

# SOUTHWEST RESEARCH INSTITUTE™

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January 14, 2002

Curt Robbins  
Puradyn Filter Technologies Inc  
3020 High Ridge Road, Suite 100  
Boynton Beach, FL 33426  
561-547-9499  
Fax: 734-432-3157

Subject: Test Results  
PO 001048-00  
Page 1 of 3

Dear Mr. Robbins:

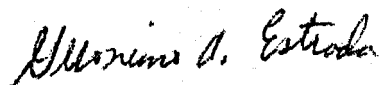
Results are complete on the sample submitted on January 08, 2002 for test analysis. Results and test methods are provided on the following table.

Testing was performed according to the listed methods with no deviations or modifications. Sample aliquot was taken in accordance with the listed test procedure, and precision of the test should be consistent with stated limits in the test procedure.

The data reported pertains only to the samples received by Southwest Research Institute and represents only sampling of these batches. This report shall not be reproduced except in full without the express written permission of Southwest Research Institute.

If you have any questions concerning these test results, please contact me at (210) 522-3006 or by email at [Gestrada@SwRI.org](mailto:Gestrada@SwRI.org).

Sincerely,



Geronimo A. Estrada, Asst. Director  
Fuels and Lubricants Research  
Petroleum Products Research Department  
*Automotive Products and Emissions Research Division*

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## FILTER CAPACITY AND CONTAMINANT REMOVAL PER SAE HS806-95

TEST DATE: JANUARY 09, 2002

WORK ORDER NUMBER: 291406

STAND I.D. NO. 3

SPONSOR: PURADYNE

CONTAMINANT I.D.: SOFTC-2A BATCH NO.:970001

FILTER I.D.: 300LB

TEST OIL I.D.: RFO-3-93 BATCH NO.: 56677

FILTER BRAND: PURADYNE

VOLUME: 38 LITERS

TEMPERATURE DEG. C: 82.0

ADD RATE: 1.0 G/HR.

TEST FLOW RATE: 6.72 GPH

INITIAL SYSTEM CLEANLINESS (G/L): 0.0000

CONTAMINANT DELIVERY RATE: 0.087 L/HR.

INLET FILTER PRESSURE : 45.5 PSI

TEST TERMINAL: 100 HRS.

TEST TIME HRS.	FLOW RATE GPH	FILTERING EFFICIENCY (%)	WEIGHTED AVERAGE
4.00	6.72	97.64%	390.54%
8.00	6.85	85.75%	343.00%
12.00	6.72	90.50%	362.00%
16.00	6.72	73.08%	292.33%
20.00	6.72	63.27%	253.07%
24.00	6.72	69.39%	277.56%
28.00	6.72	65.62%	262.48%
32.00	6.72	77.83%	311.33%
36.00	6.72	81.35%	325.41%
40.00	6.72	70.87%	283.47%
44.00	6.72	78.41%	313.64%
48.00	6.72	80.21%	320.83%

AVERAGE EFFICIENCY: 77.83%

CAPACITY GRAMS: 38.50

HRS. LIFE: 48.00

TECHNICIAN: DAVID DON & GEORGE GARCIA

DATE COMPLETED: JANUARY 14, 2002

APPROVED BY:

*Herminia A. Estrada*



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INITIAL SYSTEM CLEANLINESS (G/L): 0.0000

CONTAMINANT DELIVERY RATE: 0.087 L/HR.

INLET FILTER PRESSURE : 45.5 PSI

TEST TERMINAL: 100 HRS.

TEST TIME HRS.	FLOW RATE GPH	FILTERING EFFICIENCY (%)	WEIGHTED AVERAGE
52.00	6.72	67.12%	268.46%
56.00	6.72	61.32%	245.29%
60.00	6.72	70.23%	280.93%
64.00	6.72	60.02%	240.08%
68.00	6.72	62.75%	250.98%
72.00	6.72	66.05%	264.19%
76.00	6.72	61.17%	244.67%
80.00	6.72	55.19%	220.77%
84.00	6.72	58.23%	232.92%
88.00	6.72	53.65%	214.61%
92.00	6.72	58.14%	232.58%
96.00	6.72	54.88%	219.50%
100.00	6.72	62.25%	249.01%

AVERAGE EFFICIENCY: 69.00%

CAPACITY GRAMS: 62.25

HRS. LIFE: 100.00

TECHNICIAN: DAVID DON & GEORGE GARCIA

DATE COMPLETED: JANUARY 14, 2002

APPROVED BY: *Gerardo A. Estrada*



## APPENDIX A CONTAMINANTS

### 1. Glass Beads

See Appendix "D" for addresses of supplier:

- 1.1 Facet Quantek (10-20 micron range)
- 1.2 Powder Technology Inc.
- 1.3 Potters Industries.
- 1.4 Cataphote Division, Ferro Corporation.

