



***S&B PERFORMANCE
FILTERS & INTAKE KITS***

TEST RESULTS

Certified to the ISO 5011 Air Filtration Standard

1999-2005 GM Trucks & SUVs (Gas)

S&B Performance Filter 66-2129D

(Test Results for Parts Made After 5/1/06)

ISO 5011, Second Edition Air Filter or Intake Kit Test Report

The test data presented in the following report represents the restriction of airflow, efficiency and dust loading capacity. The filters tested were procured from various distributors or provided by customers. The tests were performed in accordance with ISO 5011. The following were measured in accordance with the test: (1) Pressure Drop for Clean Element, Initial Efficiency and Dust Loading Capacity. The Flow Rate used to conduct the Dust Loading and Capacity test(s) is listed under the *Average Environmental Conditions and Test Specifications*. PTI ISO Course Test Dust was utilized and the particle data sheet for the batch is attached.

The test sequence begins with measuring the pressure drop of a clean filter as a function of the airflow rate which is measured in cubic feet per minute (CFM). Subsequently, the cumulative efficiency and dust loading capacity are measured. The termination point when measuring for capacity is shown at the bottom of the report under the heading *Termination ΔP* . The results of the tests are recorded in the top table and charts shown on the next page. The filters are inspected before and after the tests are performed.

The Top Table demonstrates the results of the testing for up to three (3) samples per filter type (part number). The Efficiency represents the amount of dust (contaminants) that was stopped by the filter during each test. The Capacity measures the dust holding capability of the filter.

During the test, the filter is loaded with dust until it reaches a terminal pressure drop increase of 10 inches of water (28" H₂O for Heavy Duty Vehicles) across the filter element (please refer to the Average Environmental Conditions and Test Specifications at the bottom of the next page to verify the pressure drop utilized on this particular test).

The Line Graph shows the pressure drop as a function of the airflow rate for the clean filter(s). The computer controlled test equipment initiates the test at close to zero (0) cubic feet per minute (CFM) and then increases the CFM gradually until the CFM termination point is reached. During the test, the restriction of the filter is measured in inches of water ("H₂O) as it relates to the air flow rate (CFM). Visual inspections of filters are performed to insure against dust leakage and manufacturing flaws.

The Bar Graph illustrates the cumulative efficiency for the filter(s) tested.

Definition of Terms & Test Protocol

Restriction

Restriction measures how difficult it is for the air to get through the filter and is measured in inches of H₂O. Instead of referring to restriction, the industry uses "air flow" to describe the effect of restriction. They say for example, that a High Performance Filter "flows better" than the OEM paper filter. On a line graph, the lower the restriction of a filter the better the air flow.

Efficiency

Efficiency is measured in % and is the amount of dirt/contaminants that the filter stops from going into the engine.

Capacity

Capacity is the total amount of contaminants/dirt the filter will hold before reaching its termination point. The termination point is a predefined restriction point that is used as the cut-off point when measuring how much dirt a filter will hold. For typical vehicles, 10" H₂O is used at the termination point. For heavy duty trucks, this number is 28" H₂O.

Note: Testing was conducted based on the ISO 5011 testing standard; however, variances from the actual test procedures may exist. The intent of the testing is to show comparative test results between various products that are intended for similar use. Tests are conducted under a climate controlled environment; however, changes in temperature and humidity between tests may occur which could alter the actual test results.

ISO 5011 Air Filtration Standard

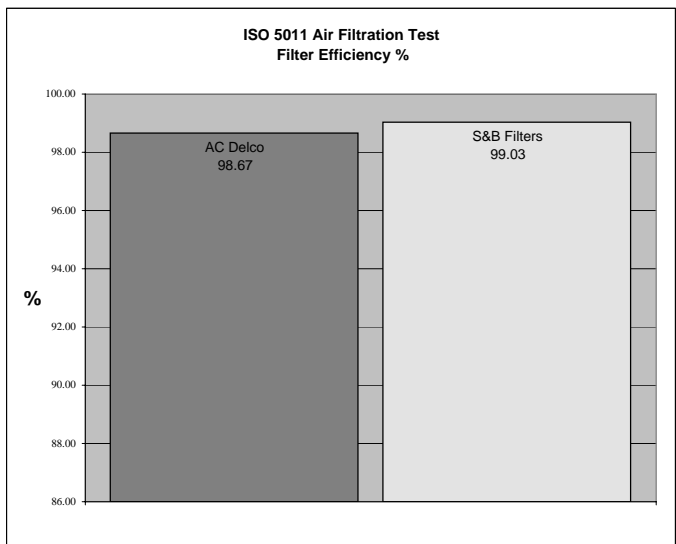
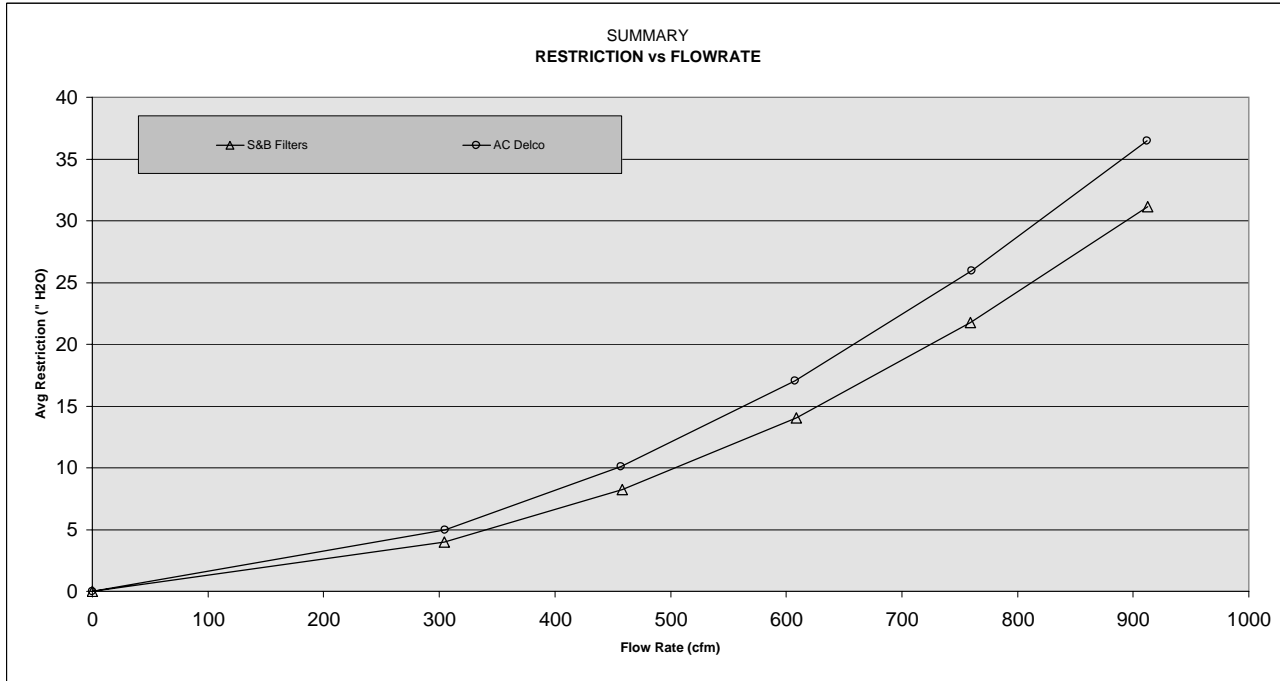
Replacement Air Filter Comparison

