

TOTAL *evolution*

Technical Support Data



TOTAL *evolution*

Clean Air - Clean Engine



BACKGROUND

- ▶ Total, is committed to the production and marketing of fuels with a lower environmental footprint ahead of legislation. To support the mandatory introduction of Euro II vehicle specifications in South Africa from 1st January 2008 we bring you the launch of Total Evolution – the latest generation of unleaded petrol that enables motorists to travel further per tank full of unleaded petrol, and reduce their vehicles' harmful exhaust emissions at the same time.
 - *TOTAL EVOLUTION* Unleaded 95 and 93 is designed for use in all vehicles currently running on standard unleaded petrol.
 - *TOTAL EVOLUTION* Unleaded 95 and 93 is not a substitute for lead replacement petrol.
 - *TOTAL EVOLUTION* Unleaded 95 and 93 has been rigorously tested in diverse conditions. A representative fleet of 11 passenger cars were tested using the European emission test cycle, on tracks under controlled environments and on the open road, in real world driving conditions.

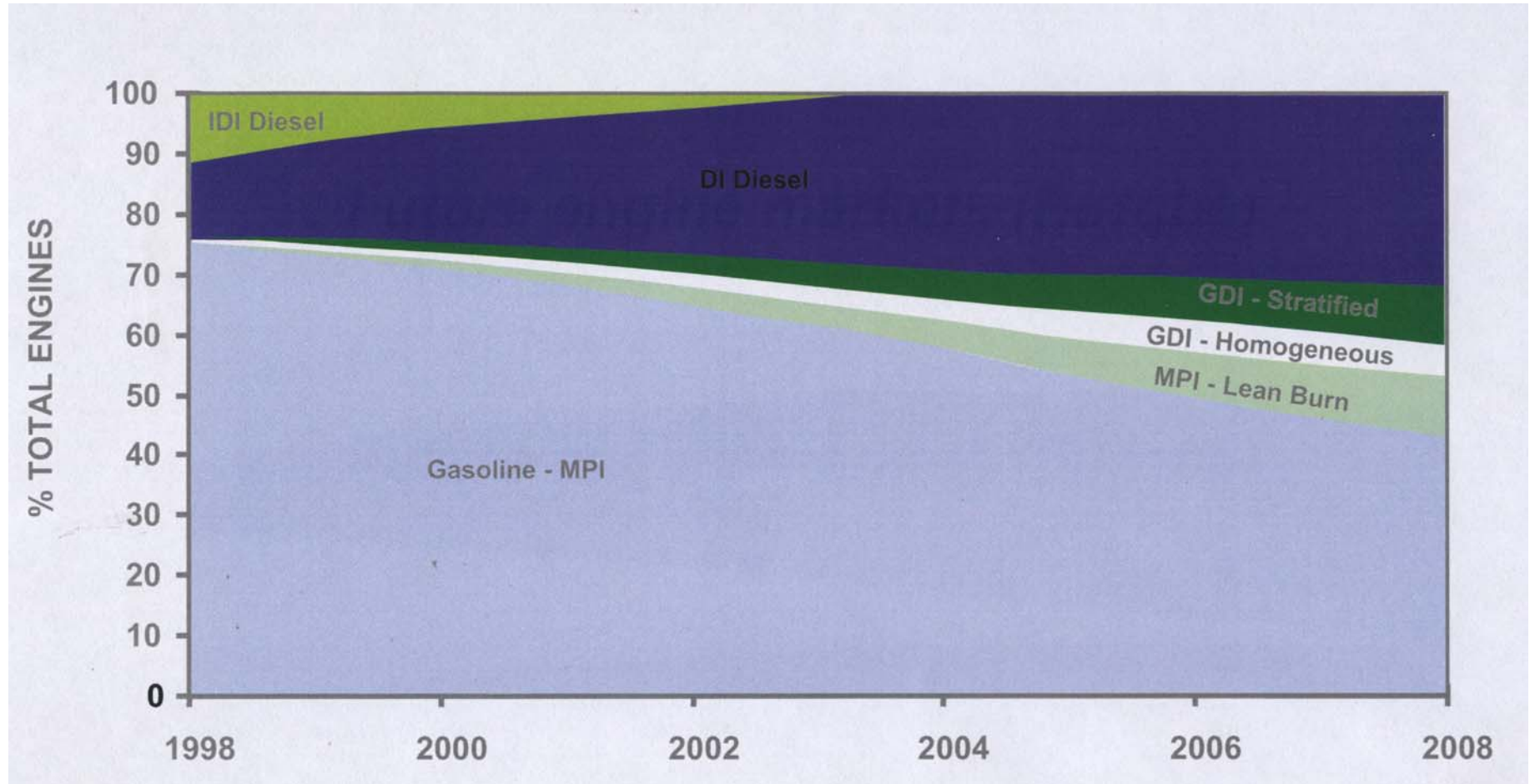


Benefits of Total Evolution Unleaded Petrol

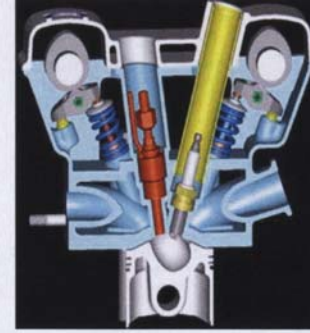
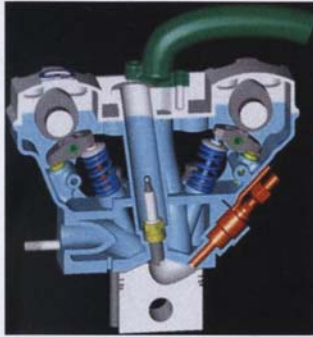
- ▶ What is *TOTAL EVOLUTION* Unleaded 95 and 93?
- ▶ **TOTAL EVOLUTION Unleaded 95 and 93 is a completely new fuel additive package developed and manufactured by TOTAL in Europe. It is designed for all cars operating on unleaded petrol and allows drivers of these cars to benefit from;**
