
# ISO 5011 Test Results

## Certified to the ISO 5011 Air Filtration Standard

### Cold Air Intake Kit

### 1994-1997 Ford F250/350 V8-7.3L Diesel

**Part Numbers:**
**75-5027 (Cotton Filter)**
**75-5027D (Dry Filter)**

S&B Filters, Inc. ● 787 South Wanamaker Avenue ● Ontario, California 91761 ● (909) 947-0015 ● (909) 947-0603 ● www.sbfilters.com

# 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 ^P*. 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.

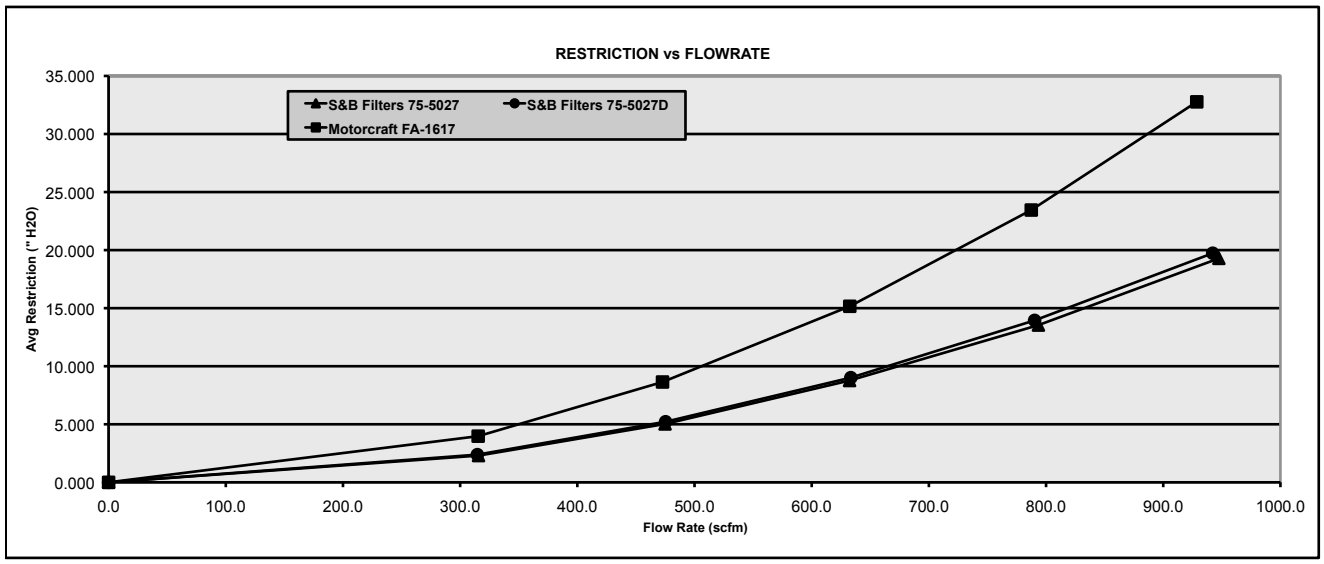
# ISO 5011 Air Filtration Standard

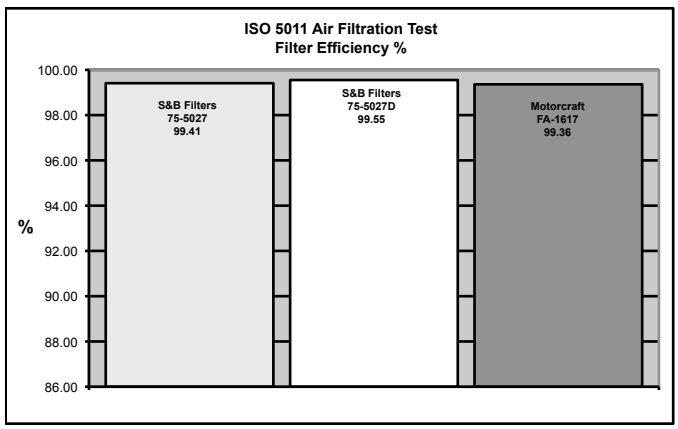
**Intake Kit Comparison**

**S&B Filters75-5027**

**Test Number 315**

| Air Filter Mfg. & Part # | INITIAL RESTRIC. ("H2O) | CAPACITY (grams) | EFFICIENCY (%) | Air Flow scfm | Net Restriction (Inches of H2O) | % Less Restrictive than FA-1617Motorcraft |
|---|---|---|---|---|---|---|
| Filter #1 | 6.7 | 176.5 | 99.41 | 0.0 | 0.000 | 0.0% |
| S&B Filters | | | | 315.7 | 2.303 | 42.1% |
| 75-5027 | | | | 474.9 | 5.025 | 41.8% |
| | | | | 632.3 | 8.768 | 42.2% |
| | | | | 793.5 | 13.542 | 42.3% |
| | | | | 947.5 | 19.287 | 41.1% |
| Filter #2 | 6.8 | 142.1 | 99.55 | 0.0 | 0.000 | 0.0% |
| S&B Filters | | | | 314.7 | 2.384 | 40.0% |
| 75-5027D | | | | 475.3 | 5.218 | 39.6% |
| | | | | 633.4 | 9.016 | 40.5% |
| | | | | 790.2 | 13.948 | 40.5% |
| | | | | 942.2 | 19.732 | 39.8% |
| Filter #3 | 14.9 | 159.1 | 99.36 | 0.0 | 0.000 | |
| Motorcraft | | | | 315.4 | 3.975 | |
| FA-1617 | | | | 472.7 | 8.640 | |
| | | | | 632.5 | 15.162 | |
| | | | | 787.4 | 23.451 | |
| | | | | 928.6 | 32.769 | |




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

