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2024 Vertical End Suction Pump Test Results

Zpex Flow Rate Efficiency Testing - 2.12.2024

Testing: Performed on 2 separate vertical end suction pumps.

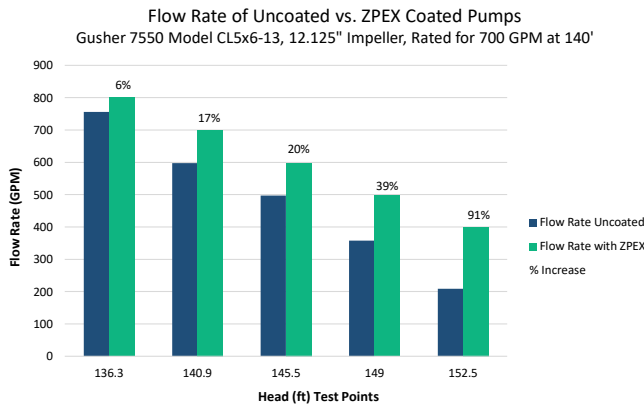
Pump 1: 5x6-13. Pump 2: 2x3-13

Material: Ductile Iron

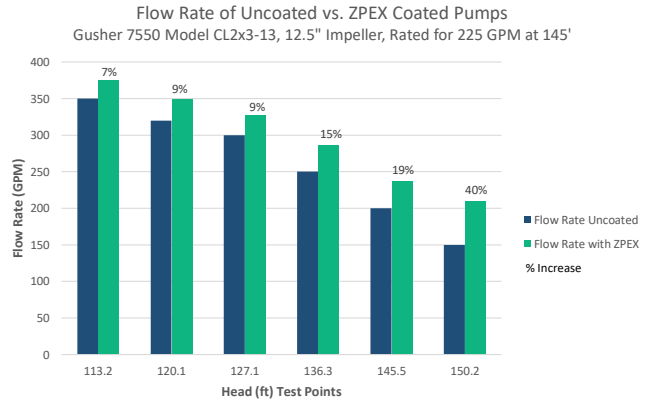
Testing Procedure: 7550 Series Vertical End Suction Pumps. The pumps were purchased as All-Iron pumps. The first test was performed at the factory with no internal coating, the second test was completed after coating the pump with Z-Pex.

Objective: To measure differences in efficiencies on each pump before and after applying the Zpex Coating system.

Pump 1: 5x6-13



Pump 2: 2x3-13



ZPEX INCREASED THE FLOW RATE BY 18%

ENGINEER'S CONCLUSIONS

The biggest takeaway was the improved flow rates at a given head with the pumps after they had been coated with the Z-Pex. I was honestly pretty shocked at how much the flow rate increased.

In my experience with E-Coat, the discharge pressure is somewhat 'unknown' as nozzles/eductors are often clogged, material can build up on the inside of pipes, clogged strainers. Additionally, a majority of pumps will recirculate tanks, so any foreign oil/dirt/metal parts/etc just get recirculated until clogged somewhere. Therefore, any pump would benefit from being able to generate more flow at a given pressure.



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ENGINEER'S CONCLUSIONS; CONT'D

PUMP 1:

For a given discharge pressure, the coated pump provides more flow. For example, at the rated point (140 Feet), the coated pump is producing 100 GPM more than the non-coated pump.

Alternatively, for a given flow rate, the total dynamic head (TDH) produced by the pump is higher. For example, at the rated point of 700 GPM, the non-coated pump developed 138 Feet of head, while the Z-Pex coated pump delivered 142 Feet (more than the manufacturer's published curve).

PUMP 2:

The second pump delivered the same results as the first, a substantial increase in the performance of the pump.

In terms of percent increase, the coating helped the second pump even more.

Per the table below, you can see that the coated pump is generally delivering 20-40 GPM more across the pump curve. At the rated point (225 GPM at 145 Feet), the coated pump is delivering 37 GPM more. The Z-Pex coated pump is surpassing the 'published performance curve' by the pump manufacturer. The non-coated pump is not.

| Gusher 7550 Series Vertical End-Suction Centrifugal Pump | | | | | | |
|--------------------------------------------------------------------|-----------|------------------------|----------------------|----------------------------|----------------------------|--|
| Pump Size: 5x6-13 with a 12.125" Trim, Rated for 700 GPM at 140 ft | | | | | | |
| PSI | Head (ft) | Flow (GPM) Pre-coating | Flow (GPM) with ZPEX | Flowrate Increase | Percent Increase/ Decrease | |
| 66 | 152.5 | 209 | 400 | 191 | 91% | |
| 64.5 | 149 | 357.5 | 497 | 139.5 | 39% | |
| 63 | 145.5 | 497 | 598 | 101 | 20% | |
| 61 | 140.9 | 597 | 700 | 103 | 17% | |
| 59 | 136.3 | 756 | 800 | 44 | 6% | |
| Pump Size: 2X3-13 with a 12.5" Trim, Rated for 225 GPM at 145 FEET | | | | | | |
| PSI | Head(ft) | Flow (GPM) Pre-coating | Flow (GPM) with ZPEX | Flowrate Increase | Percent Increase/ Decrease | |
| 65 | 150.2 | 150 | 210 | 60 | 40% | |
| 63 | 145.5 | 200 | 237 | 37 | 19% | |
| 59 | 136.3 | 250 | 287 | 37 | 15% | |
| 55 | 127.1 | 300 | 328 | 28 | 9% | |
| 52 | 120.1 | 320 | 350 | 30 | 9% | |
| 49 | 113.2 | 350 | 375 | 25 | 7% | |
| Test Description | | Flow (GPM) Pre-coating | Flow (GPM) with ZPEX | Percent Increase/ Decrease | | |
| Max Head | | 154.77 | 161.7 | 4.5% | | |
| Max Efficiency | | 49.4 | 52.36 | 6.0% | | |
| Head @ Max Flow (430 GPM) | | 85.4 | 92.4 | 8.2% | | |
| Head @ Design Point (225 GPM) | | 140 | 147 | 5.0% | | |
| Avg Amp Draw @ 225 GPM | | 20.5 | 20.65 | 0.7% | | |