2. Test Dust is available in two standard grades, Fine and Coarse. These contaminants are also referred to as "Arizona Road Dust," "Arizona Test Dust," "Fine or Coarse Dust," and "SAE Fine or Coarse Test Dust."

Airzona Test Dust (Coarse and Fine) is manufactured by Powder Technology Inc. Differences in test results may occur between different batches of test dust. Therefore, it is recommended that comparison testing of filters be performed using a single batch of dust per test program whenever possible.

Arizona test dust is a naturally occurring contaminant consisting primarily of silicon dioxide with smaller amounts of other crystalline and organic matter. It is collected from a select area of Arizona desert, milled and classified to specified particle size.

Typical chemical analysis of Arizona Test Dust is shown in Table A-1. Particle size specifications for Arizona Fine and Coarse Test Dust are shown in Tables A-2 and A-3.

Care should be taken in handling test dust because stratification or agglomeration of particles may occur during shipping or handling. It is therefore recommended that test dust be resuspended or blended prior to use.

### 3. Contaminant SOFTC-2A, Standardized Oil Filter Test Contaminant.

3.1 SOFTC-2A is a mixture of ferric oxide, carbon black and PV resin of graded sizes blended in mineral oil, in proportions by weight of 22% solids and 78% oil. The specified composition of solids is:

3.1.1 Sixteen parts by weight carbon black powder, average particle size 0.70 microns.

3.1.2 Two parts by weight of ferric oxide, 95% of particles are in the range of 0-5 micron size, as measured by volume.

3.1.3 Four parts by weight of PV resin, particle size advertised to be as follows:

- ~100% to pass through a 30 mesh screen
- 90% minimum to pass through an 80 mesh screen
- 80% minimum to pass through a 200 mesh screen

Formulation procedure is described in Federal Specification F-F-351c.

Ready mixed SOFTC-2A is manufactured and sold by Powder Technology Inc. (see Appendix D for address and telephone number).

Because SOFTC-2A is a blend of controlled sub-

stances, it can be reproduced with minimal variation. Therefore, tests conducted with this contaminant over an extended period of time (other things being equal) will be more reproducible than with a natural sludge type contaminant.

3.2 Contaminant Handling — the standard contaminant concentrate, when purchased in 3.8 Liter cans, should be dated and the container inverted and stored so that the opening access is on the bottom. Prior to contaminant usage, warm contents of can to approximately 82°C, shake thoroughly, and transfer contents from can being sure all contaminant is removed.

Place 7.6 Liters of standard contaminant in the agitator and recirculate through a centrifugal impeller type pump at 3450 rpm, 68 L/min at 700 mm head. Regulate flow of contaminant through the pump at 3.8L/min. Depending upon ambient conditions, oil temperature normally falls within the range of 51-71°C during circulation in the agitator. Continuous operation of the agitator may be maintained throughout the filter test, but the contaminant must be agitated by circulation through the centrifugal type pump for at least one hour immediately prior to each addition to the blender or injector. Add additional SOFTC-2A to re-establish original contaminant level when approximately 3.8 Liters of contaminant has been removed from the agitator. (see figure 21)

Re-establishment of the original level is necessary to prevent "working" of the contaminant by a high turnover rate in the pumping cycles. Remove a sample of the contaminant from the agitator original charge (after 1 hour of operation), the samples thus removed are analyzed to determine the percentage of solids content using the petroleum ether and n-Pentane insolubles analysis procedure. Homogeneity of contaminant being added to the blender or injector must be assured. The importance of having a truly representative material for addition to the testing system cannot be overemphasized.

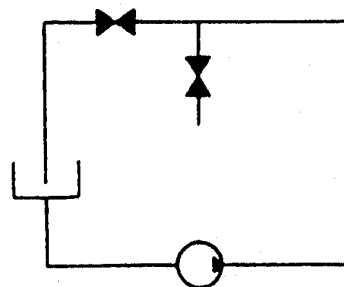


Fig. 21 Contaminant Conditioning