4701 Beloit
0509599

BALANCE REPORT
FOR

California American Water Office Remodel

Sacramento, California

BY

T.A.B.C.O.
TOTAL AIR BALANCE CO., INC.
2175 Stone Avenue, Suite #6
San Jose, California
(408) 280-6194

Mechanical Contractor: Rand Mechanical, Inc.
Roseville, California

Contractor License #520842

November 14, 2005
Project #3517-1

T.A.B.C.O.
Total Air Balance Co., Inc.

Report Abbreviations

AC/HR.....Air Changes per Hour.

CD .....Ceiling Diffuser.

DNA.....Data Not Available.

DNL.....Data Not Listed.

FD.....Fire Damper.

FR .....Floor Register.

HOOD.....Flow Hood. Measures CFM directly
PPM and K factor are not required.

INA.....Inaccessible.

NA .....Not Applicable.

NI .....Not Installed.

NIC.....Not In Contract.

OBD.....Opposed Blade Damper.

OD.....Outside Diameter.

OPEN.....Open Duct.

OVL .....Oval Duct.

RND .....Round Duct.

SWD .....Side Wall Diffuser.

T-#.....Traverse, Followed by a number ie:1,2,3 etc.
corresponding to the location of the traverse.

VD.....Volume Damper.

W.G. .....Measured in inches of Water Gauge

CERTIFICATION

We, **T.A.B.C.O., Inc.**, certify that all systems have been tested and balanced to their optimum performance capabilities, based upon the equipment, design and installation. All balancing was performed in accordance with or exceeds AABC, NTF and NEBB national procedural standards.

We are an independent balancing agency retained by the Mechanical Contractor and not affiliated with the design engineers.

Project: **California American Water Office Remodel** **Sacramento, CA**

Owner: **California American Water** **Sacramento, CA**

Certified by: _____
T S. Hinmon, T.B.E.

November 14, 2005
Date

Certifying Agency (Seal)

Total Air Balance Co., Inc.

Date: 11/7/05
Project Name: California American Water
Office Remodel

Air Distribution Test Sheet

Area Served	Opening No.	Opening Size	SQ FT Area	Required Vel	Required CFM	Preliminary Vel	Preliminary CFM	Final Vel	Final CFM
Supply Air									
VAV-4									
Open Office	1	24 x 24	Flow hood		230				215
Open Office	2	24 x 24	Flow hood		230				233
Open Office	3	24 x 24	Flow hood		230				238
VAV-4 Total Air					690				686
Minimum					210				215
CF									.98
VAV-5									
Open Office	1	24 x 24	Flow hood		285				292
Open Office	2	24 x 24	Flow hood		285				295
Open Office	3	24 x 24	Flow hood		285				291
VAV-5 Total Air					855				878
Minimum					260				263
CF									1.11
VAV-6									
Open Office	1	24 x 24	Flow hood		500				529
Open Office	2	24 x 24	Flow hood		500				492
Open Office	3	24 x 24	Flow hood		500				503
Open Office	4	24 x 24	Flow hood		500				510
VAV-6 Total Air					2000				2034
Minimum					600				610
CF									1.08

Notes:

OSA IS AT 15% MIN
VERIFIED BY CONTROLS CONTRACTOR
COFFY

Total Air Balance Co., Inc.