S&B Filters 66-2129D

Test Number 216

Filter Description & No.	RUN #	# PLEATS	INITIAL RESTRIC. (H ₂ O)	CAPACITY (grams)	EFFICIENCY (%)	Air Flow (scfm) Avg of 3 Samples	Net Restriction (Inches of H ₂ O)	% Less Restrictive than A1618CAC Delco
Filter #1	1	21	12.6	240.5	99.08	0.0	0.000	0.0%
S&B Filters	2	21	13.3	243.2	99.01	304.5	3.967	20.5%
66-2129D	3	21	12.8	276.1	99.01	458.3	8.246	18.3%
	AVERAGE	21.0	12.9	253.3	99.03	608.9	14.043	17.5%
						759.4	21.752	16.1%
						912.6	31.160	14.6%

Filter #2	1	121	15.6	355.8	98.80	0.0	0.000	
AC Delco	2	121	17.1	562.8	98.52	304.7	4.989	
A1618C	3	121	17.1	457.6	98.68	457.3	10.098	
	AVERAGE	121.0	16.6	458.8	98.67	607.6	17.031	
						760.5	25.935	
						912.0	36.476	



**ISO 5011 Air Filtration Test
Air Flow Summary**

01'-05' GM 6.6L Duramax Diesel

S&B Filters Part Number 66-2129D Flows:

17.5% Better Than AC Delco At Rated Flow
17.4% Better Than AC Delco Across CFM Spectrum

AVERAGE ENVIRONMENTAL CONDITIONS & TEST SPECIFICATIONS

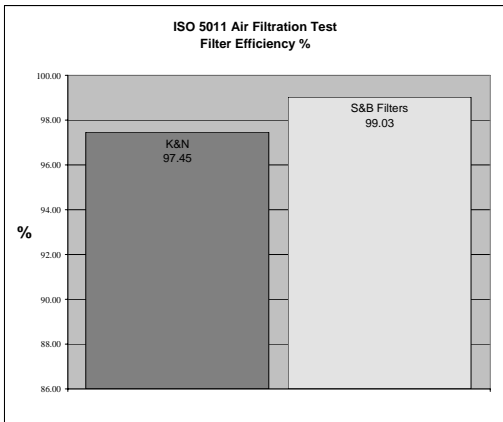
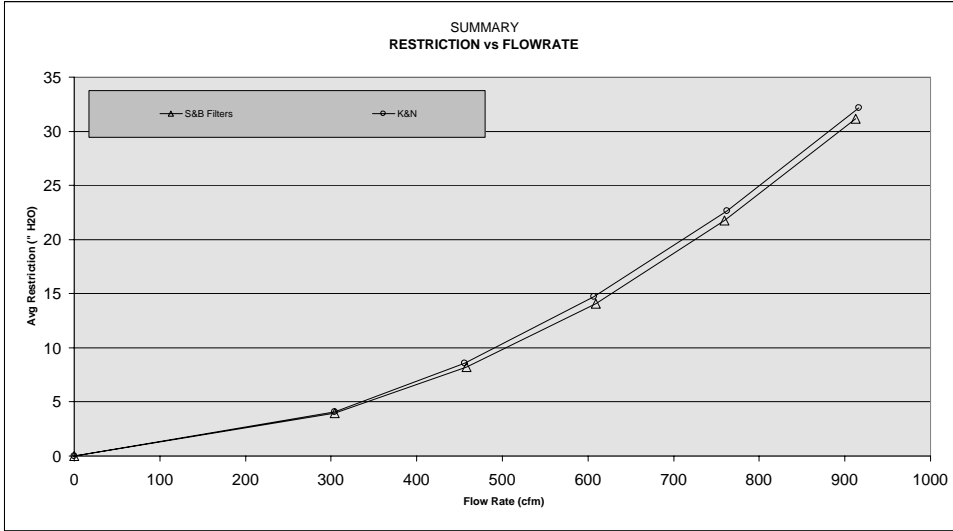
Temperature:	70.61	deg F
Relative Humidity:	50.36	%
Baro Pressure:	28.96	mmHg
Test Stand:	# 1	
Inlet Size:	3.275	inches

Housing:	OEM-Univ	
Contaminant:	Coarse	Test Dust
Contam. Lot #:	5336C	
Dust Feed Rate:	17.05	grams/minute
Rated Flow:	609	cfm

ISO 5011 Air Filtration Standard
Replacement Air Filter Comparison
S&B Filters 66-2129D
Test Number 216

Filter Description & No.	RUN #	# PLEATS	INITIAL RESTRIC. (H ₂ O)	CAPACITY (grams)	EFFICIENCY (%)	Air Flow (scfm) Avg of 3 Samples	Net Restriction % Less Restrictive than 33-2135K&N (Inches of H ₂ O)
Filter #1 S&B Filters 66-2129D	1	21	12.6	240.5	99.08	0.0	0.000
	2	21	13.3	243.2	99.01	304.5	3.967
	3	21	12.8	276.1	99.01	458.3	8.246
AVERAGE		21.0	12.9	253.2	99.03	608.9	14.043
						759.4	21.752
						912.6	31.160

