

FLOW TESTING OF
12" IBC VALVE TESTING
STEALTH VALVE & CONTROLS, LTD.
JULY 2006 - REPORT NO. 2006-139/C1215

CERTIFIED BY
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INTRODUCTION

A 12" IBC Valve was flow tested with two inserts at Alden Research Laboratory, Inc. for Stealth Valve & Controls, LTD. using Alden's standard test procedures, QA-AGF-7-86 Revision 6.1. Valve performance is presented as Cv versus opening %, in both tabular and graphical format.

VALVE INSTALLATION

The valve was installed in Test Line1 in the Hooper Facility shown in plan view on Figure 1. Water was provided from a 40" penstock from the Laboratory pond head at a head of about 18 feet. An electrically powered pump provided a maximum head of about 170 ft and a maximum flow of 6,000 gpm. The gravimetric method was used to measure flow.

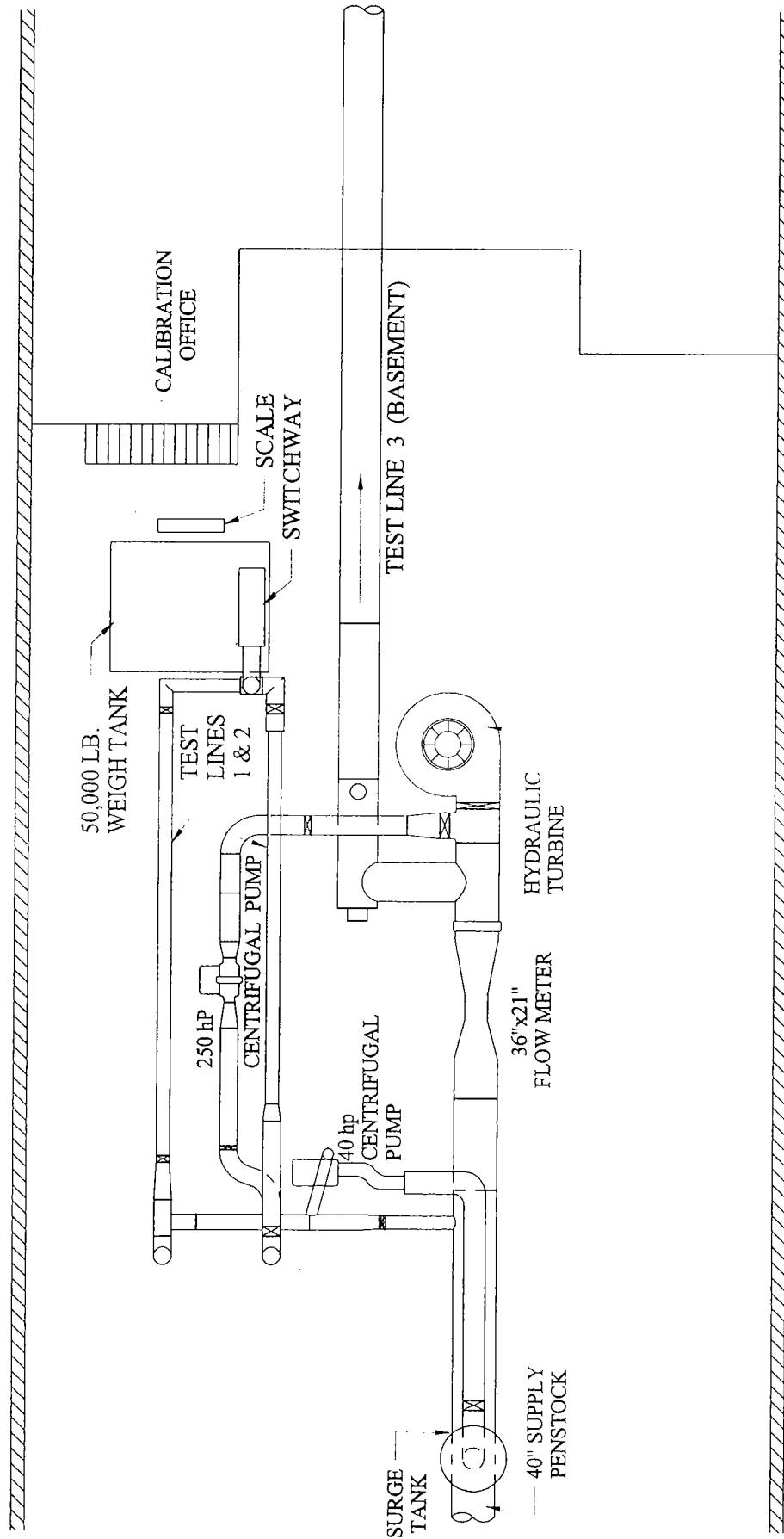
The detailed piping arrangement, immediately upstream and downstream of the flow meter, is shown in Figure 2, including all significant fittings and pipe lengths. Careful attention was given to aligning the flow element with the test line piping and to assure no gaskets between flanged sections protruded into the flow. Vents were provided at critical locations of the test line to purge the system of air.

