



943 Main Street Oshkosh, WI 54901

Tel – 920-230-4585 Fax – 920-230-4586
2/27/12

Re: H2 Minus O Water Valve Field Measurement and Verification Test

Test objective

The test objective is to assess the effects of the H2-O Water Valve on system operating pressure, flow, and verification of savings provided by reducing the amount of air passing over a municipal water meter. Verification will be determined by recording the reduction of the consumed water volume in filling a predetermined level into an on-site vessel (waste treatment tank), monitoring time and pressure, with and without the H2-O Water Valve.

Test Equipment

The test apparatus piping will be mounted to ball valve/quick connection out of the strainer before the 4 inch city water meter shown in Figure 1. It is constructed to be installed on site at the Pepsi Burnsville Minnesota facility. The bill of materials used to construct this test fixture listed in the order of installation and is as follows:

- 2 inch female quick connect coupling
- 2" x 2" X ¼" tee fitted with a 0-100 PSI analog test gauge
- 2" Neptune HP Turbine Water Meter installed with an analog gallon consumed register
- 2" H2-O Flow Control Valve
- 2" X 2" X ¼" tee fitted with a 0-100 PSI analog test gauge

Figure 1 Mounting location of the test fixture:





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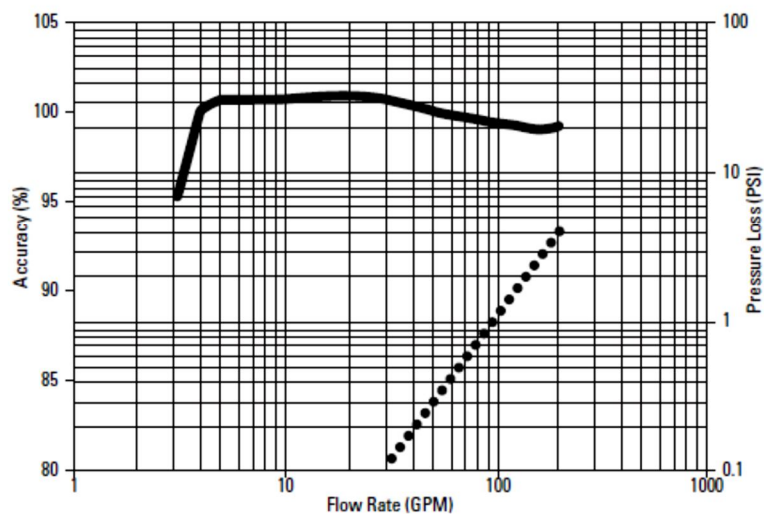
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Neptune 2 Inch Meter Information:

OPERATING CHARACTERISTICS

Meter	Normal Operating Range	Maximum	AWWA
Size	@100% Accuracy ($\pm 1.5\%$)	Intermittent Flow	Standard
2"	4 to 200 US gpm	250 US gpm	4 to 160 US gpm