Filter Description & No.	RUN #	# PLEATS	INITIAL RESTRIC. (H ₂ O)	CAPACITY (grams)	EFFICIENCY (%)	Air Flow (scfm) Avg of 3 Samples	Net Restriction % Less Restrictive than 33-2135K&N (Inches of H ₂ O)
Filter #2 K&N 33-2135	1	25	13.2	242.3	98.97	0.0	0.000
	2	25	14.2	205.6	98.81	304.4	4.071
	3	25	14.1	196.3	94.57	455.6	8.552
AVERAGE		25.0	13.8	214.7	97.45	607.2	14.729
						762.3	22.651
						916.2	32.151



ISO 5011 Air Filtration Test
Air Flow Summary

01'-05' GM 6.6L Duramax Diesel

S&B Filters Part Number 66-2129D Flows:

4.7% Better Than K&N At Rated Flow
3.6% Better Than K&N Across CFM Spectrum

AVERAGE ENVIRONMENTAL CONDITIONS & TEST SPECIFICATIONS

Temperature:	70.05 deg F	Housing:	OEM-Unit
Relative Humidity:	50.05 %	Contaminant:	Coarse Test Dust
Baro Pressure:	29.85 mmHg	Contam. Lot #:	5336C
Test Stand:	# 1	Dust Feed Rate:	17.05 grams/minute
Inlet Size:	3.275 inches	Rated Flow:	609 cfm

K&N is a registered trademark of K&N Engineering Inc. Testing was conducted based on the ISO 5011 Air Filtration standard.



Determination of Gasoline and Diesel Engine Air Consumption

CFM Calculator: Enter Data in Blue Shaded Areas

Engine Displacement (cubic inches)	400.6
Maximum RPM	3,000
Cycle Factor:	2
Enter "2" for 4 Cycle Diesel and Gasoline Enter "1" for 2 Cycle Diesel and Gasoline	
Volumetric Efficiency:	1.75
Naturally Aspirated Gasoline & Diesel Engines Enter "0.8" Super Charged Diesel Engines Enter "1.30" Turbocharged Diesel Engines Enter "1.75"	

Liters to CID Converter

Liters:	6.6
Cubic Inches:	400.6

Vehicle Information

Model Year	2001-2005
Mfg	Chevrolet
Type of Veh.	Silverado
Engine Specs	6.6L DSL LB7&LLY

Based on the information entered above, the estimated maximum CFM of the vehicle is:	609
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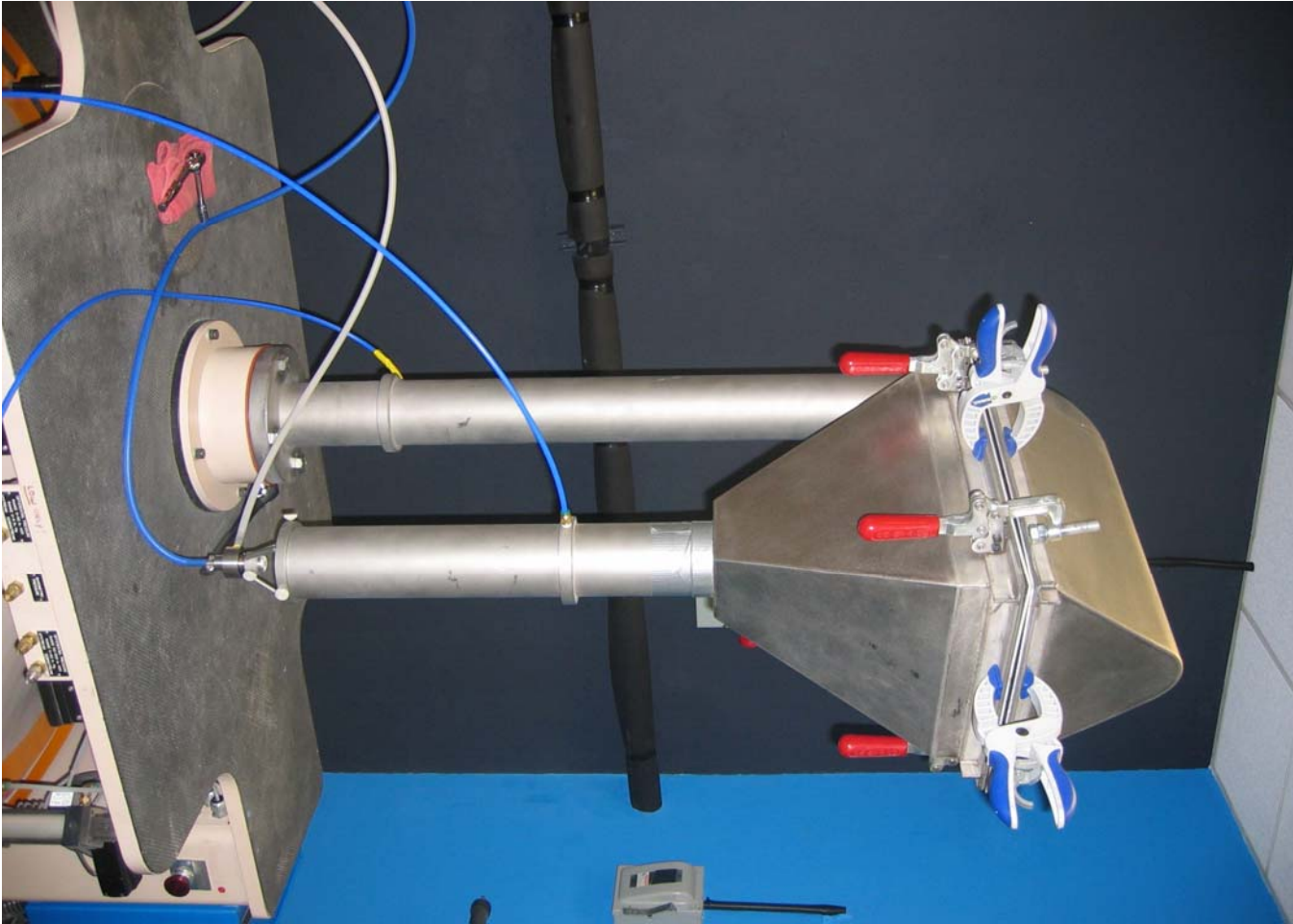
CYCLE FACTOR	
	Cycle Factor
4 Cycle Diesel and Gasoline Engine	2
2 Cycle Diesel and Gasoline Engine	1

VOLUMETRIC EFFICIENCY	
	Volumetric Efficiency (Approximate)
Naturally Aspirated Gasoline & Diesel Engines	0.8
Supercharged Diesel Engines	1.30
Turbocharged Diesel Engines	1.75

Note: The 1.75 volumetric efficiency is applicable only at top governed engine speed under full load conditions.

