



# Clean Flow™



# Engine technology continues to evolve, increasing the need to keep engines clean



## Legislation

- Exhaust Emissions
- Fuel Economy
- Sulfur Reduction
- GHG
- RFS



## Engine Technology

- GDI/Turbo
- HPCR
- Lighter and Smaller
- Global Alliances

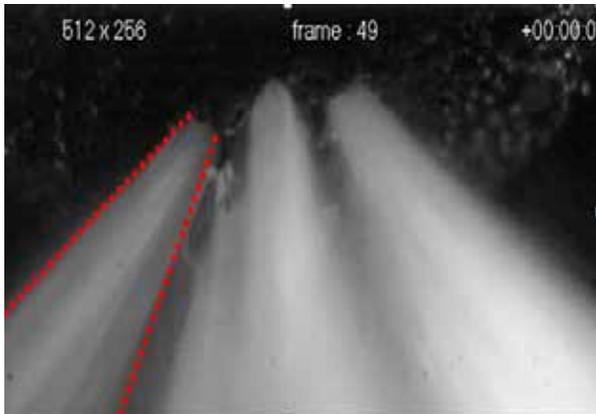


## Consumer Expectations

- Performance, Durability and Reliability
- Efficiency
- Technology and Safety
- Connectivity and Autonomy

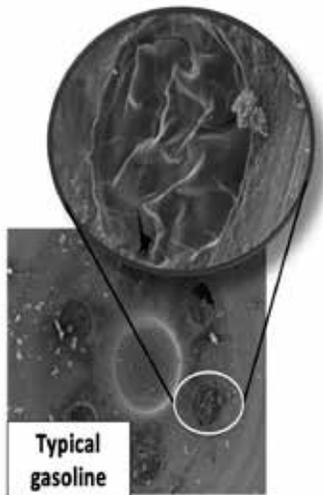
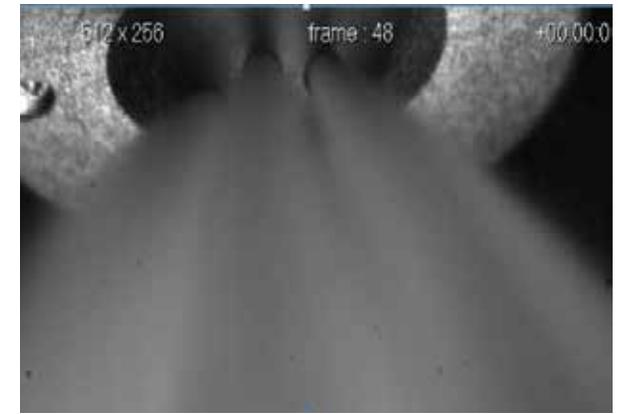
**CRITICAL DRIVERS FOR CHANGE**

**DEPOSITED INJECTOR**



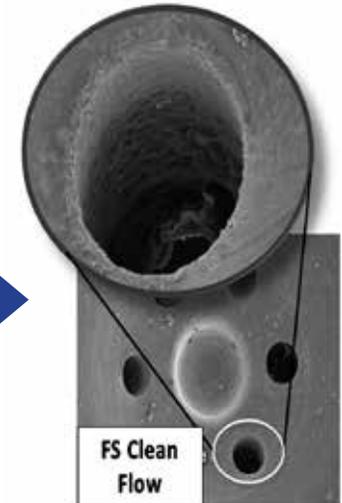
**New downsized engines are designed to increase fuel economy while lowering emissions.**

**CLEAN INJECTOR**



**Typical gasoline contributes to the development of power and efficiency robbing deposits.**

**FS Clean Flow helps to keep injectors clean allowing fuel to be delivered for optimum combustion.**



**Dirty injectors lead to hesitation from pre-ignition at low speeds, loss of fuel economy, reductions in power, and increased emissions.**

