



CONTROLLED ENVIRONMENT PERFORMANCE TEST AND CERTIFICATION REPORT

Report ID#: 90232AA4

Client ID#: WMI61
Wilco Molding, Inc.
2435 Rock Island Blvd.
Maryland Heights, MO. 63043

13 May 2010

CLEANROOM PARTICLE COUNT ISO 8 CLASSIFICATION

The data presented in this report is an exact record of the controlled environment performance and was obtained in accordance with nationally recognized standard procedures. The results shown and information given in this report are certified to be accurate and complete, to the extent possible by equipment and procedures used on this date. Air Safe, LLC. warrants that the equipment or system contained in this report is operating at the levels specified herein, at and only at this time, and makes no other warranties, stated or implied, concerning the continued performance, operation or safety in use of this equipment past this time.

Performed by:

Zach Weller
Technician
Air Safe, LLC.

Reviewed by:

Michael D. Alleman
President
Air Safe, LLC.

Reviewed by Client:

Date



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AS-13MAY10-WMI61-CLEANROOM-PARTICLE-COUNT-Report.pdf



TABLE OF CONTENTS

13 May 2010

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Wilco Molding, Inc. – WMI61 – Maryland Heights, MO. – Cleanroom – 90232AA4

Summary _____ S-1-2
Room Diagram _____ D-1-2
Particle Count _____ C-1-2
Test Equipment ID Table _____ EQ-1
Test Equipment Calibration Certificates _____ Appendix 1



**SUMMARY &
RECOMMENDATIONS**

13 May 2010

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This certification was performed in order to verify each controlled cleanroom area met the desired ISO Class 8 classification. The following documents were utilized or referenced to perform this certification:

1. ISO 14644-1; Cleanrooms and Associated Controlled Environments – Part 1 – Classifications of Air Cleanliness
2. IEST-RP-CC006.3; Testing Cleanrooms (Institute of Environmental Sciences and Technology)

MODIFICATIONS

During this certification the following items were performed:

None.

ROOM PRESSURIZATION

Status: INFORMATIONAL

Room pressurization was observed and not measured. The ante room is positive in pressure in relation to the molding cleanroom. During this certification room pressures appeared to be in the correct direction.

PARTICLE COUNT CLASSIFICATION - Room

Status: **ACCEPTABLE**

The ante room met an ISO 14644 Class 8 environment in a "dynamic" operating condition with an upper confidence limit of 1,784,771 0.5 μ particles per cubic meter. The molding cleanroom met an ISO 14644 Class 8 environment in a "dynamic" operating condition with an average of 1,415,923 0.5 μ particles per cubic meter. The assembly cleanroom met an ISO 14644 Class 8 environment in a "dynamic" operating condition with an average of 872,386 0.5 μ particles per cubic meter. During this certification all rooms met their respectively required ISO Classification.

CURRENT CERTIFICATION SCHEDULE

Recertification of the rooms is due no later than May 23, 2011. (Annual)