EQUATION	
The following is a method of determining approximated gasoline and diesel engine air flow requirement:	
Air Flow (CFM) = $\frac{\text{Displacement (cubic inches)}}{1728} \times \frac{\text{RPM}}{\text{Cycle Factor}} \times \text{Volumetric Efficiency}$	

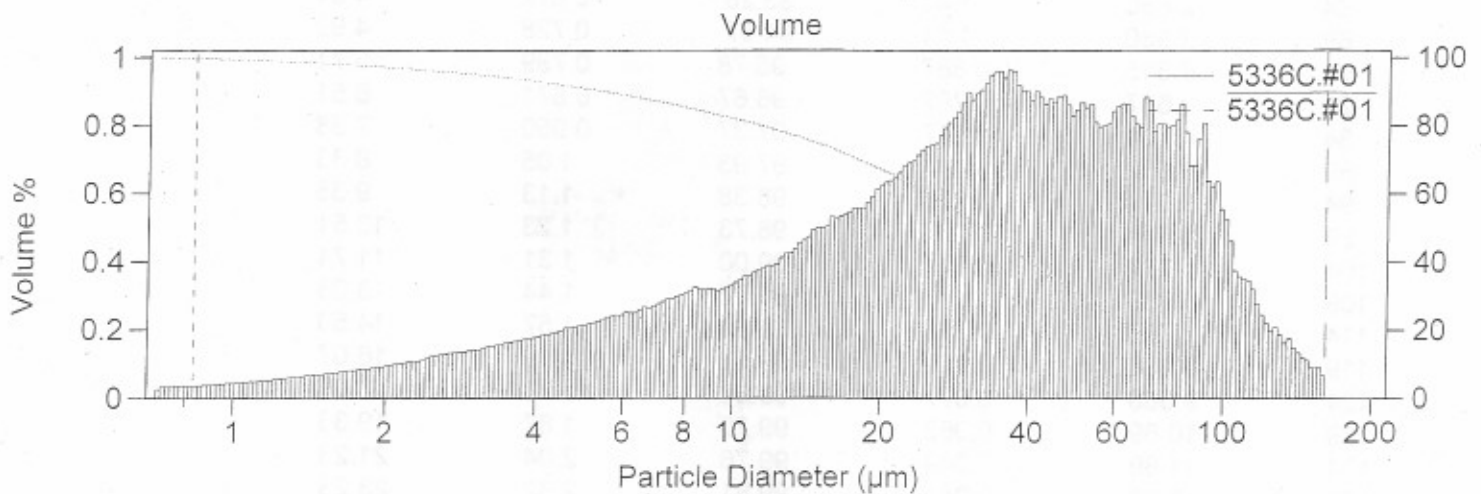
EXAMPLE	
Information necessary to calculate air consumption:	
Ford F250 7.3L V8 Diesel Truck	
4 cycle, 2100 RPM, 736 (cubic inches) displacement, turbocharged	
Air Flow (CFM) : $\frac{443.1}{1728} \times \frac{3,125}{2} \times 1.75 = 701 \text{ CFM}$	





14331 Ewing Avenue South Burnsville, Minnesota 55306
Phone: 952-894-8737

Filename: 5336C.#01 Sample Number: 200
 Group ID: 5336C
 Sample ID: ISO 12103-1, A4 COARSE TEST DUST
 Comment: SAE COARSE TEST DUST, NIST TRACEABLE
 Operator: LHA
 Electrolyte: ISOTON II
 Dispersant: TYPE IC
 Aperture Size: 400 µm 5336a.#01
 200 µm 5336a.#02
 100 µm 5336a.#03
 30 µm 5336a.#04
 Acquired: 21:38 21 Feb 2006
 Serial Number: 8308970
 Edited size data



LC= 0.831 µm UC= 162.9 µm {99.73%}

Volume Statistics (Geometric)				5336C.#01		Cumulative	Numeric Data
						Volume	% Less Than
						Micron size	
Calculations from 0.831 µm to 162.9 µm						1	0.6
Volume	5.461e9 µm ³					2	2.8
Mean:	26.06 µm			S.D.:	49.1 µm	3	5.1
Median:	31.96 µm			Variance:	2410 µm ²	4	7.1
Mean/Median Ratio:	0.815					5	9.2
Mode:	36.33 µm					7	13.1
Spec. surf. area:	0.486 m ² /ml					10	18.3
						20	33.4
						40	60.0
% >	10	25	50	75	90	80	87.5
Size µm	85.94	58.24	31.96	14.46	5.507	120	97.9
						180	100.0

