New SuperClean Test Results

December 11, 2010

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Introduction page

Improved SuperClean

Test Results

We have put 50% more TACTROL, our deposit control additive, in our ***Improved* Premium SuperClean.** That means when you use ***Improved* Premium SuperClean** you receive *more* of the benefits that you received when you purchased Regular SuperClean previously. If you have been purchasing gasoline from other inferior brands, your engine likely has deposits … performance robbing deposits. With just 5 consecutive tankfuls of ***Improved* SuperClean**, your engine will be cleaner, which results in better performance, less hesitation and stumble, easier starting, smoother acceleration *and* up to 15% reduction in emissions.

We are confident that you will notice a difference in your vehicle's performance. Our tests have shown that ***Improved* SuperClean** with 50% more TACTROL is very effective in removing deposits which have been left behind by the use of gasoline purchased from inferior brands.

Improved SuperClean - Test Results

- **Test Outline**
- **Test Protocol**
- **Test Results Summary**
- **Comparative and Related Test Data**
- **Visual Benefit Examples**

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Test Outline

- **Tests conducted for Petro-Canada at our additive supplier's flagship research facility in Richmond, Virginia**
- **Test Engines**
  - five different vehicle makes, with engine sizes ranging from 2.0L to 4.6L, were used in this evaluation. These vehicles were selected to represent a cross section of the NorthAmerican vehicle population.
- **Test Fuels**
  - Dirty Up Fuel– commercial grade regular unleaded with 10% ethanol treated at the minimum EPA LAC treat level
  - Clean Up Fuel – the same fuel was treated with 215 PTB of Afton's HiTEC® 6567 gasoline performance additive – Petro Canada SuperClean

Test Vehicles

- **These vehicles were selected to represent a cross section of the North American vehicle population.**

Vehicle			Model	Engine
ID	Make	Model	Year	Size
04FE8	Ford	Explorer	2004	4.6L
06HE1	Hyundai	Elantra	2006	2.0L
03DC5	Dodge	Caravan	2003	3.3L
06CI2	Chevrolet	Impala	2006	3.5L
02FF2	Ford	Focus	2002	2.0L

Test Protocol

Test Program conducted in 2 phases: “dirty-up” and “cleanup”

- Cylinder and piston tops cleaned prior to test
- Cylinder heads rebuilt with new pre-weighed intake valves

Dirty-Up Phase *

- 10,000 miles simulated on a mileage accumulation dynomometer
  - Driving cycle: 10% city, 20% urban, 70% highway
  - Similar cycle to the BMW Road cycle specified in ASTM D5500 Intake Valve Deposit test
  - Intake valves
    - removed and weighed to determine deposit levels at conclusion
    - Visually rated using a CRC rating scale
  - Combustion chamber deposits measured by thickness
  - Fuel injectors flowed to determine degree of injector fouling

*** Intake valve deposits during this phase exceeded the EPA 100 mg limit suggesting that fuels treated at LAC dosages will not adequately control intake valve deposits in all vehicle technologies**

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Test Protocol..continued

Cleanup Phase

- Vehicles reassembled with no disturbance to intake valve deposits
- 1500 additional miles driven to simulate 5 tankfuls of fuel
- Fuel treated with 215 PTB of HiTEC® 6567
- Intake Valves
  - Measured and rated using the same techniques as in the “dirty-up” phase
- Combustion Chamber and Fuel Injectors
  - Measured and rated using the same techniques as in the “dirty-up” phase

Results

Test Vehicle		Average IVD, mg		Percent	CRC Valve ratings		
Make/Model	Engine	Dirty-up	Cleanup	Cleanup	Dirty-up	Cleanup	Improvement
2004 Ford Explorer	4.6L	789.7	376.5	52.3	6.80	7.81	1.01
2006 Hyundai Elantra	2.0L	518.8	312.1	39.8	7.34	7.77	0.43
2003 Dodge Caravan	3.3L	973.0	616.3	36.7	6.83	7.61	0.78
2005 Chevrolet Impala	3.5L	306.7	82.8	73.0	7.95	9.17	1.22
2002 Ford Focus	2.0L	165.0	64.7	64.7	7.20	8.14	0.94
Average				53.3			.876