TEST PROCEDURE

After checking the installation, water was introduced into the system to equalize line and primary element temperature to water temperature. The downstream control valve was then closed and vent valves in the test line were opened to remove air from the system. With the line flow shut off, the flow meter output was checked for zero flow indication.

Prior to the test run, the control valve was set to the desired flow. For the gravimetric measurement method, the flow was diverted away from the weigh tank. After steady state conditions in the test

Figure 1



Hooper Low Reynolds Number Facility

Test Line 1, 2 & 3

ALDEN

line and instrument readings had been reached, the weigh tank discharge valve was closed and the weigh tank scale indicator and the electric timer were both zeroed. The flow was then diverted into the weigh tank, which automatically started the timer.

The weigh tank timer switch also activated the computer based data acquisition system to measure differential head while the weigh tank was filling. At the end of the run, flow was diverted away from the weigh tank and the timer and data acquisition system were stopped to terminate the test run. The weight of water in the tank, elapsed time, water temperature, and differential head were recorded on a data sheet. The control valve was then adjusted to the next flow and the procedure repeated. During the time allowed to stabilize the new flow, the data were entered into the computer to determine the flow and the results were plotted so that each test run was evaluated before the next run began.

FLOW MEASUREMENT METHOD

Flow was measured by the gravimetric method using a tank mounted on scales having a capacity of 45,000 pounds (resolution 0.5 lb). Water passing through the flow element was diverted into the tank with a hydraulically operated knife edge passing through a rectangular jet produced by a diverter head box. A Hewlett-Packard 10 MHz Frequency Counter with a resolution 0.001 sec was started upon flow diversion into the tank by an optical switch, which is positioned at the center of the jet. The timer was stopped upon flow diversion back to waste and the elapsed diversion time was recorded. A thermistor thermometer measured water temperature to allow calculation of water density. Volumetric flow was calculated by Equation (1).

$$q_a = \frac{W}{T\rho_w B_c} \quad (1)$$

where

- q_a = actual flow, $\frac{\text{ft}^3}{\text{sec}}$
 W = mass of water collected, lb_m
 T = time, sec
 ρ_w = water density, $\frac{\text{lb}_m}{\text{ft}^3}$
 B_c = buoyancy correction, $1 - \frac{\rho_a}{\rho_w}$
 ρ_a = air density, $\frac{\text{lb}_m}{\text{ft}^3}$

The buoyancy correction includes air density calculated by perfect gas laws with the standard barometric pressure, a relative humidity of 75%, and measured air temperature. The weigh tank is periodically calibrated to full scale by the step method using 10,000 lb_m of cast iron weights, whose calibration is traceable to NIST. Flow calculations are computerized to assure consistency. Weigh tank calibration data and water density as a function of temperature, are stored on disk file. Data were recorded manually and on disk file for later review and reporting.

TEST RESULTS

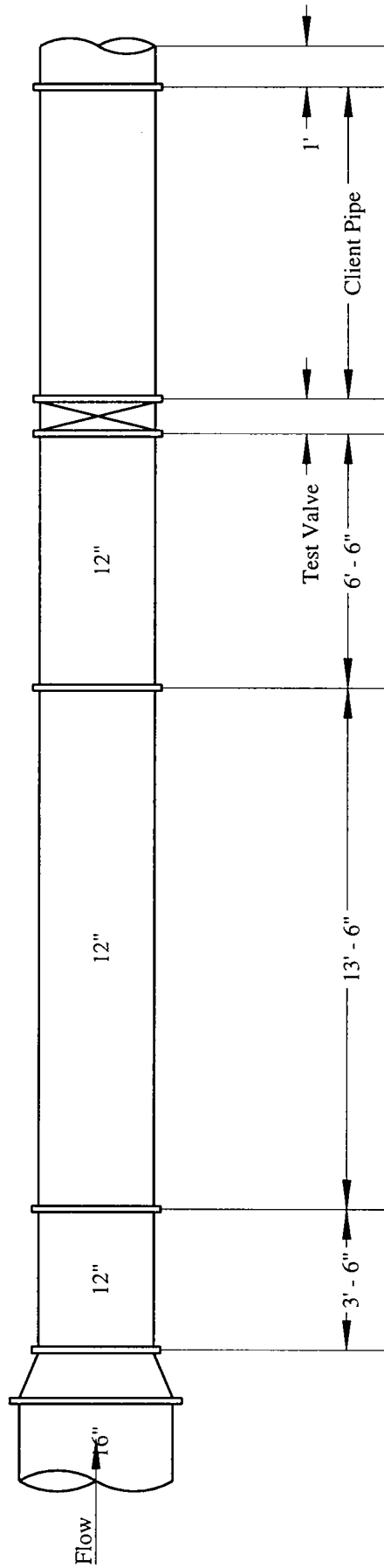
Test results are shown both in tabular form and plotted versus valve opening. The measured flow, line temperature, the transducer average reading used for calculation of the head loss in feet of water at line temperature are shown in the tables. Valve performance is given as the valve coefficient versus opening in percent. Three test flows were run at each 10% valve opening, from 10 to 100%. Tests were conducted with two inserts, standard and enhanced. The Valve Coefficient was measured at 10% openings using three differential pressures and the coefficient is plotted versus opening. Fl tests were conducted for an upstream pressure of 40 psi after the completion of the Cv tests. The effect of air admittance was evaluated for 90% and 50% openings.