5336C.#01

Channel Number	Particle Diameter µm	Diff Number %	Cum < Number %	Diff Volume %	Cum < Volume %
9	0.831	12.94	28.24	0.184	0.265
14	0.925	10.71	41.19	0.210	0.449
19	1.028	8.86	51.90	0.239	0.659
24	1.144	7.35	60.76	0.273	0.898
29	1.272	6.15	68.12	0.313	1.17
34	1.415	5.02	74.26	0.352	1.48
39	1.574	4.07	79.29	0.393	1.84
44	1.751	3.31	83.36	0.439	2.23
49	1.947	2.64	86.67	0.483	2.67
54	2.166	2.15	89.31	0.541	3.15
59	2.409	1.79	91.46	0.621	3.69
64	2.680	1.41	93.26	0.672	4.31
69	2.980	1.11	94.67	0.728	4.99
74	3.315	0.887	95.78	0.799	5.71
79	3.687	0.702	96.67	0.871	6.51
84	4.101	0.557	97.37	0.950	7.38
89	4.562	0.446	97.93	1.05	8.33
94	5.074	0.350	98.38	1.13	9.38
99	5.644	0.277	98.73	1.23	10.51
104	6.277	0.214	99.00	1.31	11.74
109	6.982	0.171	99.22	1.44	13.05
114	7.766	0.136	99.39	1.57	14.50
119	8.638	0.100	99.52	1.59	16.07
124	9.608	0.077	99.63	1.70	17.66
129	10.69	0.062	99.70	1.87	19.36
134	11.89	0.049	99.76	2.04	21.23
139	13.22	0.041	99.81	2.32	23.28
144	14.71	0.033	99.85	2.56	25.60
149	16.36	0.025	99.89	2.73	28.15
154	18.19	0.020	99.91	2.95	30.89
159	20.24	0.016	99.93	3.25	33.84
164	22.51	0.013	99.95	3.56	37.09
169	25.04	0.010	99.96	3.85	40.65
174	27.85	0.008	99.97	4.30	44.51
179	30.97	0.006	99.98	4.62	48.81
184	34.45	0.005	99.98	4.74	53.43
189	38.32	0.003	99.99	4.46	58.17
194	42.62	0.002	99.99	4.38	62.63
199	47.41	0.002	99.99	4.26	67.01
204	52.73	0.001	100.00	4.07	71.27
209	58.65	0.001	100.00	4.25	75.33
214	65.23	0.001	100.00	4.13	79.59
219	72.56	0.0043	100.00	4.01	83.72
224	80.71	0.0029	100.00	3.76	87.73
229	89.77	0.0018	100.00	3.25	91.50
234	99.85	8.6E-5	100.00	2.07	94.74
239	111.1	4.2E-5	100.00	1.41	96.82
244	123.5	2E-5	100.00	0.928	98.22
249	137.4	9.5E-6	100.00	0.600	99.15

ISO 5011 Test Detail

Automotive Air Test			
Brand: S&B Filters		TEST REQUEST #:	216
Part Number: 66-2129D		Run #:	61&64
Sample: # 1		Technician:	Bert
		Date:	4/17&18/2006
Temperature:	70.24 deg F	Contaminant:	Coarse
Relative Humidity:	49.94 %	Contam. Lot #:	5336C
Baro Pressure:	28.88 mmHg	Dust Feed Rate:	17.05 grams/minute
Test Stand:	# 1	Rated Flow:	609 cfm
Housing: OEM-Univ		Termination ΔP:	22.58 inches of water
Inlet Size:	3.275 inches	# Pleats:	21 pleats
		Pleat depth:	1.9 inches
Cartridge weight (grams)		Assembly weight (grams)	
Start of test	955.8	0.0	156.69
End of test	1196.0	0.0	158.93
Gain	240.2	0.0	2.24
AIRFLOW (scfm)	Gross restric. (°H2O)	Tare restric. (°H2O)	Net restriction (°H2O)
0.000	0.0	0.0	0.0
305.244	3.7	0.0	3.7
455.169	8.2	0.0	8.2
611.583	14.3	0.0	14.3
758.655	22.3	0.0	22.3
914.836	31.9	0.0	31.9
Dust Fed (grams)	Time (min)	Restriction at 609 scfm	Rise (°H2O)
0.0	0	12.6	0.0
34.7	2	13.2	0.6
69.2	4	13.8	1.2
103.8	6	14.0	1.4
138.6	8	15.2	2.6
172.9	10	16.8	4.2
207.7	12	20.2	7.6
242.7	14	27.5	14.9
	16		
	18		
	20		
	22		
	24		
	26		
	28		
	30		
	32		
	34		
	36		
	38		
Initial Restriction:	12.6 inches of water		
Capacity:	240.5 grams		
Efficiency:	99.1 %		
Material Balance:	1.00 %		

1

Automotive Air Test			
Brand: S&B Filters		TEST REQUEST #:	216
Part Number: 66-2129D		Run #:	59&60
Sample: # 2		Technician:	Bert
		Date:	4/17&18/2006
Temperature:	70.81 deg F	Contaminant:	Coarse
Relative Humidity:	50.24 %	Contam. Lot #:	5336C
Baro Pressure:	29.12 mmHg	Dust Feed Rate:	17.05 grams/minute
Test Stand:	# 1	Rated Flow:	609 cfm
Housing: OEM-Univ		Termination ΔP:	23.3 inches of water
Inlet Size:	3.275 inches	# Pleats:	21 pleats
		Pleat depth:	1.9 inches
Cartridge weight (grams)		Assembly weight (grams)	
Start of test	958.1	0.0	152.20
End of test	1198.3	0.0	154.64
Gain	240.2	0.0	2.44
AIRFLOW (scfm)	Gross restric. (°H2O)	Tare restric. (°H2O)	Net restriction (°H2O)
0.000	0.0	0.0	0.0
304.234	4.2	0.0	4.2
461.595	8.4	0.0	8.4
608.751	13.9	0.0	13.9
759.274	21.5	0.0	21.5
909.513	30.9	0.0	30.9
Dust Fed (grams)	Time (min)	Restriction at 609 scfm	Rise (°H2O)
0.0	0	13.3	0.0
35.1	2	13.8	0.5
69.7	4	14.0	0.7
104.6	6	14.3	1.0
140.1	8	15.0	1.7
176.0	10	16.1	2.8
210.7	12	18.5	5.2
245.6	14	28.1	14.8
	16		
	18		
	20		
	22		
	24		
	26		
	28		
	30		
	32		
	34		
	36		
	38		
Initial Restriction:	13.3 inches of water		
Capacity:	243.2 grams		
Efficiency:	99.0 %		
Material Balance:	0.99 %		