Date: 8/31/05
Project Name: California American Water
Office Remodel

Air Distribution Test Sheet

Area Served	Opening No.	Opening Size	SQ FT Area	Required Vel	Required CFM	Preliminary Vel	Preliminary CFM	Final Vel	Final CFM
Supply Air									
VAV-9									
Corridor	1	24 x 24	Flow hood		150				125
Open Office	2	24 x 24	Flow hood		400				334
Open Office	3	24 x 24	Flow hood		400				341
Open Office	4	24 x 24	Flow hood		400				331
Open Office	5	24 x 24	Flow hood		NI				NI
VAV-9 Total Air					1350				1131
Minimum					405				399
CF									1.01
VAV-12									
Office-1	1	24 x 24	Flow hood		150				154
Engineering	2	24 x 24	Flow hood		450				464
Engineering	3	24 x 24	Flow hood		450				438
Engineering	4	24 x 24	Flow hood		450				474
VAV-12 Total Air					1500				1530
Minimum					450				438
CF									1.15
VAV-13									
Office-2	1	24 x 24	Flow hood		150				169
Engineering	2	24 x 24	Flow hood		400				432
Engineering	3	24 x 24	Flow hood		400				438
Engineering	4	24 x 24	Flow hood		400				439
VAV-13 Total Air					1350				1478
Minimum					405				440
CF									1.06

Notes:
VAV-9; Box wide open. Balanced at 83% of design airflow.

Total Air Balance Co., Inc.

Date: 11/7/05
Project Name: California American Water
Office Remodel

Air Distribution Test Sheet

Area Served	Opening No.	Opening Size	SQ FT Area	Required Vel	Required CFM	Preliminary Vel	Preliminary CFM	Final Vel	Final CFM
Supply Air									
VAV-16									
Open Office	1	24 x 24	Flow hood		450				398
Open Office	2	24 x 24	Flow hood		450				402
VAV-16 Total Air					900				800
Minimum					270				275
CF									1.08
VAV-17									
Open Office	1	24 x 24	Flow hood		175				161
Open Office	2	24 x 24	Flow hood		175				149
Open Office	3	24 x 24	Flow hood		175				150
Open Office	4	24 x 24	Flow hood		175				156
VAV-17 Total Air					700				616
Minimum					210				204
CF									1.05

Notes:
VAV-17: Box wide open. Balanced at 88% of design airflow.
VAV-17: No water flow control device installed.

AIRDATA MULTIMETER CERTIFICATE OF RECALIBRATION

Customer ID: 006187

Customer: TOTAL AIR BALANCE COMPANY, INC. City: SAN JOSE State: CA S/N: M86154

As-Received Model #: ADM-870 Converted to Model #: Order #: R050775

PO #: Customer Eqpt ID#: Calibration Due Date: QA Code: 93 10CFR21:

This instrument has been calibrated using Calibration Standards which are traceable to NIST (National Institute of Standards and Technology). Quality Assurance Program and calibration procedures meet the requirements for 10CFR50 Appendix B; ANSI/N45.2; ANSI/NCSL Z540-1-1994; MIL-STD 45662A and manufacturer's specifications. Calibration accuracy is certified when meters are used with properly functioning accessories only. All Uncertainties are expressed in expanded terms (twice the calculated uncertainty). This report shall not be reproduced, except in full, without the written approval of Shortridge Instruments, Inc. Results relate only to the item calibrated. For limitations on use, see Shortridge Instruments, Inc. Instruction Manual for the use of AirData Multimeters. Procedure used: Procedure for Differential Pressure, Absolute Pressure and Temperature Recalibration of AirData Multimeters SIP-CP02 Revision: 24 Dated: 10/06/03

Calibration Technician(s): J Kautz L. Laubmeier Calibration Date: 03/25/2005

Calibration Approved by: Roy Baselos Title: Cal Mgr Date: 03/29/2005

As-Received By	Final Test By	Test By
OK	LL	
Date 03/18/05	Date 03/25/05	Date
Rh 34 %	Rh 40 %	Rh N/A %
Ambient Temperature 72 °F	Ambient Temperature 74 °F	Ambient Temperature °F
Barometric Pressure 28.37 in Hg	Barometric Pressure 28.48 in Hg	Barometric Pressure inHg
Within spec (YES) NO NA	Within spec (YES) NO	Within spec YES NO

ABSOLUTE PRESSURE TEST (in Hg)