Mr. Zachary Finck and Bruce James of Stealth valve installed the modified plate and witnessed the testing.

Analysis indicates that the flow measurement uncertainty is within 0.25% of the true value for each test run. Calibrations of the test instrumentation (temperature, time, weight, and length measurements) are traceable to the National Institute of Standards and Technology (formerly the National Bureau of Standards) and Alden's Quality Assurance Program is designed to meet ANSI/NCSL Z540-1-1994 "Calibration Laboratories and Test Equipment-General Requirements" (supercedes MIL-STD-45662A).

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Figure 2 Plan View Hooper Facility Line 1



STEALTH VALVE & CONTROLS LTD
Purchase Order Number: DD-11868
12" VALVE

July 18, 2006



STEALTH VALVE & CONTROLS LTD

Purchase Order Number: DD-11868

12" VALVE

Serial Number: STD

CALIBRATION

DATE: July 19, 2006

PIPE DIAMETER = 11.9770

| Run # | Line Temp Deg F | Net Weight lb. | Run Duration secs. | Flow GPM | Head Loss Reading Volts | Gross Head Loss Feet | Pipe Loss Feet | Net Head Loss Feet | Net Head Loss psi | CV Net | CV Gross | Opening % |
|-------|-----------------|----------------|--------------------|----------|-------------------------|----------------------|----------------|--------------------|-------------------|--------|----------|-----------|
| 1 | 78 | 45881 | 163.669 | 2024. | 3.1412 | 11.884 | 0.112 | 11.772 | 5.084 | 896.55 | 892.31 | 100 |
| 2 | 79 | 45917 | 117.513 | 2821. | 4.2269 | 23.202 | 0.226 | 22.977 | 9.924 | 894.60 | 890.24 | 100 |
| 3 | 80 | 45921 | 96.363 | 3441. | 5.3312 | 34.717 | 0.342 | 34.375 | 14.846 | 892.15 | 887.74 | 100 |
| 4 | 80 | 45922 | 102.076 | 3249. | 5.3517 | 34.934 | 0.303 | 34.631 | 14.957 | 839.17 | 835.52 | 90 |
| 5 | 80 | 45916 | 124.033 | 2673. | 4.2410 | 23.354 | 0.201 | 23.153 | 10.000 | 844.52 | 840.87 | 90 |
| 6 | 80 | 45874 | 173.131 | 1913. | 3.1381 | 11.855 | 0.100 | 11.755 | 5.077 | 848.32 | 844.75 | 90 |
| 7 | 80 | 45851 | 201.869 | 1640. | 3.1402 | 11.878 | 0.072 | 11.806 | 5.099 | 725.64 | 723.43 | 80 |
| 8 | 80 | 45882 | 148.633 | 2229. | 4.2190 | 23.125 | 0.137 | 22.988 | 9.928 | 706.75 | 704.65 | 80 |
| 9 | 80 | 45907 | 123.417 | 2686. | 5.3498 | 34.912 | 0.203 | 34.708 | 14.990 | 693.01 | 690.99 | 80 |
| 10 | 80 | 45873 | 171.689 | 1929. | 5.3573 | 34.990 | 0.101 | 34.888 | 15.068 | 496.51 | 495.79 | 70 |
| 11 | 80 | 37051 | 163.865 | 1633. | 4.2461 | 23.407 | 0.071 | 23.336 | 10.079 | 513.80 | 513.01 | 70 |
| 12 | 80 | 36439 | 221.656 | 1187. | 3.1601 | 12.085 | 0.037 | 12.048 | 5.204 | 519.89 | 519.10 | 70 |
| 13 | 80 | 18418 | 181.945 | 731.0 | 3.1406 | 11.881 | 0.013 | 11.868 | 5.126 | 322.53 | 322.35 | 60 |
| 14 | 80 | 18579 | 130.634 | 1027. | 4.2578 | 23.527 | 0.027 | 23.500 | 10.150 | 322.03 | 321.84 | 60 |
| 15 | 80 | 24631 | 140.244 | 1268. | 5.4424 | 35.877 | 0.042 | 35.835 | 15.477 | 322.03 | 321.84 | 60 |
| 16 | 80 | 18481 | 176.118 | 757.8 | 5.3328 | 34.735 | 0.014 | 34.720 | 14.996 | 195.47 | 195.43 | 50 |
| 17 | 80 | 18334 | 213.122 | 621.2 | 4.2602 | 23.551 | 0.009 | 23.541 | 10.168 | 194.59 | 194.55 | 50 |
| 18 | 79 | 12330 | 200.348 | 444.4 | 3.1799 | 12.289 | 0.005 | 12.284 | 5.305 | 192.71 | 192.67 | 50 |
| 19 | 79 | 9326 | 260.595 | 258.4 | 3.2129 | 12.632 | 0.001 | 12.631 | 5.455 | 110.50 | 110.50 | 40 |
| 20 | 79 | 12204 | 250.600 | 351.6 | 4.2062 | 22.986 | 0.003 | 22.983 | 9.926 | 111.48 | 111.47 | 40 |
| 21 | 79 | 18292 | 303.937 | 434.6 | 5.3324 | 34.725 | 0.004 | 34.721 | 14.996 | 112.09 | 112.09 | 40 |