# Not all gasolines perform the same.



New Intake Valve



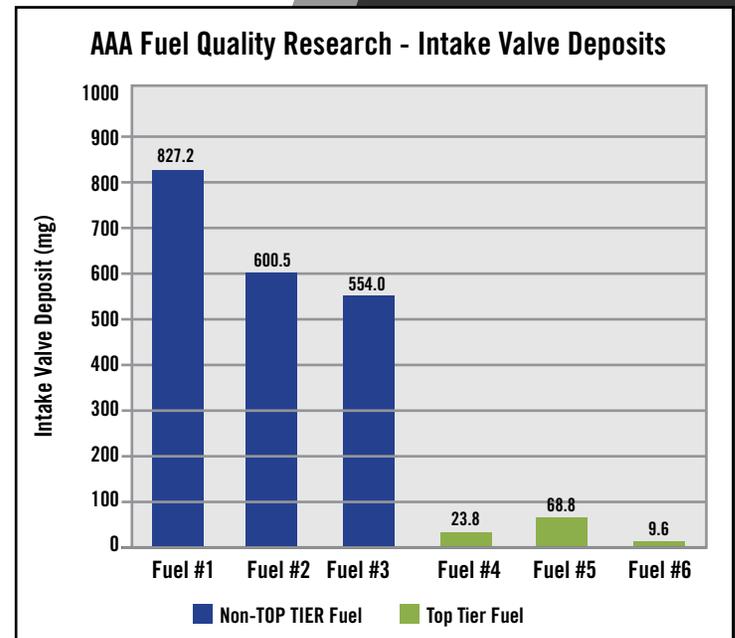
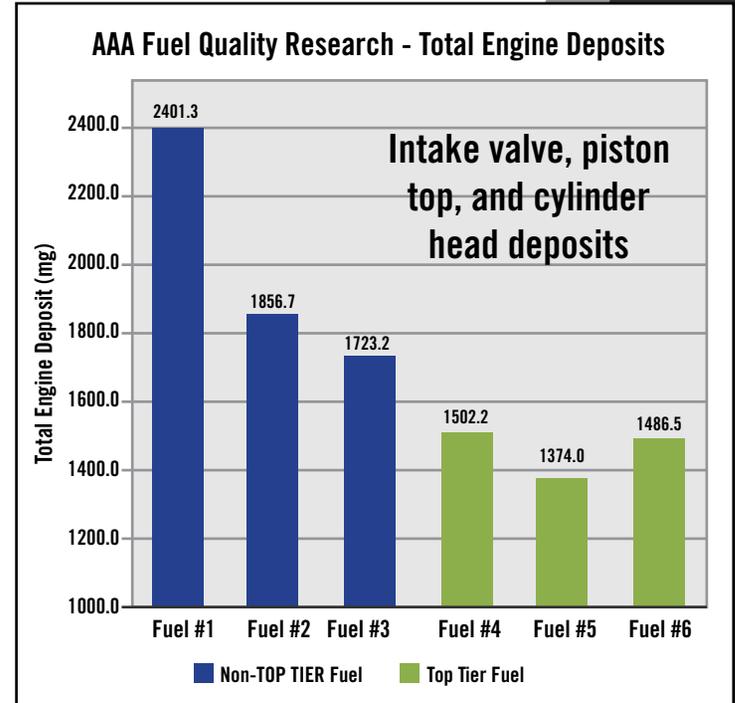
TOP TIER  
26mg