**SUMMARY &
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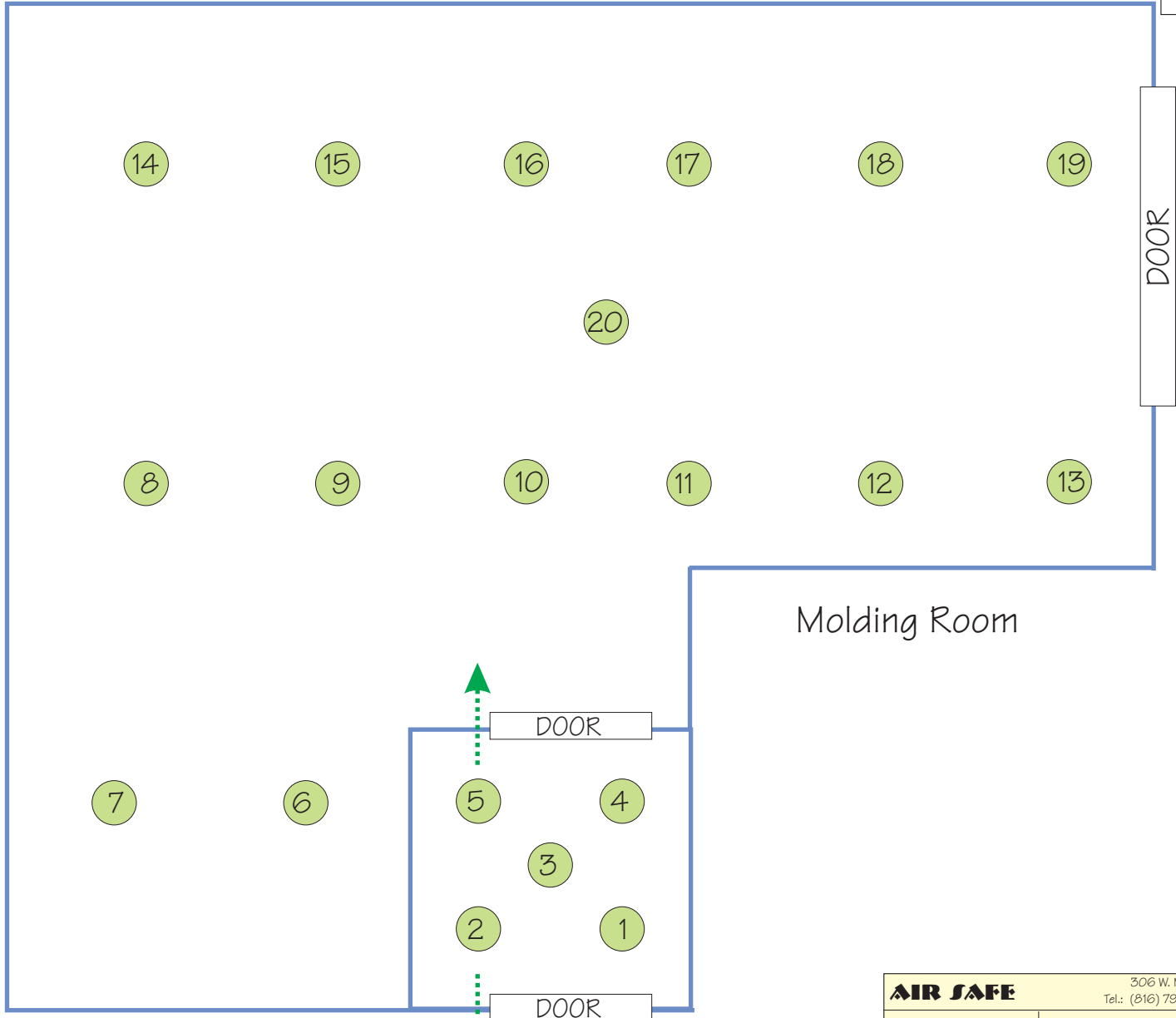
FINAL RECOMMENDATIONS

- None.



Included within this report are the room layout diagrams and the test data used to evaluate the cleanroom's performance during the time the facility was tested.

Facility Engineering Controls (Rooms) Final Status:

Acceptable

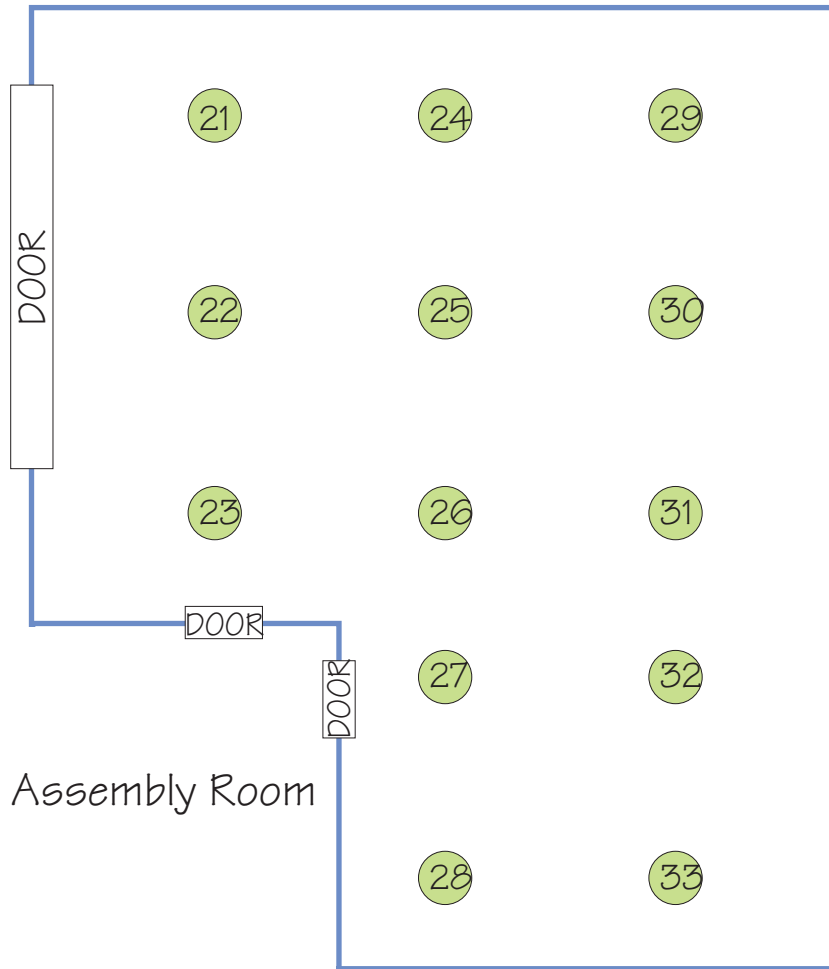


D-1

KEY	
	Room Pressure Direction (observed)
	Particle Count Location

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AIR SAFE			306 W. Murray St. Liberty, MO 64068 Tel.: (816) 792-8250 fax: (816) 792-8105
DATE: 13MAY10	90232	Drawn by: Z. Weller	
Buffer and Ante Room Layout w/ Supply, Particle Count, & Equip. Locations			
Original Sketches: 13MAY10			Revision: NONE



D-2

KEY

 Particle Count Location

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AIR SAFE			306 W. Murray St. Liberty, MO 64068 Tel.: (816) 792-8250 fax: (816) 792-8105
DATE: 13MAY10	90232	Drawn by: Z. Weller	
Buffer and Ante Room Layout w/ Supply, Particle Count, & Equip. Locations			
Original Sketches: 13MAY10			Revision: NONE

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PARTICLE COUNT PERFORMANCE

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Particle Count Summary

Equipment ID #:	Room	Fed Std. 209E†				ISO 14644-1				Desired Class	Actual Class
		Average	Std. Dev.	Std. Error	95% UCL	Average	Std. Dev.	Std. Error	95% UCL		
EQ-010	Ante Room	46878.00	3905.17	1743.38	50539.09	1655481	137910	61567	1784771	8	8
EQ-010	Molding Room	40094.47	2434.60	629.10	N/A	1415923	85977	22216	N/A	8	8
EQ-010	Assembly Room	24703.23	1974.69	548.53	N/A	872386	69736	19371	N/A	8	8

† Federal Standard 209E has been officially replaced with the ISO 14644 standard and is included here only for informational purposes.