STEALTH VALVE & CONTROLS LTD

Purchase Order Number: DD-11868

12" VALVE

Serial Number: STD

CALIBRATION

DATE: July 19, 2006

PIPE DIAMETER = 11.9770

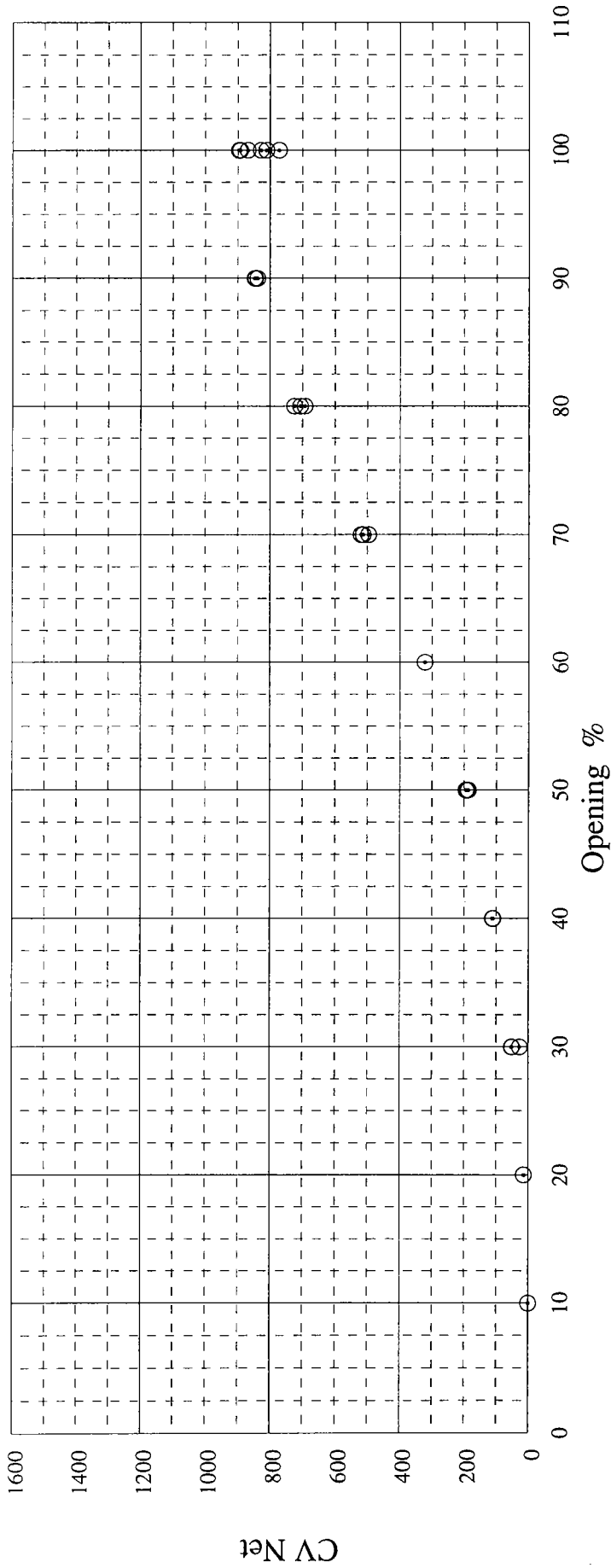
| Run # | Line Temp Deg F | Net Weight lb. | Run Duration secs. | Flow GPM | Head Loss Reading Volts | Gross Head Loss Feet | Pipe Loss Feet | Net Head Loss Feet | Net Head Loss psi | CV Net | CV Gross | Opening % |
|-------|-----------------|----------------|--------------------|----------|-------------------------|----------------------|----------------|--------------------|-------------------|--------|----------|-----------|
| 22 | 79 | 9135 | 320.685 | 205.6 | 5.3654 | 35.069 | 0.001 | 35.068 | 15.146 | 52.79 | 52.79 | 30 |
| 23 | 79 | 6666 | 291.908 | 164.9 | 4.2277 | 23.211 | 0.001 | 23.210 | 10.024 | 52.02 | 52.02 | 30 |
| 24 | 79 | 6054 | 380.378 | 114.9 | 3.1020 | 11.477 | 0.000 | 11.477 | 4.957 | 51.56 | 51.56 | 30 |
| 25 | 79 | 3350 | 419.711 | 57.63 | 5.4155 | 35.592 | 0.000 | 35.592 | 15.372 | 14.68 | 14.68 | 20 |