LAC  
100mg



Base Fuel  
1018mg



# What is LAC Gasoline?

## LAC = Lowest Additive Concentration

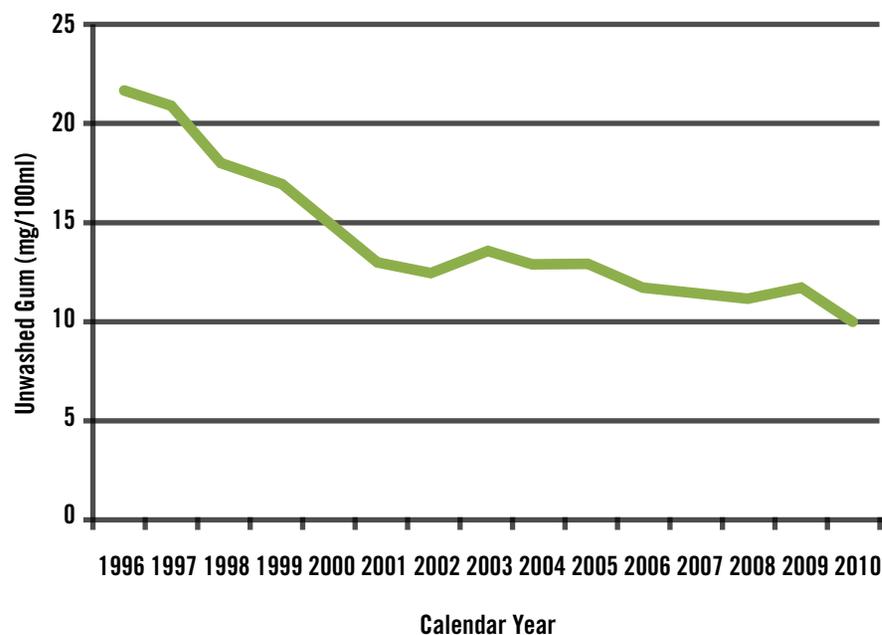
- Minimum additive level to pass government tests

## Result of the Clean Air Act / Amendments

- “Effective beginning January 1, 1995, no person may sell or dispense to an ultimate consumer in the United States, ... any gasoline which does not contain additives to prevent the accumulation of deposits in engines or fuel systems”

### U.S. Average Gasoline Detergent Levels

(Existent Gum as Surrogate for Detergent Level: Data Source - Alliance Fuel Surveys)



# Automakers are Concerned with LAC Gasoline

## KEY FINDINGS

- After 4,000 miles of simulated driving, the test engine operated on TOP TIER gasolines averaged 19 times fewer intake valve deposits than when operated on non-TOP TIER gasolines.
- Long-term use of a gasoline without an enhanced additive package can lead to reductions in fuel economy of 2-4%, drivability issues, and increased emissions.
- In most cases, carbon deposits can be reduced or removed from critical engine components by switching gasoline brands to one that meets TOP TIER standards.
- Approximately six in ten drivers (63%) believe there is a difference in the quality of gasoline sold by retailers, yet only (12%) of drivers purchase gasoline based upon the detergent additive package. Additional survey findings, page 2.
- Most TOP TIER gasolines do not cost significantly more than non-TOP TIER gasoline. The average price difference between the TOP TIER and non-TOP TIER brands surveyed was three cents per gallon over a 12-month period.

- New engine designs increase the need for deposit control
- Lower detergent levels can lead to increased deposits
- Deposits can lower fuel economy and impede attainment of Tier 2 emission standards

NEWSROOM.AAA.COM

© 2016 American Automobile Association, Inc.

All of the above lead to an overall decrease in driver satisfaction

Automakers recommend gasoline that meets stringent IVD, CCD, Fuel Injector fouling, and Low Temperature Valve Sticking performance

# What is FS Clean Flow Gasoline?

Gasoline designed to meet performance standards preferred by top automakers

- ✓ Effective in all gasoline engines
- ✓ Improves engine cleanliness
- ✓ Significantly reduces all engine deposits
- ✓ Improves engine performance and horsepower
- ✓ Reduces emissions and engine hesitation
- ✓ Reduces rough idling
- ✓ Reduces intake valve deposits
- ✓ Restores fuel economy
- ✓ Prolongs engine life
- ✓ Improves storage life
- ✓ Total fuel system protection





# UNLEASH THE CLEAN