2" ACCURACY



———— Accuracy

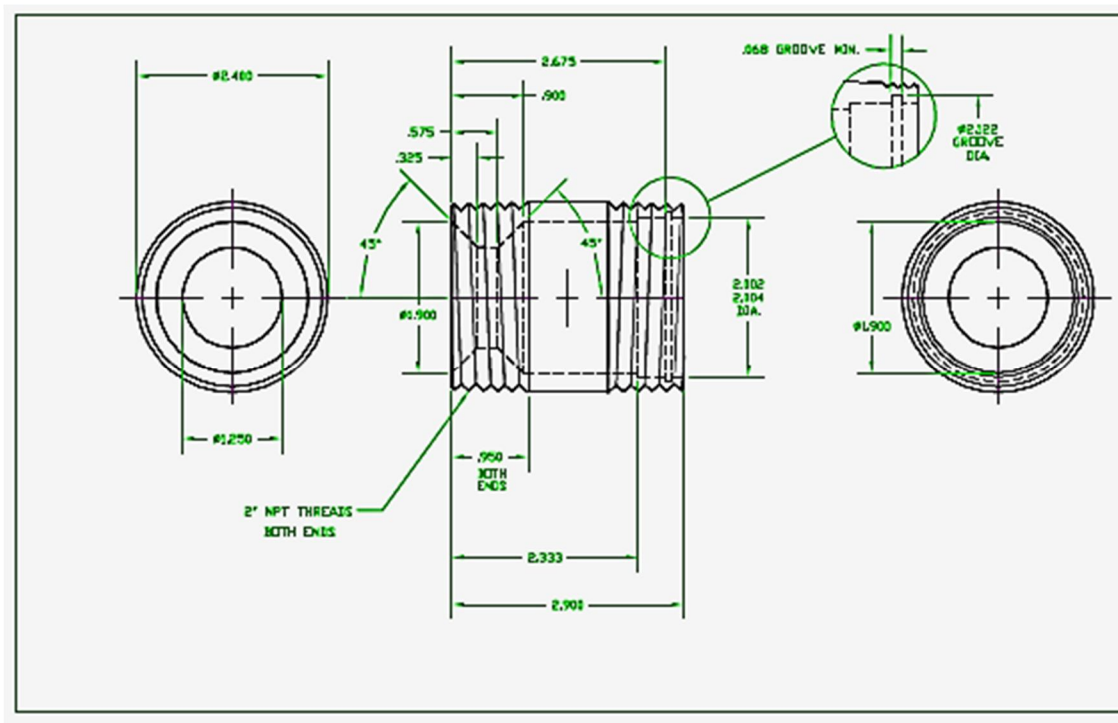
..... Head Loss

These charts show typical meter performance. Individual results may vary.



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2 Inch H2-O Water Valve Cut Sheet

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Theoretical Pressure Drop over 2 Inch Pipe as it relates to GPM

Pressure Drop (PSI)	GPM	Fluid Velocity	Maximum GPM
.4	50	6 Feet Per Second	264
.91	75		329
1.61	100	12 Feet Per Second	384
2.51	125		435
3.62	150		
4.93	175		
6.44	200	18 Feet Per Second	



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Theoretical Pressure Drop over 2 Inch Pipe Fittings

Fitting Description	Pressure Drop (PSI)
2 Inch Ball Valve	.22
2 Inch Elbow	.578
2 Inch Tee	.523
2 Inch Turbine Meter	6.25
2 Inch Check Valve	2.12

Test Procedure

Test 1:

A timed, metered test will be conducted without the H2-O Water Valve to determine our baseline from which the calculated savings will be derived. We will be installing the metered test apparatus onto the 2 inch quick connection exiting the main municipal water line prior to the city meter exiting the strainer body.

A meter reading will be taken and recorded.

We will open the 2" ball valve and start the water flow, start the timer and record the pre-meter and post-meter pressure gauge readings.

We will record the meter reading for each 1,277 gallons one foot line that we be marked inside the tank. The total calculated tank volume is 11,500 gallons which the total tank height is 9 feet; each one foot line is 1,277 gallons. Once the water level reaches the line we will record the meter reading and time.

Test 2:

The exact same testing procedures will be followed as in test 1 with the H2-O Water Valve installed into the test apparatus.

Results

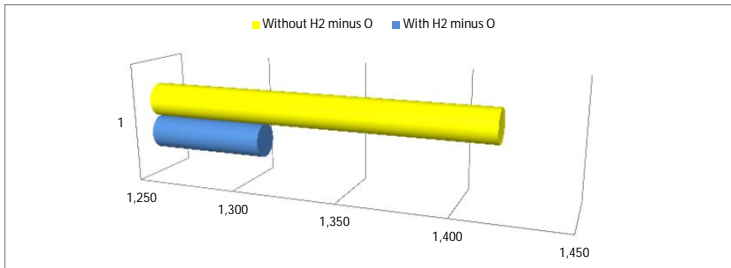
The total difference in consumed amount from test 1 and test 2 will determine the percentage savings that the implementation of the H2-O water valve will provide in this particular plant setting.

Chris Boysen
Vice President
ECM, LLC.