**94'-97' Ford F-Series 7.3L Powerstroke Diesel**

**S&B Filters** Part Number **75-5027** Flows:

**42.2**% Better Than **OE** at Rated CFM
**41.9**% Better Than **OE** Across CFM Spectrum

**S&B Filters** Part Number **75-5027D** Flows:

**40.5**% Better Than **OE** at Rated CFM
**40.1**% Better Than **OE** Across CFM Spectrum

**AVERAGE ENVIRONMENTAL CONDITIONS & TEST SPECIFICATIONS**

| | | | | | |
|---|---|---|---|---|---|
| **Temperature:** | 70.98 | deg F | **Housing:** | uni con | |
| **Relative Humidity:** | 50.27 | % | **Contaminant:** | Coarse | |
| **Baro Pressure:** | 29.00 | mmHg | **Contam. Lot #:** | 5457C | |
| **Test Stand:** | # 1 | | **Dust Feed Rate:** | 17.67 | grams/minute |
| **Inlet Size:** | 3.75 | inches | **Rated Flow:** | 631 | cfm |

Testing was conducted based on the ISO 5011 Air Filtration standard.

S&B PERFORMANCE
FILTERS & INTAKE KITS

# Determination of Gasoline and Diesel Engine Air Consumption

**CFM Calculator: Enter Data in Blue Shaded Areas**

| | |
|---|---|
| Engine Displacement (cubic inches) | **445.4** |
| RPM at maximum horse power | **2,800** |
| 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: | 7.3 |
| Cubic Inches: | 445.4 |

**Vehicle Information**

| | |
|---|---|
| Model Year | 94'-97' |
| Make | Ford |
| Model | F-Series |
| Engine Specs | V8 Diesel |

| | |
|---|---|
| **Based on the information entered above, the estimated CFM of the vehicle at maximum Horse Power is:** | **631** |

---

| **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:

$$\text{Air Flow (CFM)} = \frac{\text{Displacement (cubic inches)}}{1728} \times \frac{\text{RPM}}{\text{Cycle Factor}} \times \text{Volumetric Efficiency}$$

