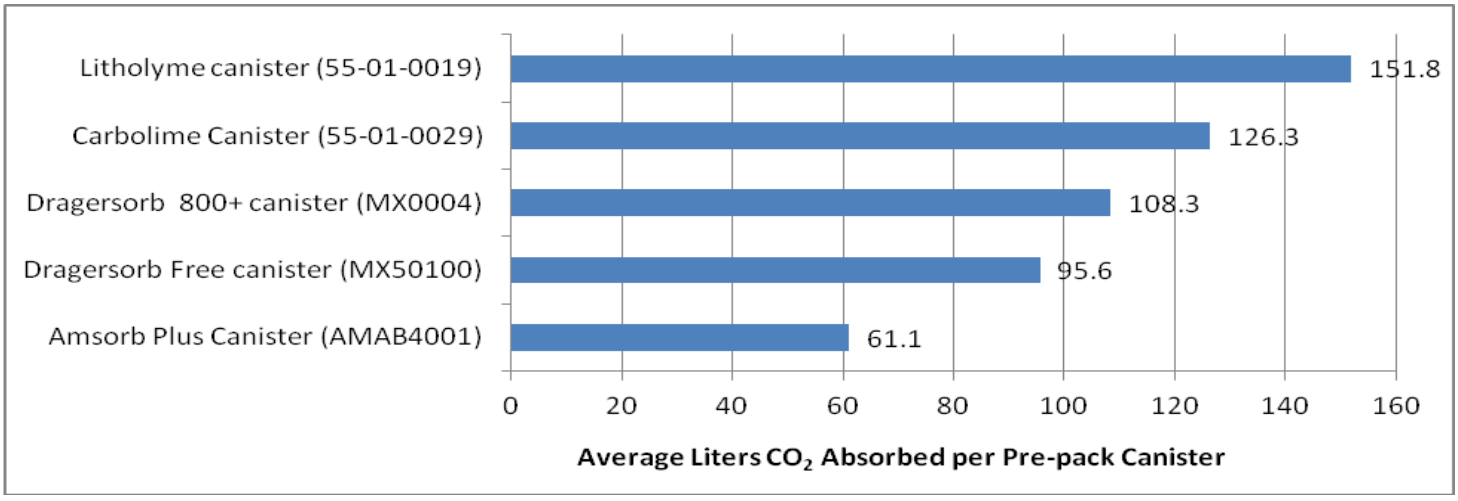
Comparative CO_2 Absorbent Capacity Analysis: Drager Style Pre-pack Canisters

Litholyme®, Dragersorb Free®, Dragersorb 800+®, Carbolime®, and Amsorb Plus®

Test Summary

The following study by engineers at Allied Healthcare Products, Inc. compares competitive pre-pack cartridges designed to fit Drager® Apollo®, Primus®, and Fabius® anesthesia workstations. This comparative study was performed on a Drager Apollo in a controlled environment under accelerated conditions. The table below is a summary of the results in liters of CO_2 absorbed per canister. The following pages provide detailed supporting information on experimental setup, test parameters, and test data.

Brand of Drager Style Pre-Pack Cartridge	**Liters of CO_2 Absorbed per canister**
• Dragersorb Free canister (MX50100)	**95.6**
• Dragersorb 800+ canister (MX0004)	**108.3**
• Litholyme canister (55-01-0019)	**151.8**
• Carbolime Canister (55-01-0029)	**126.3**
• Amsorb Plus Canister (AMAB4001)	**61.1**



Test Report

Date: 10July2013

Test Report: **Drager Style Cartridge Absorbency Test**

Author: WJ Kullmann

Test Conducted by: WJ Kullmann

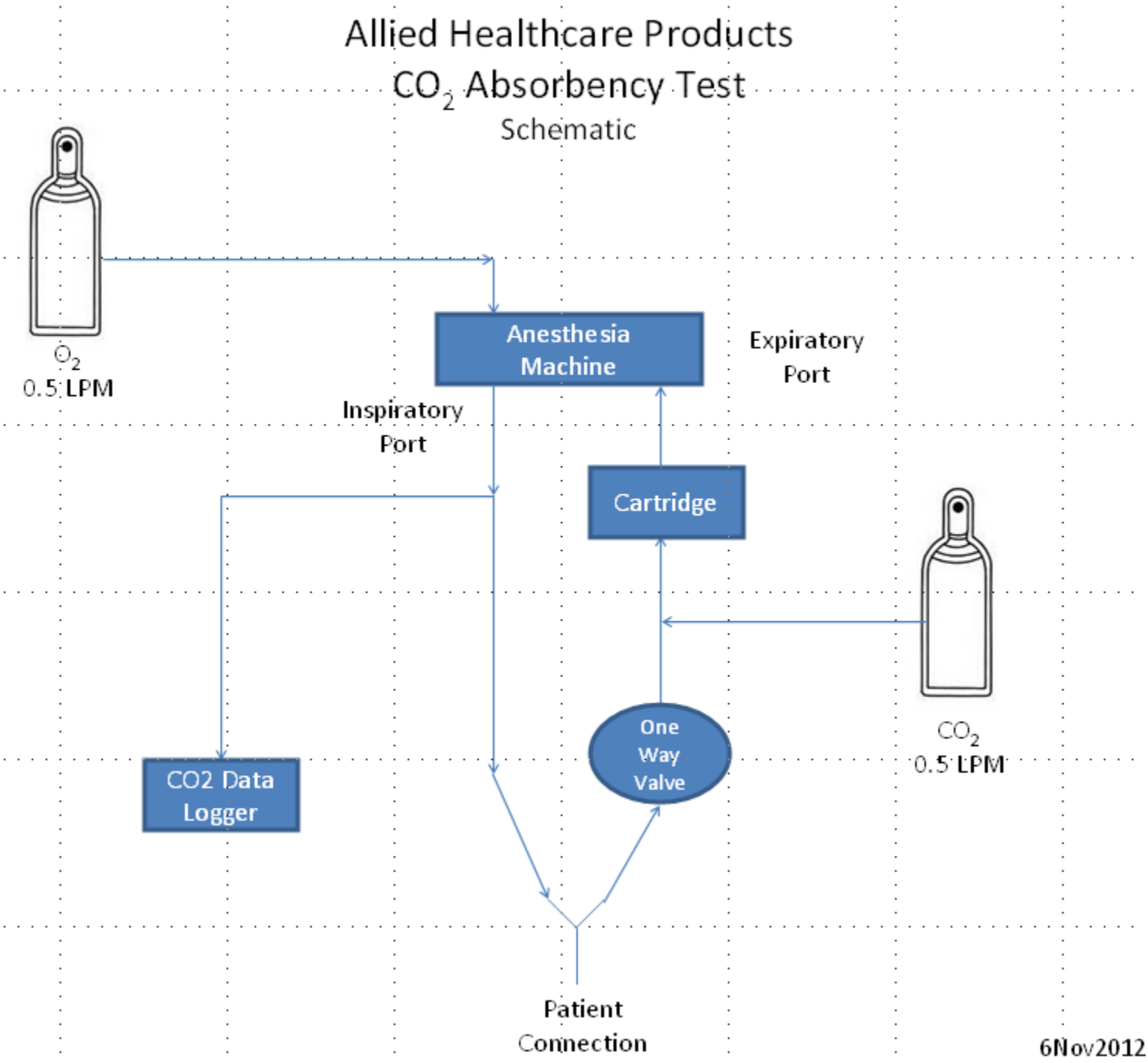
Test Equipment:

- Anesthesia Machine: Drager Apollo
  - Serial Number ASAH-0186
- Flow Analyzer: RT-200 # R05G
  - Calibration Date: 11/12 Calibration Due Date:5/13
- Flow Analyzer: RT-200 # Q04WS
  - Calibration Date: 3/13 Calibration Due Date:9/13
- Scale:
  - Calibration Date: 8/12 Calibration Due Date: 8/13
- CO_2 Sampling Data Logger: Tool # 4297
  - Calibration Date: 4/12 Calibration Due Date:4/13
  - Calibration Date: 4/13 Calibration Due Date:4/14
- Thermometer Tool# 4388
  - Calibration Date: 8/12 Calibration Due Date:8/14
- Timer Tool# 4387
  - Calibration Date: 8/12 Calibration Due Date:8/14

Test Purpose:
This test will measure the absorption capability of various CO_2 absorbent disposal cartridges in an accelerated usage test.

Test Report

Test Configuration / Schematic:



Test Report

Accelerated Test Description:

The capacity of a carbon dioxide absorbent may be tested by performing an absorption (utilization) experiment under conditions that simulate clinical use. This test will use an accelerated test method for comparison purposes. A fully functional anesthesia machine will be used to simulate clinical use. The accelerated method will consist of continually introducing test gas CO_2 into the patient return (expiratory) limb of the breathing circuit to simulate the exhaled breath of a patient. The simulated method will allow the test to be run continuously and will provide consistency throughout the test period. Gas concentrations are monitored at the inspiratory limb of the patient breathing circuit and is downstream of the absorbent cartridge. The test gas CO_2 is introduced into the expiratory limb of the patient circuit at a rate of 0.50 lpm. A one way check valve is installed between the patient connection and the anesthesia machine to ensure proper flow direction of the test gas. Fresh gas to the anesthesia machine will be supplied at a flow of 0.50 LPM of oxygen and will be metered within the anesthesia machine. Scavenging will be provided at approximately 25 cmH_2O.

The test is concluded when the CO_2 concentration in the inspiratory limb reaches a "breakthrough" concentration of 0.5 % CO_2. The capacity of the absorbent is determined by:

1. The amount of time to reach "breakthrough" (0.5% CO_2).
2. The volume amount of CO_2 delivered to the patient circuit.

The deliverables of this test will be expressed as:

1. Time to "breakthrough" (hours and minutes).
2. Volume CO_2 / kg absorbent. (L/kg).

Test Operating Conditions:

The test breath parameters will be as follows:

- 12 breaths per minute
- I:E Ratio of 1:2
- 500 ml Tidal Volume

Room temperature will be maintained at a temperature between 65 and 73° F.

Test Report

Test Procedure:

1. Measure / record the test cartridge weight.
2. Label the test cartridge as the test date.
3. Record the cartridge ID, Lot / Control # and Expiration date.
4. Record ambient room temperature.
5. Attach the absorbent cartridge to the anesthesia machine.
6. Turn on the anesthesia machine and set the following gas parameters:
    a. Set the anesthesia machine scavenging to the recommended flow.
    b. Set the fresh gas flow to 0.50 lpm Oxygen.
7. Perform a machine full self test.
8. Set the CO_2 flow to 0.50 lpm. Measure the CO_2 flow on the Flow Analyzer and attach to the expiratory side of the patient circuit.
9. Set the cycle counter to zero.
10. Set the timer to zero.
11. Set the breath parameters on the anesthesia machine to the following:
    a. Vt = 500 ml
    b. BPM = 12
    c. I/E = 1:2
    d. O_2 flow to .5 lpm
    e. PEEP to 2 H_2O.
12. Record the start time.
13. Record data throughout the test on the data sheet.
14. The test is completed at a CO_2 percent of 0.50.

Notes on Amsorb Plus:

The Amsorb Plus cartridge does not fit the Drager OEM CLIC adapter. A special adapter must be purchased from the manufactures of Amsorb Plus (Armstrong) in order to use the Amsorb cartridge on the Apollo machine.