TEST METER TOLERANCE = ± 2.0 % ± .1 in Hg AS-RECEIVED TEST WITHIN SPEC (YES) NO N/A

Pressure Standard: Heise #02-R	S/N: 41741/42451	Calibration Date: 03/31/04	Calibration Due Date: 04/2005	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #04-R	S/N: 41743/42453	Calibration Date: 06/01/04	Calibration Due Date: 06/2005	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #08-R	S/N: 42186/43328	Calibration Date: 02/07/05	Calibration Due Date: 02/2006	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #10-R	S/N: 42203/43352	Calibration Date: 03/01/05	Calibration Due Date: 03/2006	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #12-R	S/N: 43166/44731	Calibration Date: 12/13/04	Calibration Due Date: 06/2005	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #14-R	S/N: 43412/45043	Calibration Date: 01/10/05	Calibration Due Date: 07/2005	As-Rcvd	Test 2 Test 3

Heise Model PPM-2 Mfgd by Dresser Industries Rated Accuracy: 0.06% fs (0.0305 in Hg) Range: 0-61 in Hg Resolution: 0.01 Uncertainty: < 0.0358

Approx Set Pt	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff
14.0	13.97	13.8	-1.22	13.89	12.9	.67			
28.4	28.39	28.1	-1.02	28.48	28.3	-.63			
40.0	40.39	40.0	-.97	41.65	42.3	1.82			

DIFFERENTIAL PRESSURE TEST (in wc)

TEST METER TOLERANCE = ± 2.0 % ± 0.001 in wc AS-RECEIVED TEST WITHIN SPEC (YES) NO N/A

Pressure Standard: Heise #01-L	S/N: 41738/42449	Calibration Date: 04/12/04	Calibration Due Date: 04/2005	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #01-R	S/N: 41739/42449	Calibration Date: 04/12/04	Calibration Due Date: 04/2005	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #02-L	S/N: 41741/42454	Calibration Date: 04/05/04	Calibration Due Date: 04/2005	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #03-L	S/N: 41738/42448	Calibration Date: 06/11/04	Calibration Due Date: 06/2005	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #03-R	S/N: 41738/42445	Calibration Date: 06/09/04	Calibration Due Date: 06/2005	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #04-L	S/N: 41743/42455	Calibration Date: 06/11/04	Calibration Due Date: 06/2005	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #07-L	S/N: 42185/42186	Calibration Date: 02/11/05	Calibration Due Date: 02/2006	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #07-R	S/N: 42185/43326	Calibration Date: 02/11/05	Calibration Due Date: 02/2006	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #08-L	S/N: 42186/43329	Calibration Date: 02/11/05	Calibration Due Date: 02/2006	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #09-L	S/N: 42202/43351	Calibration Date: 03/01/05	Calibration Due Date: 03/2006	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #09-R	S/N: 42202/43350	Calibration Date: 03/01/05	Calibration Due Date: 03/2006	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #10-L	S/N: 42203/43353	Calibration Date: 03/02/05	Calibration Due Date: 03/2006	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #11-L	S/N: 43165/44551	Calibration Date: 12/15/04	Calibration Due Date: 06/2005	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #11-R	S/N: 43165/44730	Calibration Date: 12/14/04	Calibration Due Date: 06/2005	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #12-L	S/N: 43166/44732	Calibration Date: 12/15/04	Calibration Due Date: 06/2005	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #13-L	S/N: 43415/45041	Calibration Date: 01/15/05	Calibration Due Date: 07/2005	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #13-R	S/N: 43415/45039	Calibration Date: 01/15/05	Calibration Due Date: 07/2005	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #14-L	S/N: 43412/45045	Calibration Date: 01/15/05	Calibration Due Date: 07/2005	As-Rcvd	Test 2 Test 3

Differential Pressure Standards: Heise Model PPM1 Manufactured by Dresser Industries