**EXAMPLE**

Information necessary to calculate air consumption:

Ford F250 7.3L V8 Diesel Truck

4 cycle, 2800 RPM, 445.4 (cubic inches) displacement, turbocharged

$$\text{Air Flow (CFM)} : \frac{445.4}{1728} \times \frac{2800}{2} \times 1.75 = 631 \text{ CFM}$$

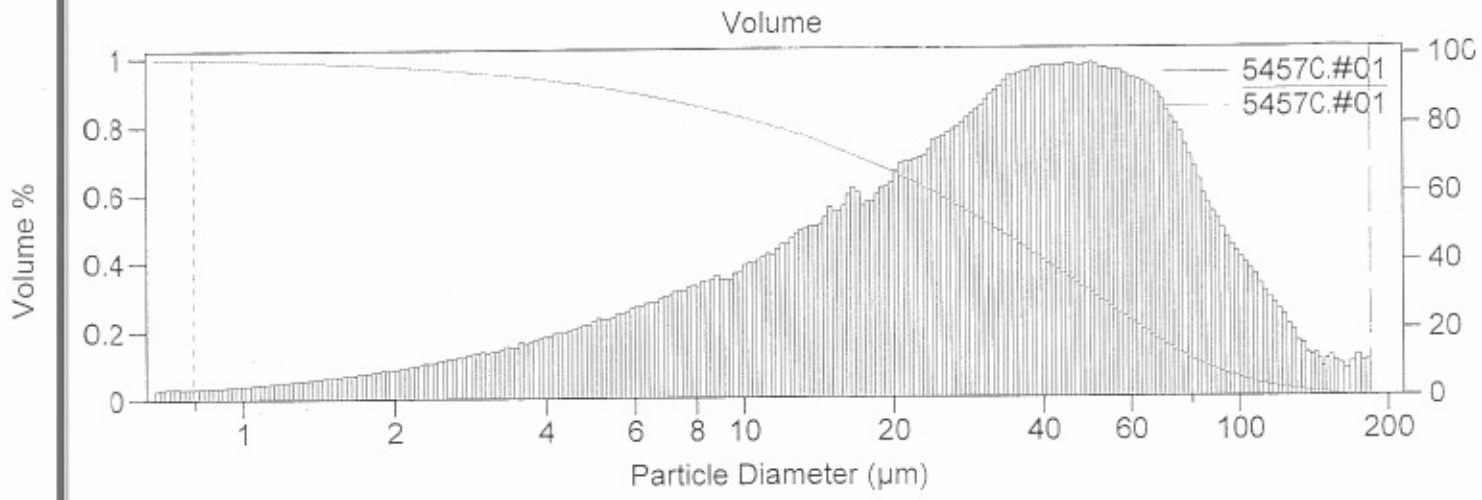
COULTER® MULTISIZER AccuComp® 1.19

17 Apr 2007

POWDER TECHNOLOGY, INC.

PTI
POWDER TECHNOLOGY INC.
14581 Ewing Avenue South Burnsville, Minnesota 55306
Phone: 952-894-8737

Filename: 5457C.#01 Sample Number: 200
Group ID: 5457C
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 5457d.#01
200 µm 5457d.#02
100 µm 5457d.#03
30 µm 5457d.#04
Acquired: 17:51 4 Apr 2007
Serial Number: 33
Edited size data




LC= 0.794 µm UC= 184.4 µm {99.75%}

Volume Statistics (Geometric) 5457C.#01

Calculations from 0.794 µm to 184.4 µm

| | | | |
|---|---|---|---|
| Volume | 4.967e9 µm$^3$ | | |
| Mean: | 25.84 µm | S.D.: | 47.4 µm |
| Median | 31.56 µm | Variance: | 2250 µm$^2$ |
| Mean/Median Ratio: | 0.819 | | |
| Mode: | 49.89 µm | | |
| Spec. surf. area: | 0.476 m$^2$/ml | | |