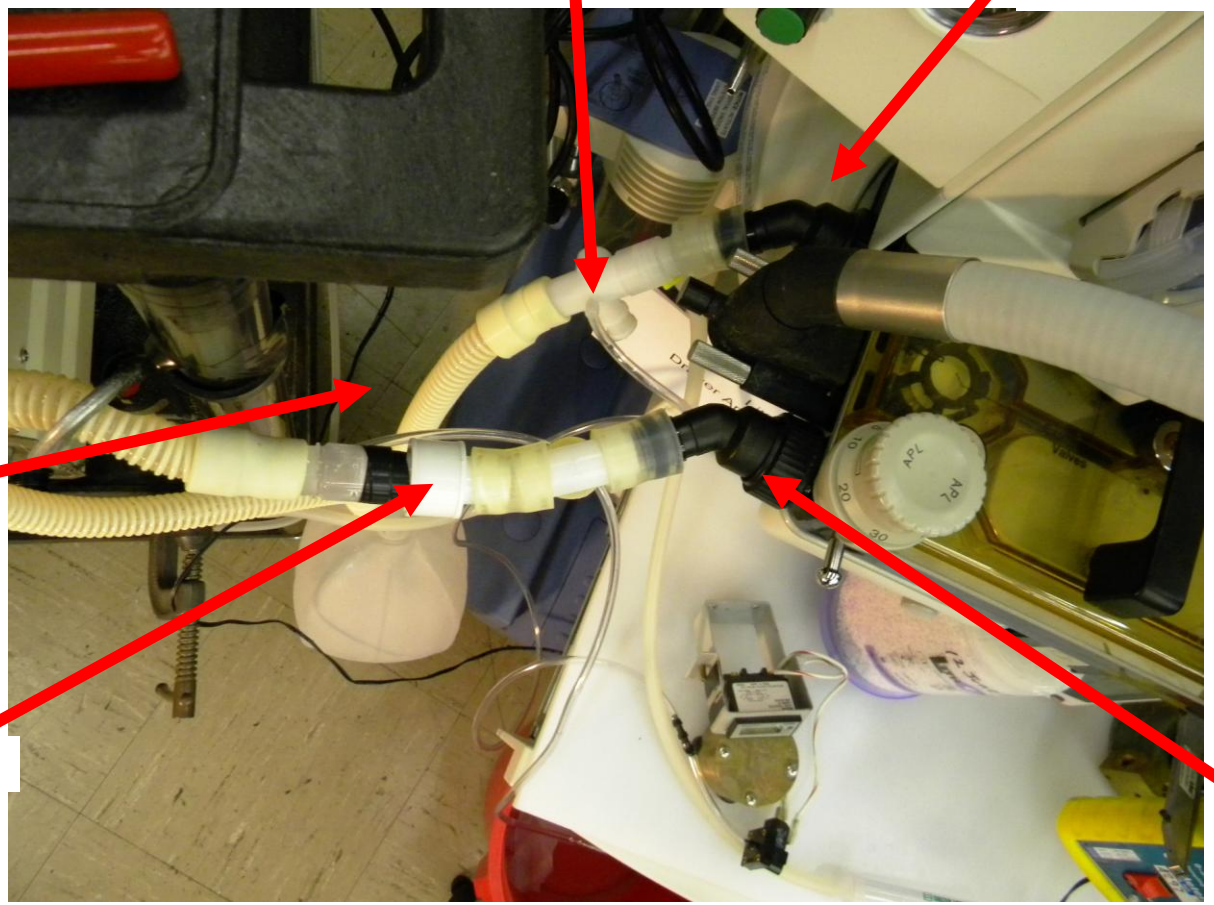
Video:

The test was video taped.
The file path for the video is:
P:/Engineering/RandD Engineering/ Absorbency Testing/ Drager