Particle Count Data

Timestamp	Location (Number)	0.3 um (p/cu.ft.)	0.5 um (p/cu.ft.)	5.0 um (p/cu.ft.)	10.0 um (p/cu.ft.)	0.3 um (p/cu.mt.)	0.5 um (p/cu.mt.)	5.0 um (p/cu.mt.)	10.0 um (p/cu.mt.)	Time (sec)	Volume (cu.ft.)
5/13/2010 10:29:05	0	0	0	0	0	0	0	0	0	60	1.0
5/13/2010 10:36:48	0	0	0	0	0	0	0	0	0	60	1.0
5/13/2010 10:41:29	0	0	0	0	0	0	0	0	0	60	1.0
5/13/2010 10:53:13	1	429405	52733	134	73	15164294	1862248	4732	2578	60	1.0
5/13/2010 10:55:12	2	411919	48784	91	48	14546782	1722791	3214	1695	60	1.0
5/13/2010 10:56:32	3	395216	45658	68	30	13956921	1612397	2401	1059	60	1.0
5/13/2010 10:57:54	4	380451	43929	132	86	13435500	1551338	4662	3037	60	1.0
5/13/2010 10:59:18	5	377059	43286	70	47	13315713	1528631	2472	1660	60	1.0
5/13/2010 11:01:28	6	370566	42232	74	51	13086415	1491409	2613	1801	60	1.0
5/13/2010 11:03:42	7	372823	41935	39	18	13166120	1480921	1377	636	60	1.0
5/13/2010 11:05:27	8	386027	44414	78	49	13632415	1568466	2755	1730	60	1.0
5/13/2010 11:06:51	9	373577	41871	52	26	13192747	1478660	1836	918	60	1.0
5/13/2010 11:08:24	10	370468	42279	100	64	13082954	1493069	3531	2260	60	1.0
5/13/2010 11:09:53	11	367324	41513	47	28	12971925	1466018	1660	989	60	1.0
5/13/2010 11:11:14	12	361802	40846	53	33	12776917	1442463	1872	1165	60	1.0
5/13/2010 11:13:19	13	357238	39984	43	19	12615741	1412022	1519	671	60	1.0
5/13/2010 11:14:54	14	364114	40486	58	35	12858565	1429750	2048	1236	60	1.0
5/13/2010 11:16:18	15	355089	39533	56	29	12539850	1396095	1978	1024	60	1.0
5/13/2010 11:17:46	16	352858	38812	59	23	12461063	1370633	2084	812	60	1.0
5/13/2010 11:19:11	17	335509	37072	52	28	11848389	1309185	1836	989	60	1.0
5/13/2010 11:20:36	18	334024	36792	60	29	11795946	1299297	2119	1024	60	1.0
5/13/2010 11:22:00	19	346553	37897	45	17	12238404	1338320	1589	600	60	1.0
5/13/2010 11:23:23	20	334276	35751	66	37	11804846	1262535	2331	1307	60	1.0

Std. Dev. = Standard Deviation, Std. Error = Standard Error, UCL = Upper Confidence Limit, p/cu.ft = particle per cubic feet, p/cu.mt = particle per cubic meter, sec = seconds, cu.ft. = cubic feet, Fed Std. = Federal Standard, ISO = International Standards Organization, EQ = Test Equipment ID, NA = Not Applicable



**PARTICLE COUNT
PERFORMANCE**

13 May 2010

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**Particle Count Data
(cont.)**