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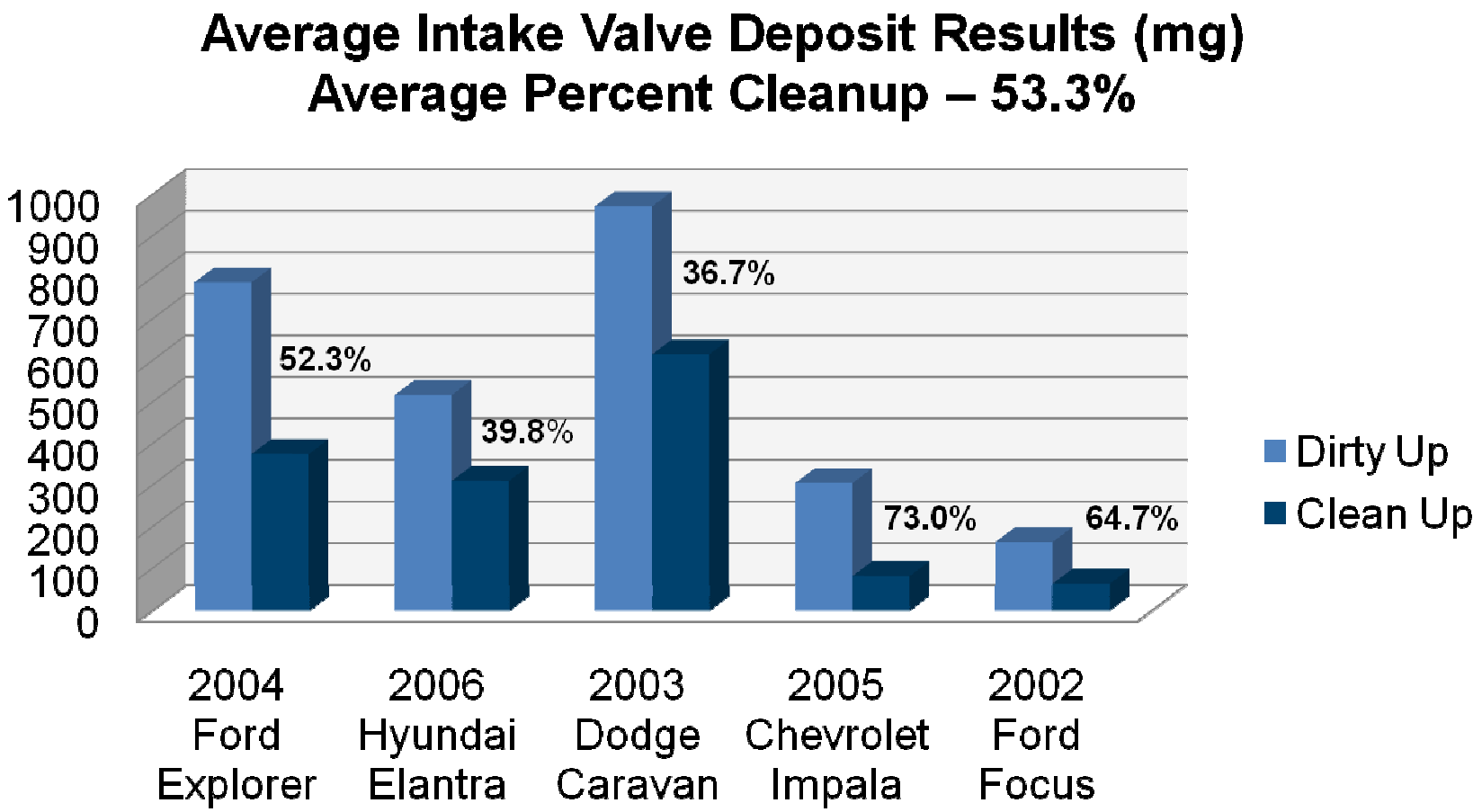
Results



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Results

- **Emissions**
  - Houser and Crosby (Society of Automotive Engineers paper # 922259) identified a linear relationship between changes in emissions with a change in valve cleanliness.
- **According to the analysis of Houser and Crosby, a one number change in CRC IVD rating would give the flowing emissions improvements:**
  - No effect on HC - statistically difficult to determine
  - 10.6% lower CO emissions
  - 17.8% lower NOx emissions
- **The use of HiTEC 6567 at 215 ptb is expected to deliver emissions reduction of:**
  - up to 12.9% for CO
  - up to 21.7% from NOx.
  - Average benefits anticipated are 9.3% for CO and 15.7% for NOx.

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Conclusion & Benefits

- **The test program specifically confirms the beneficial effect of Intake Valve Cleanup on driveability performance**
  - Broad spectrum of vehicle makes/engine types
  - Commercial fuel
  - Realistic deposit levels (& CU performance)
  - Cleanup using a DCA package (not mechanical CU)

- **Benefits**
  - Areas of benefit from fuel additive technology
    - Deposit Removal
    - Driveability improvements (Cold start time & engine operation)
    - Emissions reduction