#01-L, 03-L, 05-L, 07-L, 09-L, 11-L, 13-L, 15-L Rated Accuracy: > 0.07% fs (0.000175 in wc) Range: 0.0-0.25 in wc Res.: 0.00001 Uncertainty: < 0.00035
#01-R, 03-R, 05-R, 07-R, 09-R, 11-R, 13-R, 15-R Rated Accuracy: > 0.06% fs (0.003 in wc) Range: 0.0-5.0 in wc Res.: 0.0001 Uncertainty: < 0.00344
#02-L, 04-L, 06-L, 08-L, 10-L, 12-L, 14-L, 16-L Rated Accuracy: > 0.06% fs (0.03 in wc) Range: 0.0-50.0 in wc Res.: 0.001 Uncertainty: < 0.0346

Approx Set Pt	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff
.0500	.0506	.0504	-.40	.0533	.0530	-.56			
.1250	.1260	.1255	-.40	.1254	.1248	-.48			
.2250	.2204	.2200	-.18	.2271	.2264	-.31			
.2700	.2716	.2710	-.22	.2715	.2209	-.22			
2.000	2.027	2.026	-.05	2.039	2.037	-.10			
3.600	3.659	3.651	-.22	3.684	3.677	-.27			
4.400	4.456	4.470	.31	4.457	4.465	.27			
27.00	27.66	27.70	.14	27.58	27.56	-.07			
50.00	50.79	50.59	-.39	49.42	49.16	-.53			
Overrange									

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AIRDATA MULTIMETER CERTIFICATE OF RECALIBRATION

S/N: M156154
Order #: R050773

LOW VELOCITY CONFIRMATION (FPM)

TEST METER TOLERANCE = ± 3.0% ± 7 FPM AS-RECEIVED TEST WITHIN SPEC (YES) NO N/A

Vel Equiv Standard: AirData Multimeter S/N: M96151 Calibration Date: 05/20/03 Calibration Due Date: 05/2006 As-Rcvd Test 2 Test 3
Vel Equiv Standard: AirData Multimeter S/N: M03538 Calibration Date: 12/11/03 Calibration Due Date: 12/2006 As-Rcvd (Test 2) Test 3
Vel Equiv Standard: AirData Multimeter S/N: M03984 Calibration Date: 12/11/03 Calibration Due Date: 12/2006 As-Rcvd Test 2 Test 3
Vel Equiv Standard: AirData Multimeter S/N: M03573 Calibration Date: 12/11/03 Calibration Due Date: 12/2006 (As-Rcvd) Test 2 Test 3
Rated Accuracy: Velocity ± 1.5 % ± 3.5 fpm Manufactured by Shortridge Instruments, Inc. Range: 100-9000 fpm Resolution: 0.1
Uncertainty: <3.81 fpm at 100 fpm; <2.55 fpm at 500 fpm

Approx Set Point	Standard	Test Meter	Diff	Standard	Test Meter	Diff	Standard	Test Meter	Diff
100	117.3	119	-.3	111.5	109	-2.5			
500	515.8	509	3.2	492.8	491	-1.8			

ADM-640C, ADM-670/670C and ADM-860/860C AirData Multimeters are read in AirFoil Mode. ADM-850 Multimeters are read in Pitot Tube Mode.

TEMPERATURE TEST - AIRDATA MULTIMETER (° F)

