

CASE STUDY:

Why Use Dixon Triplex and Quintuplex Manifolds on HHP Hydraulic Fracturing Pumps?

Facts

- The Fluid End (FE) is a main consumable of the High Horsepower (HHP) pump used in hydraulic fracturing operations
- Current life span of a FE ranges from 200 to 1,400 hours.
- Fundamental root causes of FE failure:
 - Cracking of the cross bores
 - Cracking of the valve seat deck
 - Corrosion pitting
 - Cavitation, pump damage due to flow restrictions
- End-user cost for 3-Port FE on a HHP pump ranges from \$25K to \$60K, and the price is dependent on the brand and/or the material of the FE.
- End-user cost for the 5-port FE on an HHP pump ranges from \$55K to \$130K, and the price is dependent on the brand and/or material of the FE.

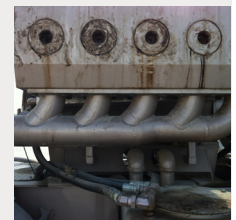
Dixon Action & Results

Focus is to eliminate flow restrictions and welds when designing intake manifolds. Combine iron manufacturing technology with flow geometry to eliminate welds (7-18 seams). Minimize sand dropout existing in the suction manifolds used today. Include user-friendly inspection ports.

- Designed and patented 3-port and 5-port intake manifolds for HHP pumps.
- Lab tests completed for pressure (350 PSI) and cold (-62°F)
- All new manifold assemblies are pressure tested to 700 PSIG
- Lab test are available by contacting engineering@dixonvalve.com.

End-User Feedback

- Well service company maintenance personnel state that carbon steel manifolds are working okay. Leaks along the weld seams are a regular nuisance, and repair consists of re-welding and/or use of rubber washers with screws.
- Sand dropout causing flow restrictions is common, and some manifold designs last longer than others. End-users reported that 600-800 hours in service is considered a very good performance.
- Lab tests and field trials were recommended per the following application parameters:
 - Low temperature with CO2 at -30°F
 - ASTM spec calls for -62°F
 - Maximum working pressure is 350 PSIG, and test pressure should be 1 1/2 times working pressure or 525 PSIG
 - Acidizing well treatments use Hydrochloric (HCL) and Hydrofluoric (HFL) acids in (concentrations ranging 15-28%



Left: Inside suction manifold is a failing weld, and is packed with sand.
Right: A failed FE with attached 5-port suction manifold.