the **shaft and bearings** as well as an occasional **failure repair** cost of \$14,000 per occurrence.

When the **pump cavitates** and forces a **plant outage**, a plant like the example given here can lose about \$1 million a day in productivity.

**We recommend a CRV<sup>®</sup> upstream of the elbow preceding the pump suction. Please contact us for more information at 650-941-9292 or visit us at: [www.chengfluid.com](http://www.chengfluid.com)**

**CRV<sup>®</sup> Benefits**

- Reduced cavitation at pump suction
- Increase in BFBP flow and head
- Reduced power to pump for reduced auxiliary load
- Reduced pump and piping vibration
- Improved pump performance