| 26 | 79 | 2079 | 324.273 | 46.29 | 4.2723 | 23.675 | 0.000 | 23.675 | 10.225 | 14.46 | 14.46 | 20 |
| 27 | 79 | 2077 | 471.507 | 31.80 | 3.1346 | 11.816 | 0.000 | 11.816 | 5.103 | 14.06 | 14.06 | 20 |
| 28 | 79 | 39 | 212.847 | 1.323 | 5.3856 | 35.280 | 0.000 | 35.280 | 15.237 | 0.34 | 0.34 | 10 |
| 1 | 80 | 45933 | 77.030 | 4306. | 8.2961 | 65.627 | 0.549 | 65.079 | 28.107 | 811.34 | 807.94 | 100 |
| 2 | 81 | 45938 | 77.044 | 4306. | 8.0458 | 63.027 | 0.549 | 62.478 | 26.984 | 828.10 | 824.49 | 100 |
| 3 | 81 | 45939 | 77.056 | 4306. | 8.9308 | 72.255 | 0.549 | 71.706 | 30.970 | 772.88 | 769.94 | 100 |
| 4 | 81 | 45938 | 78.220 | 4242. | 7.0469 | 52.612 | 0.532 | 52.081 | 22.494 | 893.37 | 888.85 | 100 |
| 5 | 81 | 45936 | 77.243 | 4295. | 7.4645 | 56.966 | 0.546 | 56.421 | 24.368 | 869.14 | 864.96 | 100 |
| 6 | 81 | 24593 | 156.615 | 1134. | 4.9196 | 84.691 | 0.033 | 84.658 | 36.564 | 187.35 | 187.31 | 50 |
| 7 | 81 | 24690 | 156.983 | 1136. | 4.9197 | 84.695 | 0.033 | 84.662 | 36.565 | 187.64 | 187.61 | 50 |
| 8 | 81 | 12137 | 460.564 | 190.3 | 5.8139 | 110.620 | 0.001 | 110.619 | 47.776 | 27.51 | 27.51 | 30 |