Test Report

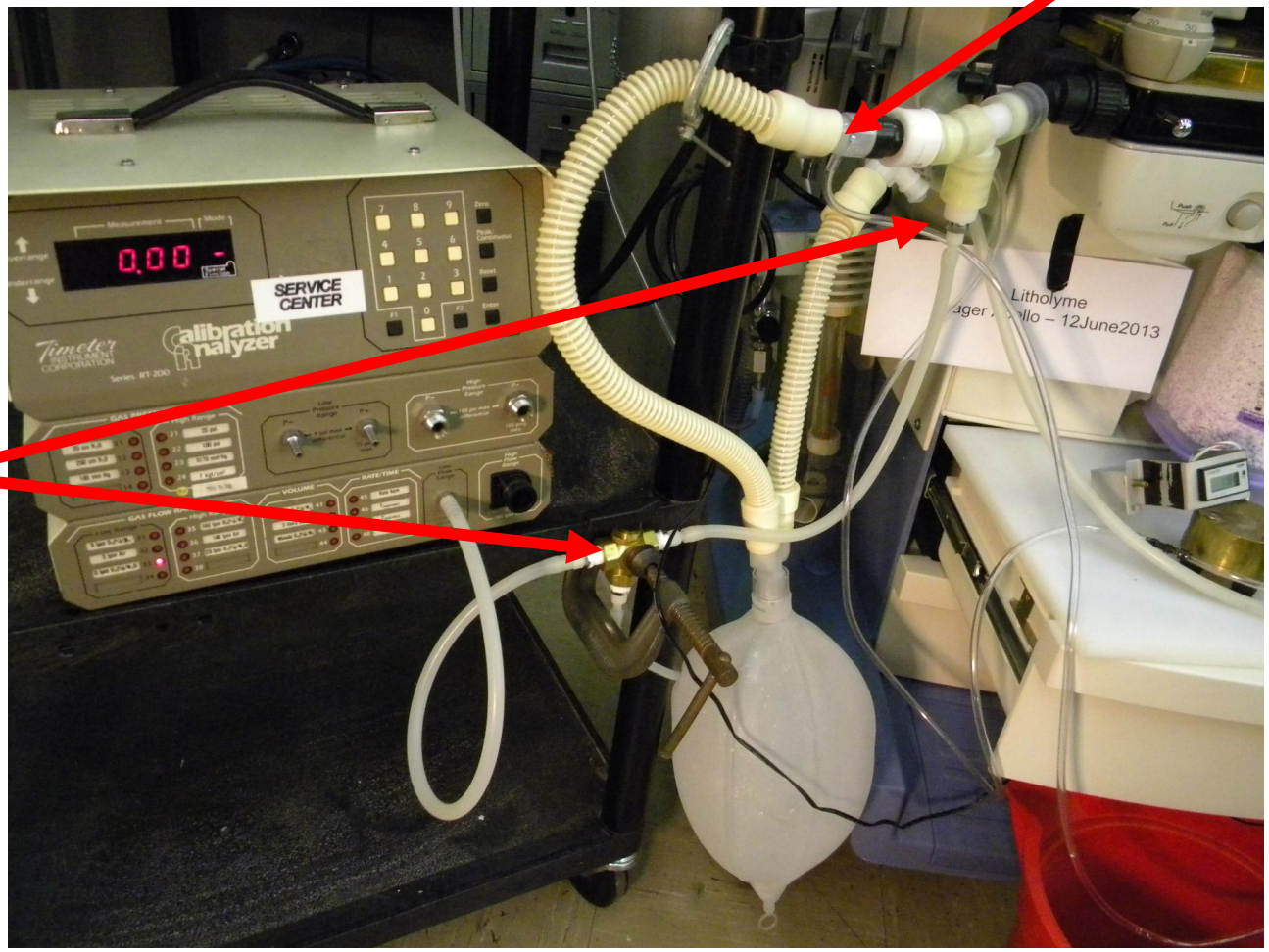
- **Test Set-Up Photos: Drager Apollo**

Test Report



Cycle Counter Pick up

CO_2 Test Gas Source



Test Report

Results:

Under identical test conditions, the following averages were measured:

	Liters of CO_2 Absorbed per Cartridge	CO_2/Kg	Canister Life * (Minutes)
• Drager FREE (OEM) canister :	**95.6**	**96.7**	**191**
• Drager 800+ (OEM) canister:	**108.3**	**113.1**	**217**
• Litholyme:	**151.8**	**138.4**	**304**
• Carbolime :	**126.3**	**109.5**	**253**
• Amsorb Plus	**61.1**	**66.7**	**122**