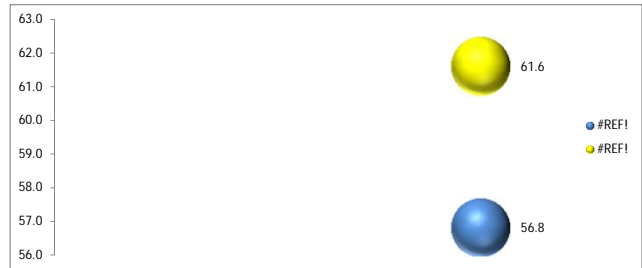


Pepsi Burnsville Test 1 - 2 Inch line set at 60 gpm

Meter Reading Total Gallons



Gallons Per Minute



Without H2 minus O

68 psi		
Time/Minutes	Meter Reading Total Gallons	Gallons per minute
0	29,505	
1	29,568	63
2	29,630	62
3	29,692	62
4	29,755	63
5	29,815	60
6	29,878	63
7	29,938	60
8	30,000	62
9	30,061	61
10	30,122	61
11	30,184	62
12	30,246	62
13	30,308	62
14	30,370	62
15	30,430	60
16	30,490	60
17	30,552	62
18	30,615	63
19	30,677	62
20	30,738	61
21	30,799	61
22	30,860	61
23	30,922	62
	1,417	61.6

With H2 minus O

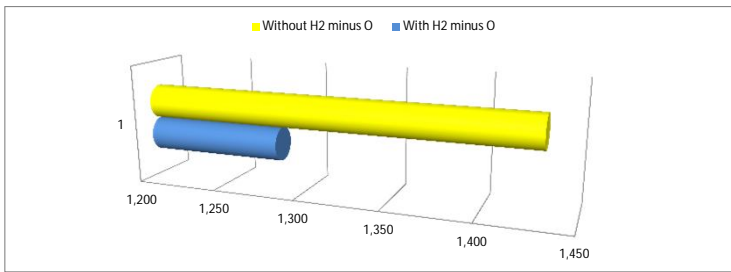
-3 psi drop = 65psi		
Time/Minutes	Meter Reading Total Gallons	Gallons per minute
0	30,922	
1	30,980	58
2	31,038	58
3	31,092	54
4	31,150	58
5	31,209	59
6	31,265	56
7	31,320	55
8	31,378	58
9	31,435	57
10	31,490	55
11	31,548	58
12	31,605	57
13	31,662	57
14	31,718	56
15	31,775	57
16	31,831	56
17	31,888	57
18	31,945	57
19	32,001	56
20	32,058	57
21	32,115	57
22	32,172	57
23	32,229	57
	1,307	56.8

Test 1 net savings is 7.7%.

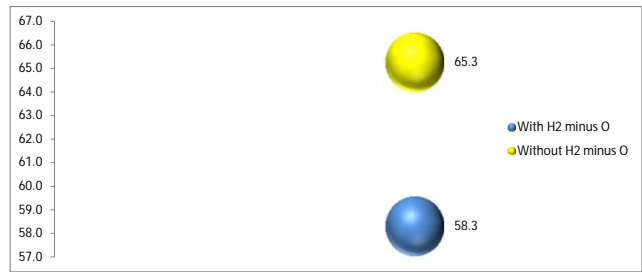


Pepsi Burnsville Test 2 - 2 Inch line set at 65 gpm

Meter Reading Total Gallons



Gallons Per Minute



Without H2 minus O		
68 psi		
Time/Minutes	Meter Reading Total Gallons	Gallons per minute
0	34,017	
1	34,085	68
2	34,150	64
3	34,214	66
4	34,280	65
5	34,345	64
6	34,409	63
7	34,472	67
8	34,539	62
9	34,601	67
10	34,668	62
11	34,730	67
12	34,797	65
13	34,862	61
14	34,923	67
15	34,990	67
16	35,057	63
17	35,120	65
18	35,185	65
19	35,250	63
20	35,313	67
21	35,380	69
22	35,449	69
	1,432	65.3

With H2 minus O		
-3 psi drop = 65psi		
Time/Minutes	Meter Reading Total Gallons	Gallons per minute
0	32,605	
1	32,663	58
2	32,720	57
3	32,780	60
4	32,838	58
5	32,900	62
6	32,958	58
7	33,015	57
8	33,072	57
9	33,130	58
10	33,190	60
11	33,248	58
12	33,308	60
13	33,365	57
14	33,422	57
15	33,480	58
16	33,538	58
17	33,598	60
18	33,655	57
19	33,713	58
20	33,771	58
21	33,830	59
22	33,888	58
	1,283	58.3

Test 2 net savings is 10.4%.