Tested by: David Hearn/Jason Steward
Project Name: Long Life Syringe

Title: Life test of 2.5mL PTFE and UHMW-PE Syringes

1.0 Objective

The objective of this test is to determine if the approximate life cycle of 2.5mL 1005.5 PTFE and UHMW-PE syringes. The test will be run in an humidity and temperature controlled environment. The test will be conducted on 5 PTFE syringes and 5 UHMW-PE syringes and the results will be compared.

2.0 Setup

Physical Test:
Testing will be done on the 5 PTFE syringes and 5 UHMW-PE syringes on 10 PSD4 pumps. All tips will be inspected to the Hamilton print to verify all tips used are in tolerance. Assemble 5 syringes per print with PTFE tips and 5 syringes with UHMW-PE.

Equipment:
Saline Solution (5 % salt concentration per volume)
PSD4 pumps valves and necessary tubing.
Computer and Software to run pumps.

Environment:
Temperature: 70ºF ±2ºF
Humidity: 45-70%
Backpressure: 0 Psi (Atmospheric)

Test Setup:
Install and plumb syringes on PSD4 pumps in test lab. Install the 1005.5 size syringes using 5% Saline solution to prime the system. Tubing will be 12 gauge Teflon tubing plumbed to individual reservoirs for each syringe. Syringes will be run at speed 2 for 80% of stroke on a PSD4 pump. No back pressure on the output port of the valve. Run syringes to failure.

Failure Criteria:
Perception failure – Fluid riding behind the syringe tip between the glass and the plunger equivalent to 2 graduations at any point around the syringe barrel.

3.0 Data

CYCLES PTFE:

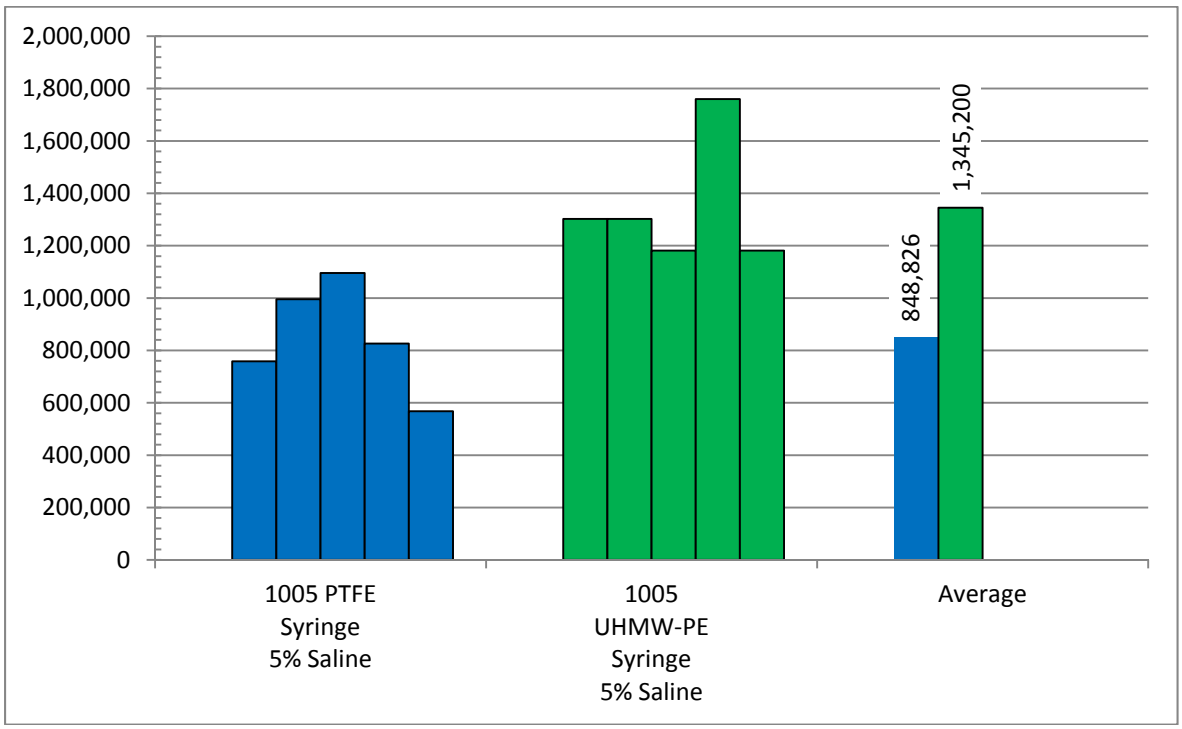
CYCLE	PTFE #1	PTFE #2	PTFE #3	PTFE #4	PTFE #5	Average
Failed	758,507	995,600	1,095,600	826,425	568,000	848,826

CYCLES UHMW-PE:

CYCLE	UHMW #1	UHMW #2	UHMW #3	UHWM #4	UHMW #5	Average
Failed	1,302,000	1,302,000	1,181,000	1,760,000	1,181,000	1,345,200

4.0 Data Summary:

The UHMW-PE syringes lasted over 1 million cycles, while the PTFE lasted under 1 million cycles in 5% saline solution.



5.0 Conclusion

The UHMW_PE syringes lasted about 500,000 cycles longer than the PTFE syringes. This is to be expected since the UHMW-PE is more wear resistant than the PTFE material. The syringes were taken off of test when the amount of leakage exceeded two graduation marks on the glass. This is the point that the syringe starts to show signs of failure.