CONSERVATION OF RESOURCES

Reducing Hydraulic Element Change-Outs For Hydraulic Frac Pump

Technical Application Bulletin

PROJECT BACKGROUND

DISCOVER

- A major oil and gas OEM and their Hydraulic Frac Pump trucks experience over one (1) hour of downtime when in bypass.
- It was discovered that these machines hit bypass mode any time the temperature was below 70°F.
- Schroeder discovered copious amounts of contamination being entrained to the system during this time in bypass.

DIAGNOSE

- These machines will see at least 120 cold starts per year. This resulting in at least one (1) hour to bring the tank fluid temperature above 70°F.
- During this time, contaminants would have direct access to critical components in the system.
- A customized version of our existing In-Line Filter (QF5) was prescribed as a solution to prevent the contamination from traveling to critical hydraulic components.

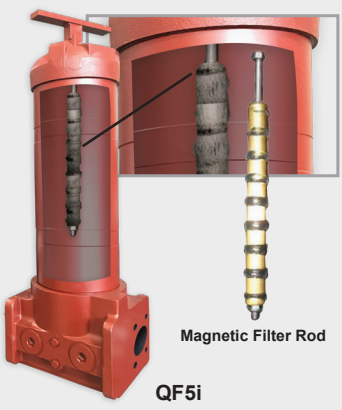
INDUSTRIES

DESIGN

What We Did: We took an existing In-Line Filter (QF5), and re-designed this product to function as an Inside-Out Flow Filter with an added magnetic filter rod, suspended through the coreless element. We called this product the QF5i - “i” for Inside-Out.

Course of action

1. The customer had concerns about issues with contaminant holding capacity (both ferromagnetic and non-ferromagnetic contaminants) and their element life being compromised while the filter was in a cold-start bypass.
2. Schroeder prescribed the need for a more efficient filtration solution during this time in bypass.
3. Where this solution would not stop the cold-start bypasses, it would be able to stop contamination from traveling to critical hydraulic components.
4. In addition to the powerful filtration capabilities from our coreless element, a magnetic filter rod was added to catch any ferrous materials as well.
5. Both revenues of filtration would then extend the life of the pump and elements and reduce overall system downtime.
6. The customer quickly saw the value and cost savings and ordered a total of 200 QF5i’s for their fleet of Hydraulic Frac Pump trucks.



DELIVER

QF5i used on end consumer premises:
To validate the cold-start protection, a QF5i was tested at a single Hydraulic Frac Pump truck. During the bypass, the customer noticed the hard working magnetic rod catching copious amounts of ferrous materials that would normally be introduced to the system and lessen the life of the pump and overall system.

Use of a close-to-production prototype of the QF5i:
By tweaking our already existing QF5 and engineering it to include features like inside-to-out flow, as well as a magnetic filter rod, we were truly able to manufacture a solution to best meet the customer's exact needs.

Core components that are used:
- Porting Base: Cast Aluminum
- Element Case: Steel
- Cap: Ductile Iron

Savings in element changeouts
Reduced changeouts from four (4) to three (3) times a year
Reduced the amount of labor cost from four (4) to three (3) changeouts

Component service life:

Hydraulic Frac Pump	Without QF5i	With QF5i	Savings
Element change interval	4 times a year	3 times a year	$107,864.00
Pump Life	10,000 hours	10,500 hours	$150,000.00
Labor costs, external company	4 times a year	3 times a year	$3,750.00

ROI

Element change savings per year

$108K

Pump life expectancy

▲5%

Labor costs per year

$3.75K

Underlying values:
Costs per element = $539.32 per truck (200 total)
$539.32 x 200 = $107,864.00

Pump life = ~ 10,000 hours
+5% pump life w/ QF5i
10,000 hrs x 5% = 500 hours
Pump Lease Rate = $300 / hr
500 hrs x $300 / hr
= $150,000 / pump

Labor Costs = $18.75 / element change x 200 trucks = $3750

CUSTOMER BENEFITS

- Magnetic filtration protection while filter is in cold start bypass
- Coreless QCL element with inside-out flow for eco-friendly disposal
- Efficient means to remove both ferromagnetic and non-ferromagnetic parts from fluid

FURTHER APPLICATION AREAS

- Any mobile and industrial machines that need pump protection
- Applications that require filtration during cold-start bypasses

PRODUCT SPECS

QF5i | Cold Start Protection Inside-Out

Flow: 120 gpm (454 L/min)
Operating Pressure: 500 psi
Temp. Range: -20°F to 225°F
Bypass Setting:
Cracking: 60 psi
Full Flow: 95 psi
Housing Material:
Porting Base: Cast Aluminum
Element Case: Steel
Cap: Ductile Iron
Housing Seal Material:
Buna N
Viton®