The data reported on herein was obtained by measuring equipment the calibration of which is traceable to NIST, following the installation and test procedures referenced in this report, resulting in a flow measurement uncertainty of +/- 0.25% or less.

CERTIFIED BY: 

CALIBRATED BY: THL





STEALTH VALVE & CONTROLS LTD
 Purchase Order Number: DD-11868
 12" VALVE
 Serial Number: STD
 July 19, 2006

Certified By: *James B. Light*



STEALTH VALVE & CONTROLS LTD

Purchase Order Number: DD-11868

12" VALVE

Serial Number: Enhanced

CALIBRATION

DATE: July 18, 2006

PIPE DIAMETER = 11.9770

| Run # | Line Temp Deg F | Net Weight lb. | Run Duration secs. | Flow GPM | Head Loss Reading Volts | Gross Head Loss Feet | Pipe Loss Feet | Net Head Loss Feet | Net Head Loss psi | CV Net | CV Gross | Opening % |
|-------|-----------------|----------------|--------------------|----------|-------------------------|----------------------|----------------|--------------------|-------------------|---------|----------|-----------|
| 1 | 77 | 45886 | 141.542 | 2340. | 3.1242 | 11.705 | 0.152 | 11.552 | 4.989 | 1046.45 | 1039.63 | 100 |
| 2 | 80 | 45929 | 100.914 | 3287. | 4.2227 | 23.162 | 0.311 | 22.851 | 9.869 | 1045.05 | 1038.01 | 100 |
| 3 | 81 | 45933 | 84.758 | 3914. | 5.3772 | 35.203 | 0.449 | 34.754 | 15.010 | 1009.17 | 1002.71 | 100 |
| 4 | 81 | 45883 | 151.108 | 2193. | 3.1158 | 11.624 | 0.133 | 11.491 | 4.963 | 983.35 | 977.71 | 90 |
| 5 | 80 | 45929 | 108.317 | 3062. | 4.2282 | 23.219 | 0.268 | 22.951 | 9.912 | 971.51 | 965.88 | 90 |
| 6 | 81 | 45941 | 92.049 | 3605. | 5.3717 | 35.145 | 0.378 | 34.768 | 15.016 | 929.20 | 924.20 | 90 |
| 7 | 81 | 45923 | 115.084 | 2882. | 5.3630 | 35.054 | 0.236 | 34.818 | 15.038 | 742.38 | 739.88 | 80 |
| 8 | 81 | 45907 | 131.041 | 2530. | 4.2430 | 23.377 | 0.179 | 23.198 | 10.019 | 798.49 | 795.42 | 80 |
| 9 | 81 | 45874 | 174.207 | 1902. | 3.1374 | 11.849 | 0.098 | 11.750 | 5.075 | 843.32 | 839.81 | 80 |
| 10 | 81 | 42710 | 217.077 | 1421. | 3.1242 | 11.711 | 0.053 | 11.658 | 5.035 | 632.59 | 631.15 | 70 |
| 11 | 80 | 45876 | 172.541 | 1920. | 4.2360 | 23.300 | 0.100 | 23.200 | 10.020 | 605.90 | 604.59 | 70 |
| 12 | 80 | 45884 | 150.658 | 2199. | 5.3328 | 34.734 | 0.134 | 34.601 | 14.944 | 568.30 | 567.20 | 70 |
| 13 | 80 | 45856 | 210.696 | 1571. | 5.3717 | 35.140 | 0.066 | 35.074 | 15.149 | 403.36 | 402.98 | 60 |
| 14 | 80 | 30803 | 164.061 | 1355. | 4.2693 | 23.647 | 0.048 | 23.599 | 10.192 | 424.22 | 423.78 | 60 |
| 15 | 80 | 24523 | 180.233 | 982.6 | 3.1529 | 12.009 | 0.025 | 11.984 | 5.176 | 431.41 | 430.97 | 60 |
| 16 | 80 | 18418 | 215.451 | 617.4 | 3.1193 | 11.659 | 0.009 | 11.649 | 5.031 | 274.92 | 274.81 | 50 |
| 17 | 80 | 18652 | 153.761 | 876.0 | 4.2197 | 23.131 | 0.019 | 23.112 | 9.982 | 276.95 | 276.84 | 50 |
| 18 | 80 | 24833 | 168.465 | 1064. | 5.3846 | 35.275 | 0.029 | 35.246 | 15.223 | 272.53 | 272.41 | 50 |
| 19 | 80 | 24370 | 270.189 | 651.4 | 5.3500 | 34.914 | 0.010 | 34.903 | 15.075 | 167.57 | 167.55 | 40 |
| 20 | 79 | 12425 | 170.517 | 526.1 | 4.2176 | 23.105 | 0.007 | 23.099 | 9.976 | 166.39 | 166.36 | 40 |
| 21 | 79 | 12410 | 235.503 | 380.5 | 3.1768 | 12.256 | 0.003 | 12.253 | 5.292 | 165.20 | 165.18 | 40 |



