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Hi-Cube Storage Products

February 11th, 2016

Premium Labs

[REDACTED]

Burnaby, BC

[REDACTED]

Attn: Greg Hubbert

Dear Greg,

We have enclosed our report on the testing and certification performed at Premium Labs. This work was completed February 11th, 2016.

The Clean Room has been tested in accordance with ISO 14644-1. Particle Counts have been taken in accordance with ISO 14644-1 at "static" conditions.

I trust this report and the work performed have been to your satisfaction and if there are any questions please contact me at your convenience.

Best Regards,

A handwritten signature in black ink, appearing to read 'S. Leighton'.

Steve Leighton
H.E.P.A. Filter Services Inc.
Western Canada Area Manager

Clean Room Testing & Certification
Hi-Cube Storage Products - Premium Labs

Tests Performed By:

Steve Leighton, Wester Area Manager
Hartland Molson, Service Technician

Test Equipment Used:

Met One Particle Counter
Model 3423
Serial No. 1507532013

Shortridge Instruments DIM
Model ADM 870C
Serial No. M04791

TSI Anemometer
Model 9565-P
Serial No. 9565P1540015



Particle Counts per ISO 14644-1

Room particle Counts have been taken at “static” conditions approximately 1 meter from the floor level in accordance with ISO 14644-1.

ISO Classification:

ISO Class 5 Specifications:	3,520 @ 0.5 microns	29 @ 5.0 microns
ISO Class 6 Specifications:	35,200 @ 0.5 microns	293 @ 5.0 microns
ISO Class 7 Specifications:	352,000 @ 0.5 microns	2,930 @ 5.0 microns
ISO Class 8 Specifications:	3,520,000 @ 0.5 microns	29,300 @ 5.0 microns

Test Results:

Room	Location	Particle Size				ISO Class
		0.3μ	0.5μ	1.0μ	5.0μ	
Gowning Room	1	313,350.1	67,395.6	9,791.1	40.3	8
	2	430,548.4	104,248.7	18,750.8	161.0	
	3	375,956.6	73,765.2	9,666.6	25.2	
	\bar{x}	373,285.0	81,803.2	12,736.2	75.5	
	Std Dev	58,644.8	19,697.6	5,209.2	74.5	
	Std Err	33,858.6	11,372.4	3,007.5	43.0	
	Clean Room	1	3,373.5	2,124.9	1,324.3	
2		13,106.7	8,768.0	5,566.8	382.5	
3		3,984.4	1,348.2	769.7	50.3	
4		2,612.0	563.7	352.3	20.1	
5		9,451.3	6,129.8	4,031.2	387.5	
6		13,611.6	8,740.6	5,575.4	442.8	
7		12,033.4	8,404.7	5,495.8	427.8	
8		9,796.8	5,957.5	3,693.3	357.2	
9		12,863.3	8,062.2	4,891.6	442.9	
10		10,563.2	7,337.3	4,705.4	372.4	
\bar{x}		9,139.6	5,743.7	3,640.6	299.4	
Std Dev		4,255.3	3,207.1	2,059.4	168.9	
Std Err		1,345.6	1,014.2	651.2	53.4	

Room Differential Pressures

Differential pressures were tested amongst adjacent rooms. Upon inspection negative flow from the Gowning Room into the Clean Room was identified. Following a supply air adjustment in the Gowning Room, testing confirmed that airflow was occurring in the correct room order; flowing from Clean Room to Gowning Room then the Warehouse. The data below represents pressures following post adjustment.

Test Results:

Room	to	Room	Differential Pressure (iwc)
Warehouse		Gowning Room	+0.060 iwc
Warehouse		Clean Room	+0.075 iwc
Warehouse		Vent #1 Clean Room	+0.083 iwc
Warehouse		Vent #2 Clean Room	+0.076 iwc
Warehouse		Vent #3 Clean Room	+0.088 iwc
Warehouse		Vent #4 Clean Room	+0.077 iwc
Gowning Room		Clean Room	+0.014 iwc

Pressures recorded Inch Water Column (iwc).