2

Automotive Air Test			
Brand: S&B Filters		TEST REQUEST #: 216	
Part Number: 66-2129D		Run #: 63466	
Sample: # 3		Technician: Bert	
		Date: 4/17&18/2006	
Temperature: 70.36 deg F	Contaminant: Coarse		
Relative Humidity: 50.24 %	Contam. Lot #: 5336C		
Baro Pressure: 29.23 mmHg	Dust Feed Rate: 17.05 grams/minute		
Test Stand: # 1	Rated Flow: 609 cfm		
Housing: DEM-Univ	Termination Δ P: 22.84 inches of water		
Inlet Size: 3.275 inches	# Pleats: 21		
	Pleat depth: 1.9 inches		
Cartridge weight (grams)	Assembly weight (grams)	Absolute weight (grams)	
Start of test: 961.4	0.0	158.18	
End of test: 1234.9	0.0	160.93	
Gain: 273.5	0.0	2.75	
AIRFLOW (scfm)	Gross restric. ($^{\circ}$ H ₂ O)	Tare restric. ($^{\circ}$ H ₂ O)	Net restriction ($^{\circ}$ H ₂ O)
0.000	0.0	0.0	0.0
304.078	4.0	0.0	4.0
458.135	8.2	0.0	8.2
606.277	13.9	0.0	13.9
760.326	21.5	0.0	21.5
913.401	30.8	0.0	30.8
Dust Fed (grams)	Time (min)	Restriction at 609 scfm	Rise ($^{\circ}$ H ₂ O)
0.0	0	12.8	0.0
35.3	2	13.2	0.4
69.9	4	13.7	0.9
104.7	6	14.2	1.3
139.9	8	14.8	1.9
174.5	10	16.1	3.2
209.4	12	17.1	4.3
243.9	14	20.9	8.1
278.8	16	29.8	17.0
	18		
	20		
	22		
	24		
	26		
	28		
	30		
	32		
	34		
	36		
	38		
Initial Restriction: 12.8 inches of water	Capacity: 276.1 grams	Efficiency: 99.0 %	Material Balance: 0.99 %

3

Automotive Air Test			
Brand: AC Delco		TEST REQUEST #: 216	
Part Number: A1618C		Run #: 1&25	
Sample: # 1		Technician: Bert	
		Date: 2/17/06-3/1/06	
Temperature: 71.32 deg F	Contaminant: Coarse		
Relative Humidity: 51.44 %	Contam. Lot #: 5336C		
Baro Pressure: 29 mmHg	Dust Feed Rate: 17.05 grams/minute		
Test Stand: # 1	Rated Flow: 609 cfm		
Housing: OEM-Univ	Termination Δ P: 25.59 inches of water		
Inlet Size: 3.275 inches	# Pleats: 121		
	Pleat depth: 1.8 inches		
Cartridge weight (grams)	Assembly weight (grams)	Absolute weight (grams)	
Start of test: 675.5	0.0	127.32	
End of test: 1028.3	0.0	131.66	
Gain: 352.8	0.0	4.34	
AIRFLOW (scfm)	Gross restric. ($^{\circ}$ H ₂ O)	Tare restric. ($^{\circ}$ H ₂ O)	Net restriction ($^{\circ}$ H ₂ O)
0	0.0	0.0	0.0
304.367	5.1	0.0	5.1
458.139	10.4	0.0	10.4
605.362	17.4	0.0	17.4
764.084	26.7	0.0	26.7
912.113	37.4	0.0	37.4
Dust Fed (grams)	Time (min)	Restriction at 609 scfm	Rise ($^{\circ}$ H ₂ O)
0.0	0	15.6	0.0
51.4	3	17.2	1.6
102.8	6	18.5	2.9
154.6	9	19.8	4.2
205.7	12	21.2	5.6
256.9	15	22.6	7.0
308.1	18	24.6	9.0
360.2	21	27.2	11.6
	24		
	27		
	30		
	33		
	36		
	39		
	42		
	45		
	48		
	51		
	54		
	57		
Initial Restriction: 15.6 inches of water	Capacity: 355.8 grams	Efficiency: 98.8 %	Material Balance: 0.99 %

4

Automotive Air Test			
Brand: AC Delco		TEST REQUEST #: 216	
Part Number: A1619C		Run #: 9837	
Sample: # 2		Technician: Bert	
		Date: 2/22/06-3/9/06	
Temperature: 70.86 deg F	Contaminant: Coarse		
Relative Humidity: 49.37 %	Contam. Lot #: 5336C		
Baro Pressure: 28.84 mmHg	Dust Feed Rate: 17.05 grams/minute		
Test Stand: # 1	Rated Flow: 609 cfm		
Housing: DEM-Univ	Termination Δ P: 27.11 inches of water		
Inlet Size: 3.275 inches	# Pleats: 121 pleats		
	Pleat depth: 1.8 inches		
Cartridge weight (grams)	Assembly weight (grams)	Absolute weight (grams)	
Start of test 880.1	0.0	123.44	
End of test 1238.6	0.0	131.88	
Gain 558.5	0.0	8.47	
AIRFLOW (scfm)	Gross restr. ("H2O)	Tare restr. ("H2O)	Net restriction ("H2O)
0	0.0	0.0	0.0
304.299	4.9	0.0	4.9
457.327	9.6	0.0	9.6
607.777	16.2	0.0	16.2
758.398	24.6	0.0	24.6
912.43	34.7	0.0	34.7
Dust Fed (grams)	Time (min)	Restriction at 609 scfm	Rise ("H2O)
0.0	0	17.1	0.0
51.3	3	18.3	1.2
103.7	6	19.0	1.8
156.0	9	19.6	2.4
208.0	12	20.2	3.1
259.7	15	20.9	3.8
310.8	18	21.8	4.7
363.5	21	22.7	5.6
415.3	24	23.7	6.6
467.3	27	24.9	7.8
519.4	30	26.1	9.0
571.3	33	27.5	10.4
	36		
	39		
	42		
	45		
	48		
	51		
	54		
	57		
Initial Restriction: 17.1 inches of water	Capacity: 562.8 grams		
	Efficiency: 98.5 %		
	Material Balance: 0.99 %		

5

Automotive Air Test			
Brand: AC Delco		TEST REQUEST #: 216	
Part Number: A1618C		Run #: 17845	
Sample: # 3		Technician: Bert	
		Date: 2/22/06-3/13/06	
Temperature: 70.04 deg F	Contaminant: Coarse		
Relative Humidity: 50.94 %	Contam. Lot #: 5336C		
Baro Pressure: 28.68 mmHg	Dust Feed Rate: 17.05 grams/minute		
Test Stand: # 1	Rated Flow: 609 cfm		
Housing: OEM-Univ	Termination Δ P: 27.13 inches of water		
Inlet Size: 3.275 inches	# Pleats: 121 pleats		
	Pleat depth: 1.8 inches		
Cartridge weight (grams)	Assembly weight (grams)	Absolute weight (grams)	
Start of test 702.6	0.0	134.28	
End of test 1157.9	0.0	140.38	
Gain 455.3	0.0	6.10	
AIRFLOW (scfm)	Gross restr. ("H2O)	Tare restr. ("H2O)	Net restriction ("H2O)
0	0.0	0.0	0.0
305.38	5.0	0.0	5.0
456.348	10.3	0.0	10.3
609.581	17.4	0.0	17.4
759.043	26.5	0.0	26.5
911.568	37.3	0.0	37.3
Dust Fed (grams)	Time (min)	Restriction at 609 scfm	Rise ("H2O)
0.0	0	17.1	0.0
51.7	3	18.6	1.4
103.4	6	19.6	2.5
154.8	9	20.6	3.4
206.5	12	21.6	4.4
257.7	15	22.6	5.4
309.4	18	23.6	6.4
360.9	21	24.7	7.5
412.3	24	25.9	8.7
463.7	27	27.2	10.1
	30		
	33		
	36		
	39		
	42		
	45		
	48		
	51		
	54		
	57		
Initial Restriction: 17.1 inches of water	Capacity: 457.8 grams		
	Efficiency: 98.7 %		
	Material Balance: 1.00 %		