*** Accelerated Testing Results, see page 3 for description**

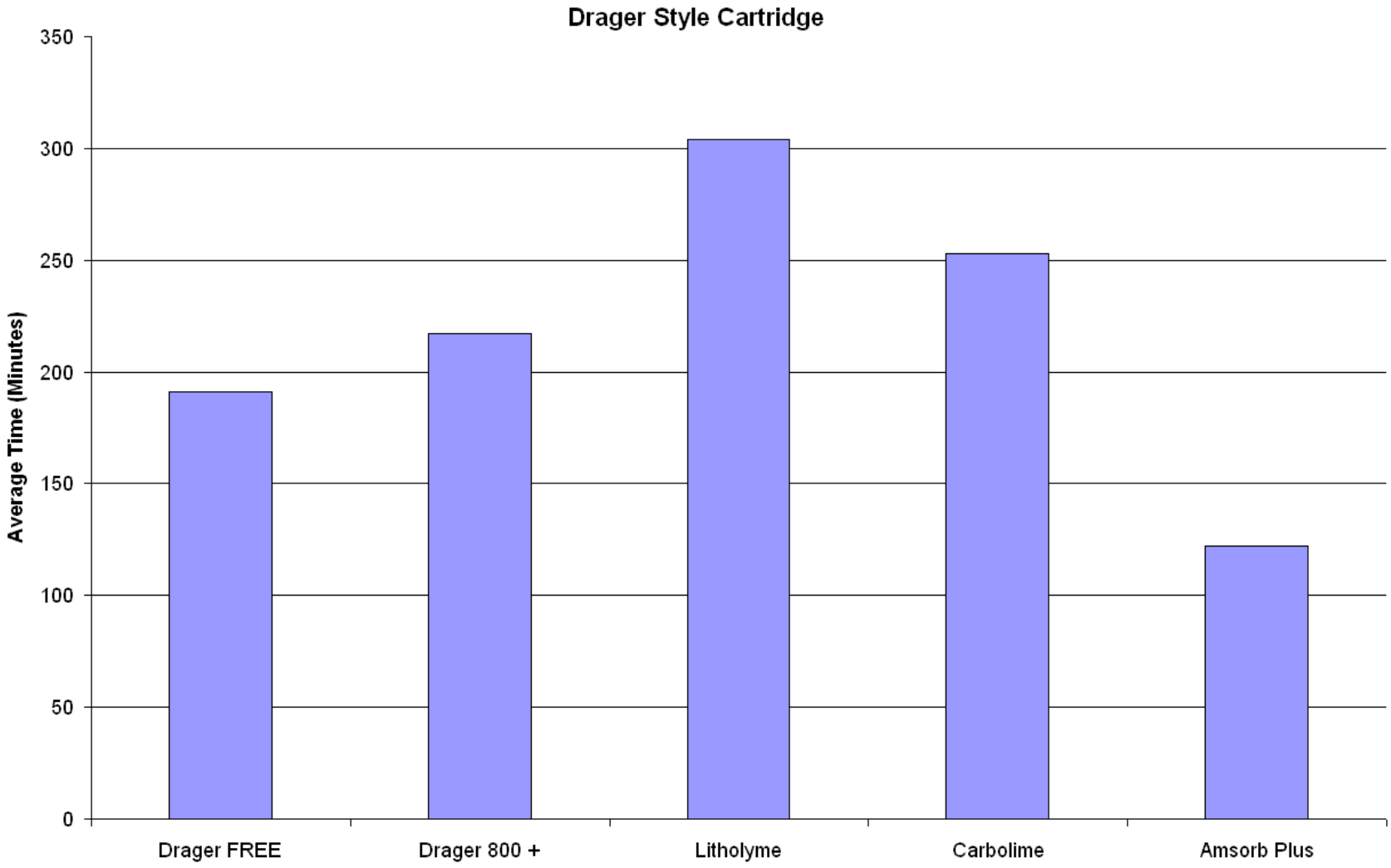
Test Report

Absorbency Test Results Summary - Drager Style Canister

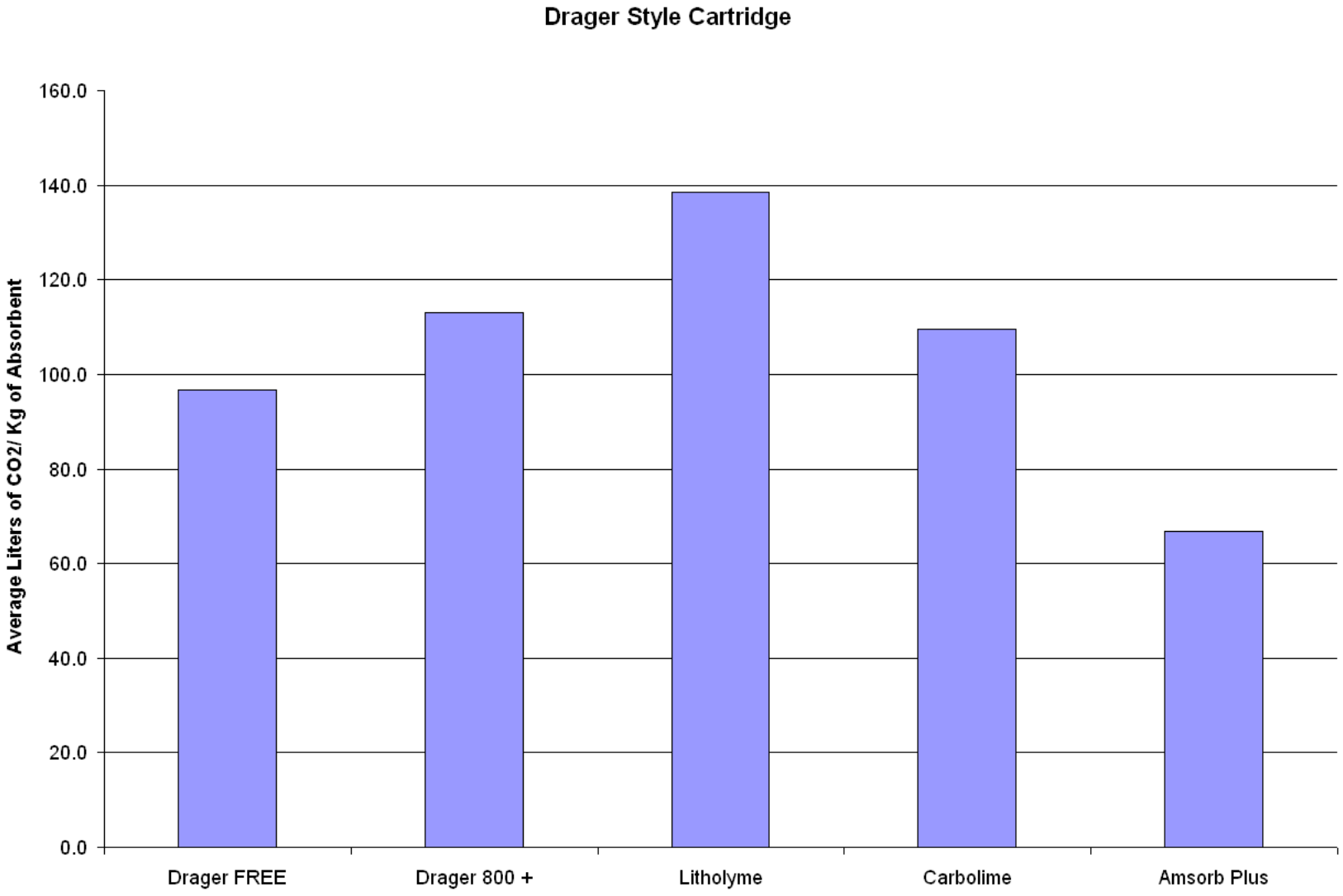
Constants		
g per lb	Vt	CO_2
453.6	(L)	Flow (LPM)
	0.5	0.5

Container	Gross Weight (grams)	Empty Container Weight (grams)	Net Absorbent Weight (grams)	Net Absorbent Weight (Kg)	Net Absorbent Weight (lb)	Time (hr:Min)	Time Minutes	CO2 Used (Liters)	Liters of CO_2 per Kg (Calculated)	Liters of CO_2 per lb (Calculated)
Drager FREE # 1	1106.1	104.9	1001.2	1.001	2.207	3:40	220	110.00	**109.9**	**49.8**
Drager FREE # 2	1088.1	104.9	983.2	0.983	2.168	3:05	185	92.50	**94.1**	**42.7**
Drager FREE # 3	1086.5	104.9	981.6	0.982	2.164	2:58	178	89.00	**90.7**	**41.1**
Drager FREE # 4	1093.0	104.9	988.1	0.988	2.178	3:02	182	91.00	**92.1**	**41.8**
Averages				**0.989**	**2.179**		191	**95.6**	**96.7**	
Drager 800+ #1	1072.5	104.9	967.6	0.968	2.133	3:59	239	119.50	**123.5**	**56.0**
Drager 800+ #2	1074.2	104.9	969.3	0.969	2.137	3:42	222	111.00	**114.5**	**51.9**
Drager 800+ #3	1077.0	104.9	972.1	0.972	2.143	3:38	218	109.00	**112.1**	**50.9**
Drager 800+ #4	1020.3	104.9	915.4	0.915	2.018	3:07	187	93.50	**102.1**	**46.3**
Averages				**0.956**	**2.108**		217	**108.3**	**113.1**	
Litholyme #1	1339.7	223.7	1116	1.116	2.460	5:15	315	157.50	**141.1**	**64.0**
Litholyme #2	1313.3	223.7	1089.6	1.090	2.402	5:00	300	150.00	**137.7**	**62.4**
Litholyme #3	1311.8	223.7	1088.1	1.088	2.399	5:04	304	152.00	**139.7**	**63.4**
Litholyme #4	1315.6	223.7	1091.9	1.092	2.407	4:55	295	147.50	**135.1**	**61.3**
Averages				**1.096**	**2.417**		304	**151.8**	**138.4**	
Carbolime #1	1356.8	223.7	1133.1	1.133	2.498	4:11	251	125.50	**110.8**	**50.2**
Carbolime #2	1389.1	223.7	1165.4	1.165	2.569	4:22	262	131.00	**112.4**	**51.0**
Carbolime #3	1383.9	223.7	1160.2	1.160	2.558	4:00	240	120.00	**103.4**	**46.9**
Carbolime #4	1378.4	223.7	1154.7	1.155	2.546	4:17	257	128.50	**111.3**	**50.5**
Averages				**1.153**	**2.543**		253	**126.3**	**109.5**	
Amsorb Plus #1	1170.0	253.3	916.7	0.917	2.021	2:11	131	65.50	**71.5**	**32.4**
Amsorb Plus #2	1164.9	253.3	911.6	0.912	2.010	2:03	123	61.50	**67.5**	**30.6**
Amsorb Plus #3	1173.0	253.3	919.7	0.920	2.028	2:01	121	60.50	**65.8**	**29.8**
Amsorb Plus #4	1171.9	253.3	918.6	0.919	2.025	1:54	114	57.00	**62.1**	**28.1**
Averages				**0.917**	**2.021**		122	**61.1**	**66.7**	