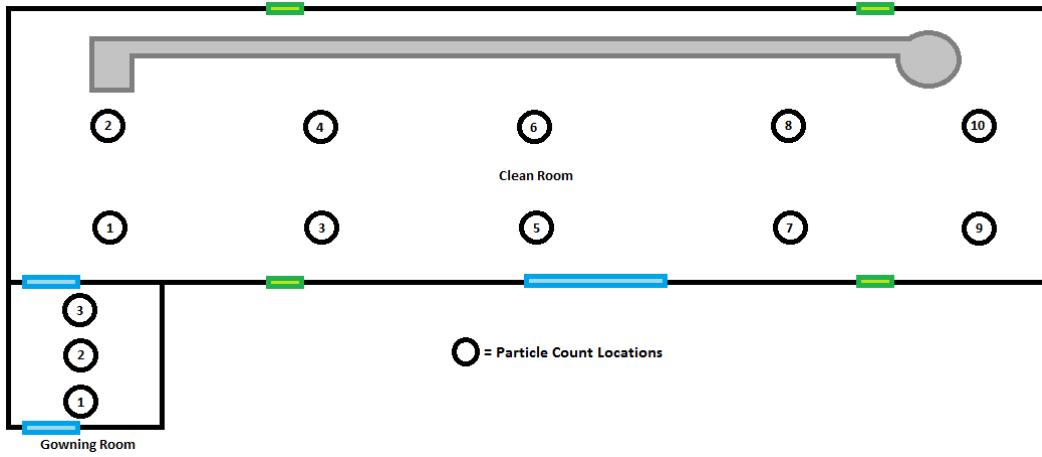
Air Changes per Hour

Diffused air supply by room was calculated, and total air changes per hour were calculated based on room volumes. Data below represents supply air following some minor adjustments.

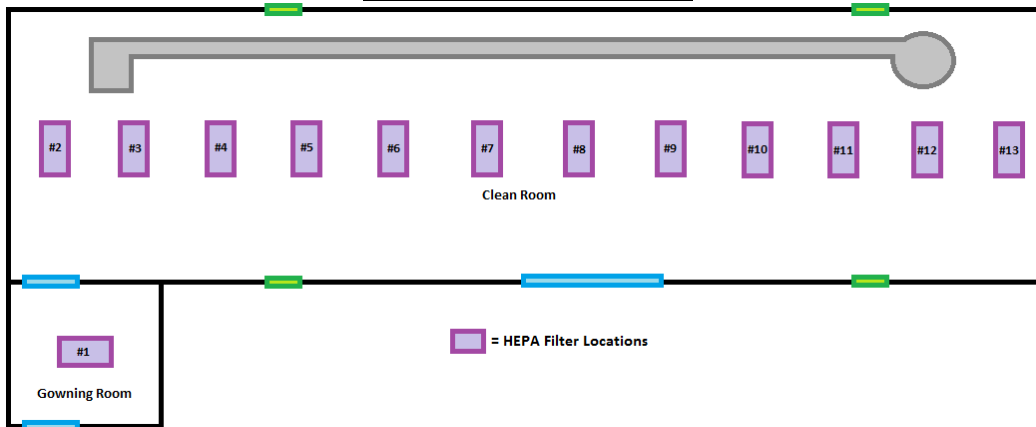
Room	Diffused Air Supply (cfm)	Room Volume (cu ft)	Air Changes Per Hour
Gowning Room	541	499	65
Clean Room	7016	8640	49

Room	HEPA Filter	Air Volume (cfm)	Comments
Gowning Room	#1	541	Airflow decreased to achieve correct pressure differential to Clean Room and Warehouse.
Clean Room	#2	565	-
	#3	573	-
	#4	567	Airflow increased.
	#5	603	-
	#6	611	-
	#7	627	-
	#8	527	-
	#9	598	-
	#10	581	-
	#11	612	-
	#12	554	-
	#13	598	-

Particle Count Locations



HEPA Filter Locations



Airflow Direction