6

ISO 5011 Test Detail

Automotive Air Test			
Brand: S&B Filters	TEST REQUEST #:	216	
Part Number: 66-2129D	Run #:	61&64	
Sample: # 1	Technician:	Bert	
	Date:	4/17&18/2006	
Temperature: 70.24 deg F	Contaminant:	Coarse	
Relative Humidity: 49.94 %	Contam. Lot #:	5336C	
Baro Pressure: 28.88 mmHg	Dust Feed Rate:	17.05 grams/minute	
Test Stand: # 1	Rated Flow:	609 cfm	
Housing: OEM-Univ	Termination ΔP:	22.58 inches of water	
Inlet Size: 3.275 inches	# Pleats:	21 pleats	
	Pleat depth:	1.9 inches	
Cartridge weight (grams)	Assembly weight (grams)	Absolute weight (grams)	
Start of test 955.8	0.0	156.69	
End of test 1196.0	0.0	158.93	
Gain 240.2	0.0	2.24	
AIRFLOW (scfm)	Gross restric. (″H2O)	Tare restric. (″H2O)	Net restriction (″H2O)
0.000	0.0	0.0	0.0
305.244	3.7	0.0	3.7
455.169	8.2	0.0	8.2
611.583	14.3	0.0	14.3
758.655	22.3	0.0	22.3
914.836	31.9	0.0	31.9
Dust Fed (grams)	Time (min)	Restriction at 609 scfm	Rise (″H2O)
0.0	0	12.6	0.0
34.7	2	13.2	0.6
69.2	4	13.8	1.2
103.8	6	14.0	1.4
138.6	8	15.2	2.6
172.9	10	16.8	4.2
207.7	12	20.2	7.6
242.7	14	27.5	14.9
	16		
	18		
	20		
	22		
	24		
	26		
	28		
	30		
	32		
	34		
	36		
	38		
Initial Restriction:	12.6 inches of water		
Capacity:	240.5 grams		
Efficiency:	99.1 %		
Material Balance:	1.00 %		

1

Automotive Air Test			
Brand: S&B Filters	TEST REQUEST #:	216	
Part Number: 66-2129D	Run #:	59&60	
Sample: # 2	Technician:	Bert	
	Date:	4/17&18/2006	
Temperature: 70.81 deg F	Contaminant:	Coarse	
Relative Humidity: 50.24 %	Contam. Lot #:	5336C	
Baro Pressure: 29.12 mmHg	Dust Feed Rate:	17.05 grams/minute	
Test Stand: # 1	Rated Flow:	609 cfm	
Housing: OEM-Univ	Termination ΔP:	23.3 inches of water	
Inlet Size: 3.275 inches	# Pleats:	21 pleats	
	Pleat depth:	1.9 inches	
Cartridge weight (grams)	Assembly weight (grams)	Absolute weight (grams)	
Start of test 958.1	0.0	152.20	
End of test 1198.3	0.0	154.64	
Gain 240.2	0.0	2.44	
AIRFLOW (scfm)	Gross restric. (″H2O)	Tare restric. (″H2O)	Net restriction (″H2O)
0.000	0.0	0.0	0.0
304.234	4.2	0.0	4.2
461.595	8.4	0.0	8.4
608.751	13.9	0.0	13.9
759.274	21.5	0.0	21.5
909.513	30.9	0.0	30.9
Dust Fed (grams)	Time (min)	Restriction at 609 scfm	Rise (″H2O)
0.0	0	13.3	0.0
35.1	2	13.8	0.5
69.7	4	14.0	0.7
104.6	6	14.3	1.0
140.1	8	15.0	1.7
176.0	10	16.1	2.8
210.7	12	18.5	5.2
245.6	14	28.1	14.8
	16		
	18		
	20		
	22		
	24		
	26		
	28		
	30		
	32		
	34		
	36		
	38		
Initial Restriction:	13.3 inches of water		
Capacity:	243.2 grams		
Efficiency:	99.0 %		
Material Balance:	0.99 %		

2

Automotive Air Test			
Brand: S&B Filters		TEST REQUEST #: 216	
Part Number: 66-2129D		Run #: 63866	
Sample: # 3		Technician: Bert	
		Date: 4/17&18/2006	
Temperature: 70.36 deg F	Contaminant: Coarse		
Relative Humidity: 50.24 %	Contam. Lot #: 5336C		
Baro Pressure: 29.23 mmHg	Dust Feed Rate: 17.05 grams/minute		
Test Stand: # 1	Rated Flow: 609 cfm		
Housing: JEM-Univ	Termination ^P: 22.84 inches of water		
Inlet Size: 3.275 inches	# Pleats: 21		
	Pleat depth: 1.9 inches		
Cartridge weight (grams)	Assembly weight (grams)	Absolute weight (grams)	
Start of test 961.4	0.0	158.18	
End of test 1234.9	0.0	160.93	
Gain 273.5	0.0	2.75	
AIRFLOW (scfm)	Gross restric. (^H2O)	Tare restric. (^H2O)	Net restriction (^H2O)
0.000	0.0	0.0	0.0
304.078	4.0	0.0	4.0
458.135	8.2	0.0	8.2
606.277	13.9	0.0	13.9
760.326	21.5	0.0	21.5
913.401	30.8	0.0	30.8
Dust Fed (grams)	Time (min)	Restriction at 609 scfm	Rise (^H2O)
0.0	0	12.8	0.0
35.3	2	13.2	0.4
69.9	4	13.7	0.9
104.7	6	14.2	1.3
139.9	8	14.8	1.9
174.5	10	16.1	3.2
209.4	12	17.1	4.3
243.9	14	20.9	8.1
278.8	16	29.8	17.0
	18		
	20		
	22		
	24		
	26		
	28		
	30		
	32		
	34		
	36		
	38		
Initial Restriction: 12.8 inches of water			
Capacity: 276.1 grams			
Efficiency: 99.0 %			
Material Balance: 0.99 %			