Test Report


Drager Style Cartridge
Average Time (Minutes)
350
300
250
200
150
100
50
0
Drager FREE
Drager 800 +
Litholyme
Carbolime
Amsorb Plus

Test Report


Drager Style Cartridge
Average Liters of CO2/ Kg of Absorbent
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
Drager FREE
Drager 800 +
Litholyme
Carbolime
Amsorb Plus

DATA

Test Report

Absorbency Test Results Summary - Drager Style Canister

Constants		
g per lb	Vt	CO_2
453.6	(L)	Flow
	0.5	(lpm)
		0.5

Container	Gross Weight (grams)	Empty Container Weight (grams)	Net Absorbent Weight (grams)	Net Absorbent Weight (Kg)	Net Absorbent Weight (lb)	Time (hr:Min)	Time Minutes	CO2 Used (Liters)	Liters of CO_2 per Kg	Liters of CO_2 per lb
Drager FREE #1	1106.1	104.9	1001.2	1.001	2.207	3:40	220	110.00	**109.9**	**49.8**
Drager FREE #2	1088.1	104.9	983.2	0.983	2.168	3:05	185	92.50	**94.1**	**42.7**
Drager FREE #3	1086.5	104.9	981.6	0.982	2.164	2:58	178	89.00	**90.7**	**41.1**
Drager FREE #4	1093.0	104.9	988.1	0.988	2.178	3:02	182	91.00	**92.1**	**41.8**
Averages				**0.989**	**2.179**		191	**95.6**	**96.7**	

Test Data: Drager FREE (OEM)

DRAGER FREE OEM Cartridge - Data										
	Test Date	Canister ID	Canister Lot #	Canister Expiration Date	Anesthesia Machine Self Test	Time	Elapsed Time (Hours:Minutes)	Cycle	% CO_2	Comments
Drager FREE #1	31May2013	31May2013	ARCM-F-002	2013-11	Pass	8:32		0		Start of Test
						9:18		551	0.033	
						9:53		977	0.036	
						10:45		1602	0.087	
						11:18		1991	0.173	
						11:31		2149	0.215	
						11:50		2374	0.325	
						12:01		2509	0.107	
						12:10		2617	0.479	
						12:12	3:40	2645	0.501	End of test
Drager FREE #2	3June2013	3June2013	ARCM-F-002	2013-11	Pass	9:31		0		Start of Test
						10:37		798	0.048	
						11:08		1162	0.083	
						11:28		1402	0.102	
						11:53		1703	0.179	
						12:03		1833	0.228	
						12:17		1991	0.307	
						12:23		2069	0.375	
						12:30		2148	0.426	
						12:36	3:05	2227	0.501	End of test

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Test Report

Test Data: Drager FREE (OEM)

Drager FREE #3	4June2013	4June2013	ARCM-F-002	2013-11	Pass	8:26		0		**Start of Test**
						9:32		799	0.035	
						10:00		1134	0.063	
						10:05		1430	0.114	
						10:12		1642	0.194	
						10:55		1796	0.259	
						11:07		1940	0.351	
						11:14		2022	0.401	
						11:20		2090	0.454	
						11:24	2:58	2139	0.501	**End of test**
Drager FREE #4	5June2013	5June2013	ARCM-F-002	2013-11	Pass	10:34		0		**Start of Test**
						11:24		599	0.014	
						12:14		1193	0.048	
						12:42		1535	0.128	
						1:02		1765	0.206	
						1:15		1921	0.275	
						1:21		1997	0.347	
						1:26		2061	0.392	
						1:30		2110	0.435	
						1:36	3:02	2182	0.500	**End of test**

Test Report

Drager 800+:

Absorbency Test Results Summary - Drager Style Canister										
	Constants									
	g per lb	Vt	CO_2							
	453.6	(L)	Flow							
		0.5	(lpm)							
			0.5							
		Empty Container	Net Absorbent	Net Absorbent	Net Absorbent	Time	Time	CO2 Used	Liters of CO_2 per Kg	Liters of CO_2 per lb
	Gross Weight	Weight	Weight	Weight	Weight	(hr:Min)	Minutes			
Container	(grams)	(grams)	(grams)	(Kg)	(lb)			(Liters)		
Drager 800+ #1	1072.5	104.9	967.6	0.968	2.133	3:59	239	119.50	**123.5**	**56.0**
Drager 800+ #2	1074.2	104.9	969.3	0.969	2.137	3:42	222	111.00	**114.5**	**51.9**
Drager 800+ #3	1077.0	104.9	972.1	0.972	2.143	3:38	218	109.00	**112.1**	**50.9**
Drager 800+ #4	1020.3	104.9	915.4	0.915	2.018	3:07	187	93.50	**102.1**	**46.3**
Averages				**0.956**	**2.108**		217	**108.3**	**113.1**	