| % > | 10 | 25 | 50 | 75 | 90 |
|---|---|---|---|---|---|
| Size µm | 82.30 | 55.98 | 31.56 | 14.15 | 5.778 |

| Cumulative Volume Micron size | Numeric data% less than |
|---|---|
| 1 | 0.6 |
| 2 | 2.5 |
| 3 | 4.5 |
| 4 | 6.6 |
| 5 | 8.6 |
| 7 | 12.7 |
| 10 | 18.3 |
| 20 | 34.3 |
| 40 | 60.2 |
| 80 | 89.2 |
| 120 | 97.4 |
| 180 | 99.9 |
| 200 | 100.0 |

# MATERIAL SAFETY DATA SHEET

## Section 1: Product/Company Information

Identity: Arizona sand including Arizona Road Dust, Arizona Silica, AC Fine and AC Coarse Te Dusts, SAE Fine and Coarse Test Dusts, J726 Test Dusts, ISO Ultrafine, ISO Fine, ISO Medium a ISO Coarse Test Dusts, MIL STD 810 Blowing Dust.

Mfg. Name: Powder Technology Inc.
14331 Ewing Avenue S.
Burnsville, MN 55306

Emergency Number: (952) 894-8737
Number for Info: (952) 894-8737
Date Updated: 2 March 2006

## Section 2: Emergency and First Aid

**Eyes:** Immediately flush eye thoroughly with water. Get medical attention if irritation persists.

**Skin:** N/A

**Inhalation:** Remove person to fresh air. If breathing is difficult, administer oxygen. If not breathing, give artificial respiration. Seek medical help if coughing and other symptoms do not subside.

**Ingestion:** Do not induce vomiting. If conscious, have the victim drink plenty of water and call a physician if discomfort is experienced.

## Section 3: Composition Information

Typical chemical composition:

| Chemical | CAS Number | Percent of Weight |
|---|---|---|
| $SiO_2$ | 14808-60-7 | 68-76% |
| $Al_2O_3$ | 1344-28-1 | 10-15% |
| $Fe_2O_3$ | 1309-37-1 | 2-5% |
| $Na_2O$ | 1313-59-3 | 2-4% |
| CaO | 1305-78-8 | 2-5% |
| MgO | 1309-48-4 | 1-2% |
| $TiO_2$ | 13463-67-7 | 0.5-1.0% |
| $K_2O$ | 12136-45-7 | 2-5% |

Loss on Ignition 2 - 5 %

All components of this material are included on the TSCA Inventory.

## Section 8: Fire and Explosion Hazard Data

Flash Point: None

Auto ignition Temperature: Not combustible

Flammable Limits: N/A

Extinguishing Media: Not Combustible

Hazardous Combustion Products: None

Lower Explosive Limit: None

Upper Explosive Limit: None

Special Fire Fighting Procedures: None

Unusual Fire and Explosion Hazards: None

## Section 9: Stability and Reactivity Data

| | |
|---|---|
| Stability: | Product is stable |
| Incompatibility (Materials to Avoid): | Strong Acids |
| Hazardous Decomposition: | Will not occur |
| Hazardous Polymerization: | Will not occur |

## Section 10: Handling and Storage

Handle and store in a manner so that airborne dust does not exceed applicable exposure limits. Use adequate ventilation and dust collection. Use exposure control and personal protection methods as described in Section 12.

## Section 11: Toxicological Information

Conditions aggravated by exposure: Eye disease, Skin disorders and Chronic Respiratory conditions.

## Section 12: Exposure Control/Personal Protection

| | |
|---|---|
| Respiratory Protection: | Use local exhaust or general dilution ventilation to control dust levels below applicable exposure limits. Minimize dispersal of dust into the air. Use appropriate NIOSH approved respiratory protection for respirable crystalline silica. |
| Eye Protection: | Wear safety glasses with side shields or goggles to avoid contact with the eyes. In extremely dusty environments and unpredictable environments, wear tight-fitting unvented or indirectly vented goggles to avoid eye irritation or injury |