Visual Benefit Examples

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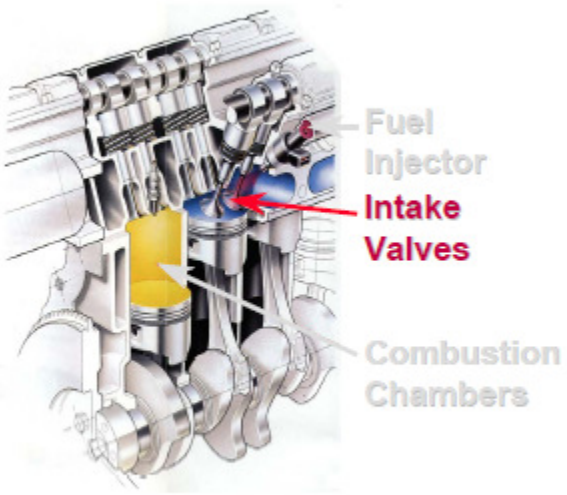
Intake Valve Clean Up



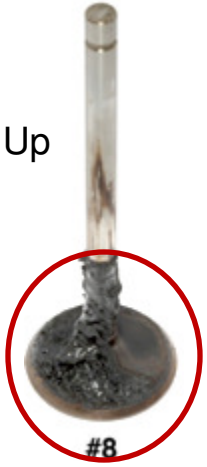
Intake Valves:

Deposits amounting to as little as the weight of an aspirin tablet (100 mg) are sufficient to fail the current industry cleanliness test. These deposits can upset the finely controlled preparation of air and fuel entering the cylinder.

Symptoms:

Poor driveability, increased exhaust emissions and even loss of power.

Valve After Dirty Up



Valve After Clean Up

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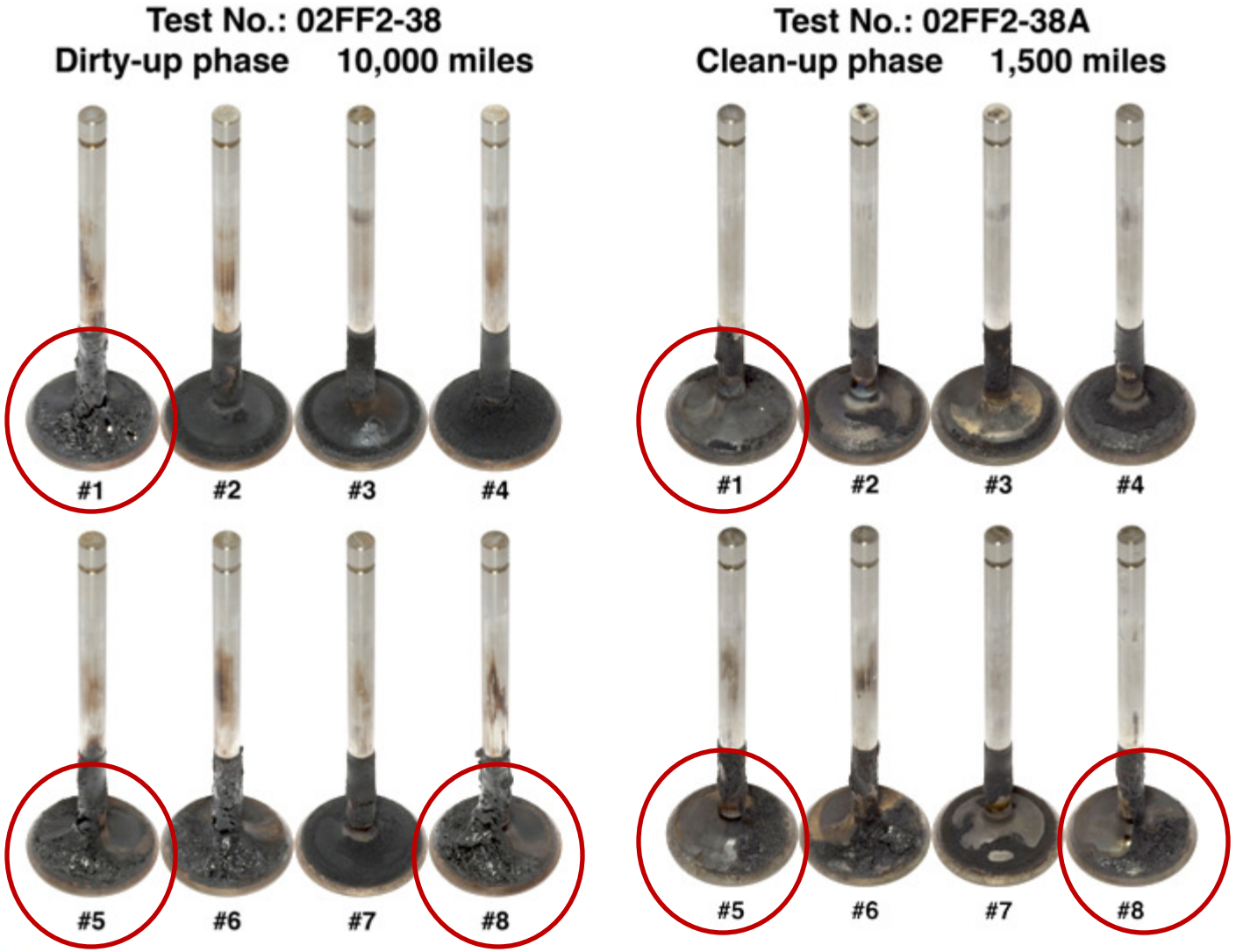
Ford Focus Intake Valves