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Test Report

Test Data: Drager 800+

DRAGER 800 + OEM Cartridge - Data										
	Test Date	Canister ID	Canister Lot #	Canister Expiration Date	Anesthesia Machine Self Test	Time	Elapsed Time (Hours:Minutes)	Cycle	% CO_2	Comments
Drager 800+ #1	6June2013	6June2013-B	ARD4-F012	2014-01	Pass	11:50		0		Start of Test
						12:23		404		
						1:11		977		
						2:15		1738		
						2:54		2206		
						3:12		2422		
						3:21		2537		
						3:43		2801		
						3:49	3:59	2873		End of test
Drager 800+ #2	7June2013	7June2013	ARD4-F012	2014-01	Pass	9:52		0		Start of Test
						10:23		393	-0.038	
						11:15		1016	-0.035	
						12:20		1789	0.029	
						12:50		2153	0.130	
						1:04		2324	0.220	
						1:16		2460	0.316	
						1:23		2553	0.373	
						1:29		2623	0.439	
						1:33	3:42	2671	0.500	End of test

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Test Report

Test Data: Drager 800+

Drager 800+ #3	10June2013	10June2013	ARD4-F012	2014-01	Pass	9:21		0		**Start of Test**
						10:12		621	-0.035	
						10:56		1146	-0.023	
						11:36		1625	0.019	
						12:13		2074	0.141	
						12:29		2268	0.232	
						12:41		2403	0.324	
						12:51		2524	0.405	
						12:54		2564	0.443	
						12:58	3:38	2614	0.500	**End of test**
Drager 800+ #4	11June2013	11June2013	ARD4-F012	2014-01	Pass	7:57		0		**Start of Test**
						8:59		744	-0.033	
						9:33		1144	-0.027	
						10:13		1631	0.014	
						10:45		2011	0.183	
						10:51		2083	0.237	
						10:55		2124	0.285	
						10:58		2170	0.376	
						11:02		2209	0.431	
						11:05	3:07	2248	0.501	**End of test**

Test Data: Litholyme

Absorbency Test Results Summary - Drager Style Canister										
	Constants									
	g per lb	Vt	CO_2							
	453.6	(L)	Flow							
		0.5	(lpm)							
			0.5							
		Empty Container	Net Absorbent	Net Absorbent	Net Absorbent	Time	Time	CO2 Used	Liters of CO_2 per Kg	Liters of CO_2 per lb
	Gross Weight	Weight	Weight	Weight	Weight	(hr:Min)	Minutes			
Container	(grams)	(grams)	(grams)	(Kg)	(lb)			(Liters)		
Litholyme #1	1339.7	223.7	1116	1.116	2.460	5:15	315	157.50	**141.1**	**64.0**
Litholyme #2	1313.3	223.7	1089.6	1.090	2.402	5:00	300	150.00	**137.7**	**62.4**
Litholyme #3	1311.8	223.7	1088.1	1.088	2.399	5:04	304	152.00	**139.7**	**63.4**
Litholyme #4	1315.6	223.7	1091.9	1.092	2.407	4:55	295	147.50	**135.1**	**61.3**
Averages				**1.096**	**2.417**		304	**151.8**	**138.4**	

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Test Report

Test Data: Litholyme

Litholyme Drager Style Cartridge - Data										
	Test Date	Canister ID	Canister Lot #	Canister Expiration Date	Anesthesia Machine Self Test	Time	Elapsed Time (Hours:Minutes)	Cycle	% CO_2	Comments
Litholyme # 1	12June2013	12June2013	L00413	01/2015	**Pass**	7:53		0		**Start of Test**
						8:39		559	-0.042	
						9:27		1137	-0.041	
						10:26		1841	-0.038	
						11:06		2314	-0.023	
						12:30		3321	0.166	
						12:36		3404	0.210	
						12:54		3612	0.345	
						12:59		3676	0.399	
						1:08	5:15	3782	0.500	**End of test**
The video of this test was interrupted at 12:30 PM due to an electrical power interruption.										
Litholyme # 2	13June2013	13June2013	L00413	01/2015	**Pass**	7:45		0		**Start of Test**
						8:46		733	-0.041	
						9:37		1343	-0.038	
						10:48		2196	-0.023	
						11:08		2440	-0.009	
						11:56		3014	0.111	
						12:33		3452	0.365	
						12:37		3505	0.403	
						12:42		3557	0.454	
						12:45	5:00	3597	0.511	**End of test**

Test Report

Test Data: Litholyme

	Test Date	Canister ID	Canister Lot #	Canister Expiration Date	Anesthesia Machine Self Test	Time	Elapsed Time (Hours:Minutes)	Cycle	% CO_2	Comments
Litholyme # 3	14June2013	14June2013	L00413	01/2015	**Pass**	8:44		0		**Start of Test**
						9:56		862		
						10:49		1506		
						11:22		1895		
						12:57		3031		
						1:07		3156		
						1:24		3363		
						1:34		3479		
						1:41		3567		
						1:49	5:04	3656		**End of test**
Litholyme # 4	17June2013	17June2013	L00413	01/2015	**Pass**	8:40		0		**Start of Test**
						10:01		970	-0.043	
						10:46		1511	-0.042	
						11:14		1844	-0.038	
						12:12		2541	-0.005	
						12:46		2951	0.084	
						1:03		3148	0.174	
						1:26		3433	0.381	
						1:30		3467	0.416	
						1:36	4:56	3545	0.500	**End of test**