3

Automotive Air Test			
Brand: K&N		TEST REQUEST #: 216	
Part Number: 33-2135		Run #: 2826	
Sample: # 1		Technician: Bert	
		Date: 2/17/06-3/1/06	
Temperature: 69.16 deg F	Contaminant: Coarse		
Relative Humidity: 49.75 %	Contam. Lot #: 5336C		
Baro Pressure: 28.66 mmHg	Dust Feed Rate: 17.05 grams/minute		
Test Stand: # 1	Rated Flow: 609 cfm		
Housing: OEM-Univ	Termination ^P: 23.16 inches of water		
Inlet Size: 3.275 inches	# Pleats: 25		
	Pleat depth: 1.05 inches		
Cartridge weight (grams)	Assembly weight (grams)	Absolute weight (grams)	
Start of test 754.7	0.0	126.40	
End of test 995.3	0.0	128.92	
Gain 240.6	0.0	2.52	
AIRFLOW (scfm)	Gross restric. (^H2O)	Tare restric. (^H2O)	Net restriction (^H2O)
0	0.0	0.0	0.0
304.844	3.7	0.0	3.7
453.956	8.1	0.0	8.1
606.49	14.0	0.0	14.0
759.039	21.7	0.0	21.7
916.326	31.1	0.0	31.1
Dust Fed (grams)	Time (min)	Restriction at 609 scfm	Rise (^H2O)
0.0	0	13.2	0.0
34.7	2	13.7	0.5
69.9	4	14.3	1.1
105.0	6	15.0	1.8
139.5	8	16.0	2.9
174.2	10	17.8	4.7
209.1	12	22.8	9.7
244.8	14	36.6	23.5
	16		
	18		
	20		
	22		
	24		
	26		
	28		
	30		
	32		
	34		
	36		
	38		
Initial Restriction: 13.2 inches of water			
Capacity: 242.3 grams			
Efficiency: 99.0 %			
Material Balance: 0.99 %			

4

Automotive Air Test			
Brand: K&N		TEST REQUEST #: 216	
Part Number: 33-2135		Run #: 10838	
Sample: # 2		Technician: Bert	
		Date: 2/22/06-3/9/06	
Temperature: 69.51 deg F	Contaminant: Coarse		
Relative Humidity: 50.04 %	Contam. Lot #: 5336C		
Baro Pressure: 28.52 mmHg	Dust Feed Rate: 17.05 grams/minute		
Test Stand: # 1	Rated Flow: 609 cfm		
Housing: OEM-Univ	Termination Δ P: 24.24 inches of water		
Inlet Size: 3.275 inches	# Pleats: 25 pleats		
	Pleat depth: 1.05 inches		
Cartridge weight (grams)	Assembly weight (grams)	Absolute weight (grams)	
Start of test 756.0	0.0	131.94	
End of test 961.4	0.0	134.41	
Gain 205.4	0.0	2.47	
AIRFLOW (scfm)	Gross restric. ("H2O)	Tare restric. ("H2O)	Net restriction ("H2O)
0	0.0	0.0	0.0
303.501	4.9	0.0	4.9
456.389	9.6	0.0	9.6
605.453	16.2	0.0	16.2
765.49	24.6	0.0	24.6
916.243	34.7	0.0	34.7
Dust Fed (grams)	Time (min)	Restriction at 609 scfm	Rise ("H2O)
0.0	0	14.2	0.0
35.5	2	14.7	0.5
69.6	4	15.4	1.1
104.1	6	16.2	2.0
138.6	8	17.3	3.1
173.4	10	19.1	4.8
208.0	12	24.2	10.0
	14		
	16		
	18		
	20		
	22		
	24		
	26		
	28		
	30		
	32		
	34		
	36		
	38		
Initial Restriction: 14.2 inches of water	Capacity: 205.6 grams		
Efficiency: 98.8 %	Material Balance: 1.00 %		

5

Automotive Air Test			
Brand: K&N		TEST REQUEST #: 216	
Part Number: 33-2135		Run #: 18846	
Sample: # 3		Technician: Bert	
		Date: 2/22/06-3/13/06	
Temperature: 70.2 deg F	Contaminant: Coarse		
Relative Humidity: 50.09 %	Contam. Lot #: 5336C		
Baro Pressure: 28.66 mmHg	Dust Feed Rate: 17.05 grams/minute		
Test Stand: # 1	Rated Flow: 609 cfm		
Housing: OEM-Univ	Termination Δ P: 24.14 inches of water		
Inlet Size: 3.275 inches	# Pleats: 25 pleats		
	Pleat depth: 1.05 inches		
Cartridge weight (grams)	Assembly weight (grams)	Absolute weight (grams)	
Start of test 750.9	0.0	125.80	
End of test 945.4	0.0	137.08	
Gain 194.5	0.0	11.28	
AIRFLOW (scfm)	Gross restric. ("H2O)	Tare restric. ("H2O)	Net restriction ("H2O)
0	0.0	0.0	0.0
304.802	3.6	0.0	3.6
456.543	8.0	0.0	8.0
609.741	14.0	0.0	14.0
762.244	21.6	0.0	21.6
916.061	30.7	0.0	30.7
Dust Fed (grams)	Time (min)	Restriction at 609 scfm	Rise ("H2O)
0.0	0	14.1	0.0
36.4	2	14.7	0.6
70.9	4	15.2	1.1
104.9	6	15.9	1.8
138.9	8	16.8	2.7
173.1	10	18.7	4.6
207.6	12	24.9	10.8
	14		
	16		
	18		
	20		
	22		
	24		
	26		
	28		
	30		
	32		
	34		
	36		
	38		
Initial Restriction: 14.1 inches of water	Capacity: 196.3 grams		
Efficiency: 94.6 %	Material Balance: 0.99 %		

6