STEALTH VALVE & CONTROLS LTD

Purchase Order Number: DD-11868

12" VALVE

Serial Number: Enhanced

CALIBRATION

DATE: July 18, 2006

PIPE DIAMETER = 11.9770

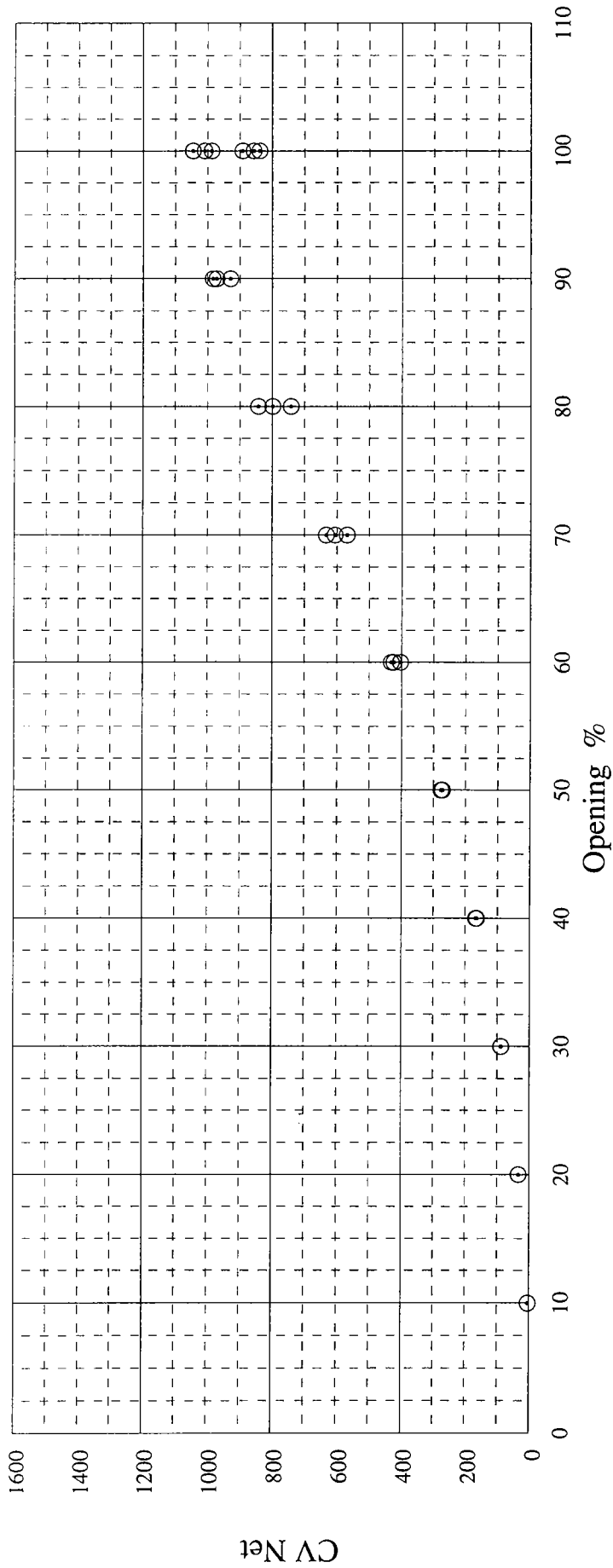
| Run # | Line Temp Deg F | Net Weight lb. | Run Duration secs. | Flow GPM | Head Loss Reading Volts | Gross Head Loss Feet | Pipe Loss Feet | Net Head Loss Feet | Net Head Loss psi | CV Net | CV Gross | Opening % |
|-------|-----------------|----------------|--------------------|----------|-------------------------|----------------------|----------------|--------------------|-------------------|---------|----------|-----------|
| 22 | 79 | 12219 | 310.511 | 284.1 | 4.2775 | 23.730 | 0.002 | 23.728 | 10.248 | 88.66 | 88.65 | 30 |
| 23 | 79 | 12420 | 260.184 | 344.7 | 5.3451 | 34.858 | 0.003 | 34.855 | 15.054 | 88.74 | 88.73 | 30 |
| 24 | 79 | 12155 | 446.626 | 196.5 | 3.1048 | 11.505 | 0.001 | 11.505 | 4.969 | 88.06 | 88.05 | 30 |
| 25 | 79 | 3158 | 300.471 | 75.90 | 3.1480 | 11.957 | 0.000 | 11.956 | 5.164 | 33.36 | 33.36 | 20 |
| 26 | 79 | 6040 | 335.521 | 129.9 | 5.3785 | 35.206 | 0.000 | 35.206 | 15.205 | 33.30 | 33.30 | 20 |
| 27 | 79 | 4050 | 280.714 | 104.1 | 4.2197 | 23.127 | 0.000 | 23.127 | 9.989 | 32.92 | 32.92 | 20 |
| 28 | 79 | 2037 | 890.412 | 16.51 | 5.3782 | 35.203 | 0.000 | 35.203 | 15.204 | 4.23 | 4.23 | 10 |
| 1 | 79 | 45937 | 70.045 | 4735. | 9.1204 | 74.209 | 0.670 | 73.539 | 31.762 | 839.29 | 835.49 | 100 |
| 2 | 80 | 45948 | 70.150 | 4730. | 8.8171 | 71.058 | 0.668 | 70.389 | 30.401 | 856.90 | 852.86 | 100 |
| 3 | 82 | 45920 | 70.126 | 4730. | 8.2953 | 65.638 | 0.668 | 64.970 | 28.060 | 891.97 | 887.41 | 100 |
| 4 | 83 | 45940 | 70.228 | 4726. | 7.1373 | 53.571 | 0.667 | 52.904 | 22.849 | 987.62 | 981.45 | 100 |
| 5 | 83 | 45937 | 72.085 | 4604. | 6.3630 | 45.496 | 0.632 | 44.864 | 19.377 | 1044.77 | 1037.50 | 100 |

The data reported on herein was obtained by measuring equipment the calibration of which is traceable to NIST, following the installation and test procedures referenced in this report, resulting in a flow measurement uncertainty of +/- 0.25% or less.