Test Data: Carbolime

Absorbency Test Results Summary - Drager Style Canister										
	Constants									
	g per lb	Vt	CO_2							
	453.6	(L)	Flow							
		0.5	(lpm)							
			0.5							
		Empty Container	Net Absorbent	Net Absorbent	Net Absorbent	Time	Time	CO2 Used	Liters of CO_2 per Kg	Liters of CO_2 per lb
	Gross Weight	Weight	Weight	Weight	Weight	(hr:Min)	Minutes			
Container	(grams)	(grams)	(grams)	(Kg)	(lb)			(Liters)		
Carbolime #1	1356.8	223.7	1133.1	1.133	2.498	4:11	251	125.50	**110.8**	**50.2**
Carbolime #2	1389.1	223.7	1165.4	1.165	2.569	4:22	262	131.00	**112.4**	**51.0**
Carbolime #3	1383.9	223.7	1160.2	1.160	2.558	4:00	240	120.00	**103.4**	**46.9**
Carbolime #4	1378.4	223.7	1154.7	1.155	2.546	4:17	257	128.50	**111.3**	**50.5**
Averages				**1.153**	**2.543**		253	**126.3**	**109.5**	

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Test Report

Test Data: Carbolime

Carbolime Drager Style Cartridge - Data										
	Test Date	Canister ID	Canister Lot #	Canister Expiration Date	Anesthesia Machine Self Test	Time	Elapsed Time (Hours:Minutes)	Cycle	% CO_2	Comments
Carbolime # 1	18June2013	18June2013	C12813	05/2015	Pass	10:47		0		Start of Test
						12:28		1212	-0.037	
						1:25		1894	0.005	
						2:00		2320	0.100	
						2:22		2583	0.202	
						2:30		2660	0.242	
						2:38		2765	0.312	
						2:44		2843	0.363	
						2:49		2906	0.414	
						2:58	4:11	3016	0.500	End of test
Carbolime # 2	19June2013	19June2013	C12813	05/2015	Pass	7:48		0		Start of Test
						9:21		1131	-0.039	
						10:10		1716	-0.017	
						10:29		1950	0.002	
						10:47		2166	0.021	
						11:28		2661	0.171	
						11:35		2745	0.216	
						11:52		2943	0.336	
						12:04		3092	0.434	
						12:10	4:22	3158	0.500	End of test

Test Report

Test Data: Carbolime

Carbolime # 3	19June2013	19June2013B	C12813	05/2015	**Pass**	12:13				**Start of Test**
						1:01		587	-0.038	
						1:47		1137	-0.036	
						2:14		1457	-0.015	
						2:35		1707	0.007	
						3:16		2207	0.110	
						3:36		2446	0.196	
						3:43		2523	0.248	
						3:59		2719	0.634	
						4:13	4:00	288	0.500	
Carbolime # 4	20June2013	20June2013	C12813	05/2015	**Pass**	7:00		0		**Start of Test**
						8:06		791	-0.041	
						8:39		1194	-0.036	
						9:38		1897	-0.013	
						9:56		2125	0.014	
						10:28		2500	0.126	
						10:49		2747	0.235	
						10:57		2848	0.313	
						11:09		2985	0.407	
						11:17	4:17	3088	0.500	**End of test**

Test Report

Test Data: Amsorb Plus

Absorbency Test Results Summary - Drager Style Canister

Constants		
g per lb	Vt	CO_2
453.6	(L)	Flow
	0.5	(lpm)
		0.5

Container	Gross Weight (grams)	Empty Container Weight (grams)	Net Absorbent Weight (grams)	Net Absorbent Weight (Kg)	Net Absorbent Weight (lb)	Time (hr:Min)	Time Minutes	CO2 Used (Liters)	Liters of CO_2 per Kg	Liters of CO_2 per lb
Amsorb Plus #1	1170.0	253.3	916.7	0.917	2.021	2:11	131	65.50	**71.5**	**32.4**
Amsorb Plus #2	1164.9	253.3	911.6	0.912	2.010	2:03	123	61.50	**67.5**	**30.6**
Amsorb Plus #3	1173.0	253.3	919.7	0.920	2.028	2:01	121	60.50	**65.8**	**29.8**
Amsorb Plus #4	1171.9	253.3	918.6	0.919	2.025	1:54	114	57.00	**62.1**	**28.1**
Averages				**0.917**	**2.021**		122	**61.1**	**66.7**	

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Test Report

Test Data: Amsorb Plus

Amsorb Plus Cartridge - Data										
	Test Date	Canister ID	Canister Lot #	Canister Expiration Date	Anesthesia Machine Self Test	Time	Elapsed Time (Hours:Minutes)	Cycle	% CO_2	Comments
Amsorb Plus # 1	3July2013	3July2013	180313-F12	2016-02	Pass	8:13				Start of Test
						8:45		188	-0.025	
						9:04		624	0.037	
						9:20		810	0.066	
						9:35		994	0.108	
						9:50		1177	0.187	
						10:00		1288	0.269	
						10:07		1374	0.334	
						10:16		1491	0.428	
						10:24	2:11	1579	0.502	End of test
Amsorb Plus # 2	5July2013	5July2013	180313-F12	2016-02	Pass	10:18				Start of Test
						10:55		439	0.025	
						11:17		709	0.082	
						11:33		896	0.130	
						11:49		1086	0.204	
						11:58		1200	0.277	
						12:03		1258	0.307	
						12:13		1373	0.389	
						12:17		1420	0.432	
						12:21	2:03	1475	0.505	End of test

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Test Report

Test Data: Amsorb Plus

Amsorb Plus # 3	5July2013	5July2013-B	180313-F12	2016-02	**Pass**	12:24				**Start of Test**
						12:49		295	0.038	
						1:28		763	0.146	
						1:40		912	0.177	
						1:52		1048	0.234	
						2:02		1177	0.296	
						2:09		1258	0.341	
						2:12		1293	0.366	
						2:18		1361	0.411	
						2:25	2:01	1452	0.500	**End of test**
Amsorb Plus # 4	8July2013	8July2013	180313-F12	2016-02	**Pass**	7:47				**Start of Test**
						8:08		253	0.003	
						8:24		448	0.040	
						8:40		633	0.120	
						8:54		800	0.141	
						9:02		907	0.184	
						9:10		999	0.228	
						9:23		1153	0.322	
						9:37		1219	0.444	
						9:42	1:54	1380	0.500	**End of test**