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Intake Valve Clean Up

- **All vehicles showed a significant reduction in intake valve deposits after 1,500 miles of operation using fuel treated with 215 PTB of HiTEC® 6567.**

Ford Explorer Valves

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Test No.: 03DC5-19

Dirty-up phase 10,000 miles

Test No.: 03DC5-19A

Clean-up phase 1,500 miles

Dodge Caravan Valves

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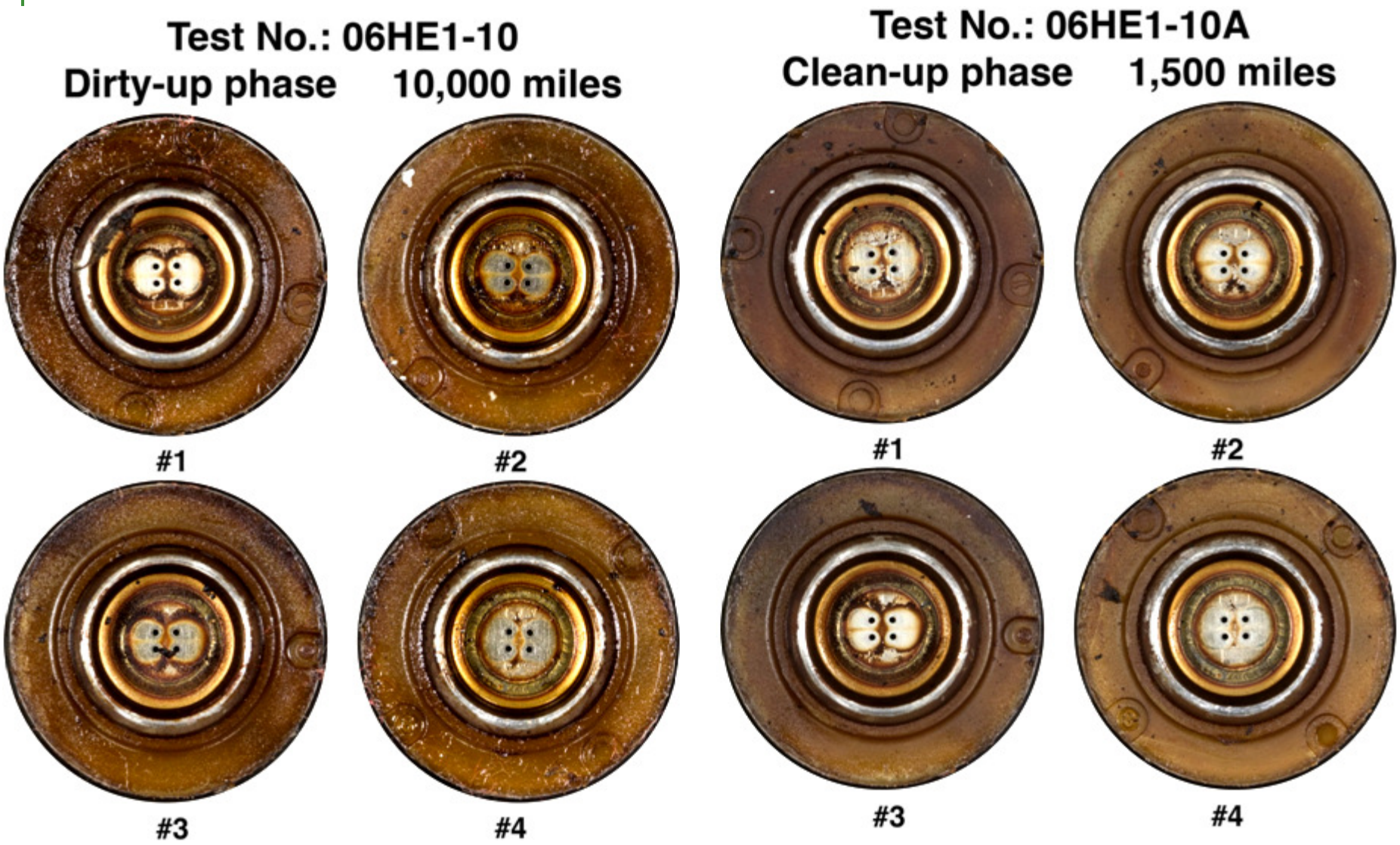
Hyundai Elantra Fuel Injectors



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