CALIBRATED BY: THL

CERTIFIED BY: 





STEALTH VALVE & CONTROLS LTD
 Purchase Order Number: DD-11868
 12" VALVE
 Serial Number: Enhanced
 July 18, 2006

Certified By: *[Signature]*



STEALTH VALVE & CONTROLS LTD

Purchase Order Number: DD-11868

12" VALVE

Serial Number: Enhanced Plates

CALIBRATION

DATE: July 19, 2006

PIPE DIAMETER = 11.9770

| Run # | Line Temp Deg F | Air Admittance Valve | Net Weight lb. | Run Duration secs. | Flow GPM | Head Loss Reading Volts | Head Loss Feet | Head Loss Feet | CV | Opening % |
|-------|-----------------|----------------------|----------------|--------------------|----------|-------------------------|----------------|----------------|--------|-----------|
| 1 | 79 | Closed | 24111 | 104.697 | 1662. | 2.6317 | 6.5740 | 6.5740 | 985.70 | 90 |
| 2 | 79 | Open | 24111 | 111.262 | 1564. | 2.7923 | 8.2488 | 8.2488 | 828.05 | 90 |
| 3 | 79 | Closed | 18083 | 187.891 | 694.9 | 3.2804 | 13.3360 | 13.3360 | 289.22 | 50 |
| 4 | 79 | Open | 18083 | 221.035 | 590.7 | 3.3617 | 14.1837 | 14.1837 | 238.40 | 50 |
| 5 | 79 | Closed | 18083 | 113.218 | 1153. | 5.7831 | 39.4234 | 39.4234 | 279.16 | 50 |
| 6 | 79 | Open | 18083 | 130.787 | 998.4 | 5.9414 | 41.0732 | 41.0732 | 236.76 | 50 |

The data reported on herein was obtained by measuring equipment the calibration of which is traceable to NIST, following the installation and test procedures referenced in this report, resulting in a flow measurement uncertainty of +/- 0.25% or less.

CALIBRATED BY: THL

CERTIFIED BY:



WATER DENSITY

| Temperature Fahrenheit | Density lb _m / ft ³ | Temperature Fahrenheit | Density lb _m / ft ³ | Temperature Fahrenheit | Density lb _m / ft ³ |
|---------------------------|--|---------------------------|--|---------------------------|--|
| 32 | 62.4179 | 62 | 62.3549 | 92 | 62.0903 |
| 33 | 62.4201 | 63 | 62.3489 | 93 | 62.0788 |
| 34 | 62.4220 | 64 | 62.3427 | 94 | 62.0671 |
| 35 | 62.4235 | 65 | 62.3363 | 95 | 62.0552 |
| 36 | 62.4246 | 66 | 62.3296 | 96 | 62.0432 |
| 37 | 62.4255 | 67 | 62.3228 | 97 | 62.0311 |
| 38 | 62.4260 | 68 | 62.3157 | 98 | 62.0188 |
| 39 | 62.4262 | 69 | 62.3084 | 99 | 62.0063 |
| 40 | 62.4261 | 70 | 62.3010 | 100 | 61.9937 |
| 41 | 62.4257 | 71 | 62.2933 | 101 | 61.9810 |
| 42 | 62.4250 | 72 | 62.2855 | 102 | 61.9681 |
| 43 | 62.4240 | 73 | 62.2774 | 103 | 61.9551 |
| 44 | 62.4227 | 74 | 62.2692 | 104 | 61.9419 |
| 45 | 62.4211 | 75 | 62.2608 | 105 | 61.9286 |
| 46 | 62.4193 | 76 | 62.2522 | 106 | 61.9151 |
| 47 | 62.4171 | 77 | 62.2434 | 107 | 61.9015 |
| 48 | 62.4147 | 78 | 62.2344 | 108 | 61.8878 |
| 49 | 62.4121 | 79 | 62.2252 | 109 | 61.8739 |
| 50 | 62.4092 | 80 | 62.2159 | 110 | 61.8599 |
| 51 | 62.4060 | 81 | 62.2063 | 111 | 61.8458 |
| 52 | 62.4025 | 82 | 62.1966 | 112 | 61.8315 |
| 53 | 62.3988 | 83 | 62.1868 | 113 | 61.8172 |
| 54 | 62.3949 | 84 | 62.1767 | 114 | 61.8027 |
| 55 | 62.3907 | 85 | 62.1665 | 115 | 61.7880 |
| 56 | 62.3863 | 86 | 62.1561 | 116 | 61.7733 |
| 57 | 62.3816 | 87 | 62.1456 | 117 | 61.7584 |
| 58 | 62.3768 | 88 | 62.1348 | 118 | 61.7434 |
| 59 | 62.3716 | 89 | 62.1239 | 119 | 61.7284 |
| 60 | 62.3663 | 90 | 62.1129 | 120 | 61.7132 |
| 61 | 62.3607 | 91 | 62.1017 | 121 | 61.6978 |