TEST METER TOLERANCE = ± 0.2° F AS-RECEIVED TEST WITHIN SPEC (YES) NO N/A

RTD Simulator: S/N 249 Calibration Date: 03/16/04 Calibration Due Date: 03/2006 (As-Rcvd) Test 2 Test 3 Set Point: 35.6° F 95° F 154.4° F
RTD Simulator: S/N 250 Calibration Date: 03/16/04 Calibration Due Date: 03/2006 (As-Rcvd) Test 2 Test 3 Set Point: 35.6° F (95°) F 154.4° F
RTD Simulator: S/N 253 Calibration Date: 03/16/04 Calibration Due Date: 03/2006 (As-Rcvd) (Test 2) Test 3 Set Point: 35.6° F 95° F (154.4°) F
RTD Simulator: S/N 254 Calibration Date: 04/13/04 Calibration Due Date: 04/2006 As-Rcvd Test 2 Test 3 Set Point: 35.6° F 95° F 154.4° F
RTD Simulator: S/N 256 Calibration Date: 04/13/04 Calibration Due Date: 04/2006 As-Rcvd Test 2 Test 3 Set Point: 35.6° F 95° F 154.4° F
RTD Simulator: S/N 257 Calibration Date: 04/13/04 Calibration Due Date: 04/2006 As-Rcvd Test 2 Test 3 Set Point: 35.6° F 95° F 154.4° F
RTD Simulator: S/N 292 Calibration Date: 12/26/03 Calibration Due Date: 12/2005 As-Rcvd Test 2 Test 3 Set Point: 35.6° F 95° F 154.4° F
RTD Simulator: S/N 293 Calibration Date: 12/26/03 Calibration Due Date: 12/2005 As-Rcvd Test 2 Test 3 Set Point: 35.6° F 95° F 154.4° F
RTD Simulator: S/N 294 Calibration Date: 12/26/03 Calibration Due Date: 12/2005 As-Rcvd Test 2 Test 3 Set Point: 35.6° F 95° F 154.4° F
RTD Simulators Model RTD-1000/500 Manufactured by General Resistance Rated Accuracy: 0.025% of setting Range: 100 Ω to 11111.10 Ω
Resolution: 0.01 Ω Uncertainty: < 32 ppm

RTD Simulator Temperature Equivalent Set Point	Test Meter	Difference	Test Meter	Difference	Test Meter	Difference
35.60	35.7	.1	35.7	.1		
95.00	95.1	.1	95.0	0		
154.40	154.5	.1	154.5	.1		

TEMPERATURE TEST OF CUSTOMER'S TEMPROBE (° F)

TEMPROBE TOLERANCE = ± 0.3° F AS-RECEIVED TEST WITHIN SPEC (YES) NO N/A

Thermometer #4 S/N 92143/Thermistor S/N A310867 Calibration Date: 08/11/03 Cal Due Date: 08/2005 Set Point: 35° F 95° F (155) F
Thermometer #1 S/N 8A069/Thermistor S/N A410860 Calibration Date: 04/19/04 Cal Due Date: 06/2006 Set Point: 35° F (95°) F 155° F
Thermometer #3 S/N 92142/Thermistor S/N 850104 Calibration Date: 07/02/03 Cal Due Date: 07/2005 Set Point: (35°) F 95° F 155° F
Thermometer #2 S/N 8B104/Thermistor S/N 871507 Calibration Date: 10/21/04 Cal Due Date: 10/2006 Set Point: 35° F 95° F 155° F
Rated Accuracy(combined): 0.023° F/0.018° F Mfgd by Hart Scientific Range: 32° F-176° F Resolution: 0.001° F Combined Uncertainty: < 0.025° F

Temperature Standard AirData Multimeter S/N M00136 Calibration Date: 03/11/05 Cal Due Date: 03/2006 Set Point: (35°) F (95°) F (155) F
Temperature Standard AirData Multimeter S/N M96100 Calibration Date: 03/11/05 Cal Due Date: 03/2006 Set Point: 35° F 95° F 155° F
Rated Accuracy: 0.03° F Manufactured by Shortridge Instruments, Inc. Range: 33° F-158° F Resolution: 0.01° F Uncertainty: < 0.023° F
Total combined Uncertainty for TemProbe testing : < 0.038° F

Approx Set Point	Standard	TemProbe	Diff	TemProbe	Diff	TemProbe	Diff	TemProbe	Diff	TemProbe	Diff	TemProbe	Diff
35.0	35.0	34.9	-.1										
95.0	95.0	95.0	0										
155.0	155.0	155.0	0										

NOTES:

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