**Electric Propellant Feed System Centrifugal Pump Performance Test**

***1. Scope***

This description of procedure defines the conditions for the hydraulic testing of the electric feed system centrifugal pump.

***2. Objective***

The objectives of testing the electric feed systems centrifugal pump are to:

* Document system pump performance.
* Establish the system curve for the pumping system.
* Determine the operating point of the pump; i.e. the point where the pump’s impeller curve crosses the system curve with the discharge valve throttled and with the discharge valve fully open.
* Assess the match between “full flow”—flow delivered by the EFS pump with the discharge valve fully open—and the actual design flow requirement.
* Assess the implications of modifying pump performance via trimming the impeller, adding a cutwater, and using impellers of differing solidity.
* Detect and diagnose other control or performance problems.

Preparation of test reports and test curves are an integral part of the test documentation.

***3. Centrifugal Pump Performance Test procedure***

* H-Q

The test is carried out at a nominally constant shaft speed, and the head (H) decreases as flowrate further (q) increases. The first set of measurements is taken at some duty point (100 percent q?). The discharge control valve is opened to give a flowrate greater than the duty flow (normally 120 or 130 percent q), and readings are taken. The valve is then closed in a series of steps, progressively decreasing the flow (right to left on our Q-H curve).We need to figure out if the final reading can be taken with the valve closed, i.e. the q = 0 or shut-off condition.

* P-Q

The power consumption is measured at different flowrates similarly, and the power-flowrate curve is plotted. A wattmeter is connected to motor power input, by multiplying wattmeter amount at motor efficiency the motor output power is calculated at different flowrates. Through these corresponding readings, the power-flowrate curve is plotted.

* η-Q

Pump efficiency (ƞ): the efficiency is the ratio of transferred mechanical work of the fluid to consumed power (P) in watts by the pump. We can plot the efficiency-flowrate (ƞ-Q) curve based on measured values from combination of H-q curve and P-q curve.

*4. Test Precautions*

* Exercise care when changing operating RPM if the equipment served by the pump is in operation.
* Avoid sudden flow changes to minimize the potential for water hammer, especially when throttling the discharge valve for a shut-off test.
* Exercise proper caution when working around live wiring and terminals and taking voltage or amp readings.
* Exercise proper caution while working around the rotating parts of the pump.