Timestamp	Location (Number)	0.3 um (p/cu.ft.)	0.5 um (p/cu.ft.)	5.0 um (p/cu.ft.)	10.0 um (p/cu.ft.)	0.3 um (p/cu.mt.)	0.5 um (p/cu.mt.)	5.0 um (p/cu.mt.)	10.0 um (p/cu.mt.)	Time (sec)	Volume (cu.ft.)
5/13/2010 11:43:37	21	181376	21303	131	83	6405233	752308	4626	2931	60	1.0
5/13/2010 11:45:08	22	194329	22545	72	44	6862664	796169	2543	1554	60	1.0
5/13/2010 11:46:44	23	201095	23819	89	52	7101603	841160	3143	1836	60	1.0
5/13/2010 11:48:19	24	210173	24668	30	11	7422189	871142	1059	388	60	1.0
5/13/2010 11:49:56	25	203281	23835	31	12	7178801	841725	1095	424	60	1.0
5/13/2010 11:51:22	26	218701	25413	30	17	7723353	897452	1059	600	60	1.0
5/13/2010 11:53:05	27	203450	24083	84	57	7184769	850483	2966	2013	60	1.0
5/13/2010 11:54:29	28	213270	25491	89	51	7531559	900206	3143	1801	60	1.0
5/13/2010 11:56:16	29	196902	23472	85	39	6953529	828906	3002	1377	60	1.0
5/13/2010 11:57:40	30	201983	24601	99	53	7132962	868776	3496	1872	60	1.0
5/13/2010 11:59:26	31	206340	25354	62	36	7286828	895368	2190	1271	60	1.0
5/13/2010 12:00:56	32	232911	28331	96	54	8225174	1000500	3390	1907	60	1.0
5/13/2010 12:02:22	33	230665	28227	76	40	8145858	996827	2684	1413	60	1.0
5/13/2010 12:05:22	0	0	0	0	0	0	0	0	0	60	1.0

Technician Initials: ZW

Location "0" is part of the particle counter verification process, before and after use.

Based on .5um and greater particles at 42" from the floor unless otherwise noted.
All testing performed in a simulated operational condition
(Counts recorded in particle / cu.ft. with 60 second sample times)

See layout diagram for locations.

Std. Dev. = Standard Deviation, Std. Error = Standard Error, UCL = Upper Confidence Limit, p/cu.ft = particle per cubic feet, p/cu.mt = particle per cubic meter, sec = seconds, cu.ft. = cubic feet, Fed Std. = Federal Standard, ISO = International Standards Organization, EQ = Test Equipment ID, NA = Not Applicable



**TEST EQUIPMENT
ID CROSS REFERENCE**

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Test Equipment ID Cross Reference

Equip. ID #	Equipment Description	Serial #	Expiration
EQ-010	Lighthouse Particle Counter Solair 3100	070204017	4-May-11

Equip. ID # = Air Safe, LLC. assigned identification number, EQ = Test Equipment ID, NR = Not Required.

EQ-1



Certificate of Calibration

RMA#: US-20630	Date Calibrated: May 04, 2010
Model#: Solair 3100	Calibration Due: May 04, 2011
Serial Number 070204017	Sensor Block ID: 070204-021
Equipment Description: Laser Particle Counter	

The above named instrument conforms to the original specifications in effect at the time of manufacture. Calibration has been accomplished by size calibration as defined by ASTM F328-98 and size Calibration as defined by applicable sections of JIS B 9921. The accuracy of the standards and equipment used in the calibration are traceable to the National Institute of Standards and Technology or have been derived from acceptable values of natural and physical constants. A record of all work performed is maintained by Lighthouse Worldwide Solutions. Lighthouse Worldwide Solutions is in compliance with ANSI Z540-1/MIL-STD 45662A. All work performed is in accordance with Lighthouse Worldwide Solutions, Quality Manual P/N 714252800-1. Reproduction of this certificate and accompanying documentation is prohibited without the expressed written permission of Lighthouse Worldwide Solutions.

Channel 1: Meets or exceeds Manufacturers Specification of + - 20%
 Channel 2 : Meets or exceeds Manufacturers Specification of + - 10%

Calibration was performed under the following controlled conditions
 Temperature of **77.6 °F** Relative Humidity of: **27.5 %** Flow Rate **1.0 CFM**

Test Equipment:

Flow Meter: 118381	Calibration Due Date: 1/7/2011
DMM: 5935094	Calibration Due Date: 6/19/2010
MCA: 3597	Calibration Due Date: 6/19/2010

Spheres: Nominal Size	Lot Number	Channel	Threshold Voltages: in Millivolts
0.30	32011	1	36
0.50	31813	2	328
1.00	33084	3	815
3.00	35601	4	2435
5.00	33533	5	3338
10.00	33542	6	3884

Signed *Gordon Glathar* Date: 04-May-10
 Gordon Glathar

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