# Cheng Fluid Systems, Inc.

***CRV® Partial Site Installation List in Petrochemical Industry***


Part of the solution to a plant's operating inefficiencies rests in the application of flow conditioning technology. The most advanced products in this area include two patented equipment designs, the Cheng Rotation Vane (CRV®) and the Large Angle Diffuser (LAD®), that fit in-line, have no moving parts, and are simple and cost effective. The CRV® and LAD® flow conditioners create a flat velocity profile through elbows, pipe turns and concentric expansions/reductions in front of process machinery and equipment. The benefits are lower head loss, elimination of cavitation, improved pumping efficiency and flow meter accuracy; increased process equipment throughput and yield lower maintenance requirements, ease of retrofit and lower overall operating costs.

**We have over 3,000 CRV® installations worldwide.**


## Dupont stops loss of $1 million per day of lost production with CRV® installation

**Problem**: DuPont installed a magnetically coupled pump in order to meet environmental regulation requirements. The pump failed within 2 hours of startup due to turbulence generated by the inlet elbow. The lost production was valued at approximately $1 million per day.

**Solution**: A 12 inch diameter CRV® was installed on the elbow on the suction side of the pump.

**Result**: Once the CRV® was installed, the turbulence in the pump was eliminated, the pump worked properly and the refinery was back online.

## Chevron saves thousands of dollars in environmental clean up costs with CRV®

**Problem**: Pumps on Chevron's Pipeline were leaking because they were cavitating and vibrating.

**Solution**: 10 inch and 12 inch diameter CRV®s were installed on the suction elbows of each pump.

**Estimated Savings**: The CRV®s eliminated the cavitation, vibration, and leakage which saved Chevron Pipeline thousands of dollars. The pumps also operated more efficiently which saved Chevron Pipeline additional money.

## Shell Chemical prevents multi-million dollar loss with CRV® installations

**Problem**: In an emergency Shell Chemical had to hook up the suction ends of their 36 inch diameter pumps to U-bends and they knew that these U-bends would cause huge vibration and cavitation problems for the pumps.

**Solution**: 36 inch diameter CRV®'s were installed at the inlets of the U-bends

**Estimated Savings**: The CRV®'s eliminated the flow turbulence to the pumps caused by the U-bends and enabled Shell Chemical to put their plant back online within days, minimizing the million dollars a day in lost revenues.

## Shell Refining fixes compressor performance with CRV®

**Problem**: Shell Refining was having a problem with the flow entering a large compressor through two closely coupled elbows.

**Solution**: After a computer flow analysis a specially designed "reverse angle" 24 inch diameter CRV® was installed at the inlet of the first elbow of the two closely coupled elbows.

**Estimated Savings**: The specially designed CRV® eliminated the flow turbulence that the two closely coupled elbows were creating and allowed Shell Refining's compressor to operate at its design ratings which increased production and revenues.

## Imperial Oil avoids costly pump suction line redesign with CRV® installation

**Problem**: Imperial Oil had a pump that was producing and unacceptable amount of vibration which created leaks in the pump's shafts and bearings and released dangerous hydrocarbons. This situation caused a safety hazard in the refinery.

**Solution**: a 10 inch diameter CRV® was installed before the last elbow on the pumps' suction line

**Result**: The CRV® brought the vibration problem well below their plants acceptable vibration limits, eliminated the safety hazard and the need of a costly pump suction line redesign.

## Chevron - One CRV® Saves Chevron More than $1 Million per Year

**Problem:** Chevron's expensive molybdenum elbows used to wear through because the catalytic particles would blow out the top of their catalytic cracking unit and erode the elbow. This elbow had to be replaced every three to four months causing an unscheduled refinery shutdown

**Solution:** Chevron installed a surface hardened 4 inch diameter CRV® at the inlet of the elbow

**Result:** The CRV® eliminated the erosion and the unscheduled down time was eliminated. The estimated savings is over $1 million dollars a year.

Arco • Am Pipe Fab • Amoco Oil Co. • Ampol • Aramco Services Co. • Bayway Refining Company • Bechtel Corporation • British Petroleum Oil • Centrade Int'l (ExxonMobil) • Chevron Products Company • Chevron Texaco • CITGO Refining • Clyde Petroleum Exploration • Coastal Refining • Conoco Phillips • DuPont China/Canada/Singapore • E. I. DuPont • Equilon Enterprises • ExxonMobil • FINA • Fran Rica Refining • Gas Liquids • Harco Equip • Imperial Oil Kirkwood /Exxon • Kirkwood Global Ind. • Koch Refining Co. • Kvaener Process • Lilly Engineering • Marathon Petro • Navajo Refining Co. • OnyxEng • Petro Equipment Sales • Phillips/Red Man Supply • Phillips 66 Co. • Salaty Synergy • Santos • Shell Albian Sands • Shell Canada Ltd. • Suncor Energy Inc. • Sunoco • Syncrude Canada • Texas Petrochemicals • Tosco Petro • United Refining Company • Wesco Mobil •