ELECTRIC MOTOR POWER CONSUMPTION COMPARISON TESTING

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Test Protocol
Customer-Supplied

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Program Description

To conduct comparative testing on the energy consumption of electric motors powering a spa-pump in a closed loop, steady state operating condition. Using the same pump mechanical hardware, the original motor powered by 240VAC will be compared to a Switch Reluctance Motor (SRM) – Digitally Controlled (prototype) motor powered by both a 30VDC power supply and 48VDC power pack. The test will consist of 10-minute runs measuring the discharge pressure, flow rate and power consumption for each configuration.

Executive Summary

The customer provided the OEM manufacturer's pump and motor as well as the Switch Reluctance Motor (SRM) – Digitally Controlled (prototype), power supply and power pack. A closed loop system was installed in one of the pump room's square water totes featuring a gravity feed to the pump's supply inlet, an ASTM B11.7-compliant discharge pressure measurement section, an in-line flow meter and a manual ball valve to control initial back pressure.

A series of 10-minute runs was taken using all three motor configurations, all conducted without removing the pump itself from the system and using the manual valve to set an initial backpressure of approximately 6 PSI.

Motor Type	Run ID	Water Flow (GPM)	Discharge Pressure (PSI)	Supply Voltage (Volts)	Current (Amps)	Power Consumption (Watts)
OEM Motor	Run 1 (Average)	55.8	6.14	239.5	4.31	1032.2
	Run 2 (Average)	55.7	6.13	239.2	4.3	1028.6
	OEM Motor (Average)	55.8	6.14	239.4	4.3	1030.4
Prototype Motor	Run 1 (Average)	53.9	6.05	30.1	11.21	337.4
	Run 2 (Average)	53.8	5.97	30.1	11.23	338.0
	Prototype Motor (Average)	53.9	6.01	30.1	11.2	337.7

Percent Change OEM to Prototype	-67.2%