 - A new detergent additive specifically formulated to remove harmful deposits left behind from previous use of standard fuels.
 - This new detergent additive virtually eliminates future deposits.
 - Together this ensures that your engine operates to the vehicle manufacturer's original performance specification for longer
 - A new friction modifier which reduces wear on fuel injection components ensuring your engine operates to the manufacturers original performance specification for longer



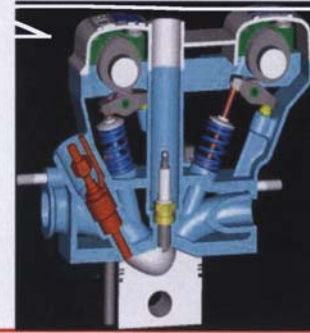
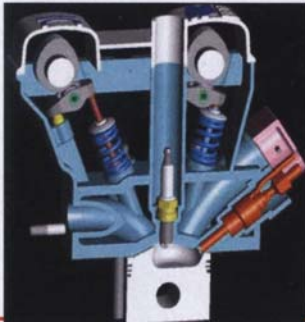
Future Engine Markets



New Engine Technology



The new DISI engines are prone to carbon fouling



Renault IDE F5R engine

- ▶ Petrol Direct Injection
- ▶ Stoichiometric fuel injection / Exhaust gas recirculation
- ▶ 1998 cm³
- ▶ Multivalve technology
- ▶ 140 Horse power / 200Nm
- ▶ Centrally fitted fuel injector



How can you prove that *TOTAL EVOLUTION* Unleaded 95 and 93 gives you more kilometres per tank full?

- ▶ *TOTAL EVOLUTION* Unleaded 95 and 93 has undergone extensive laboratory testing and has undergone more than 3,000 hours of testing in diverse driving conditions. Tests such as rolling road, circuit and normal driving conditions have proven the benefits.



How does *TOTAL EVOLUTION* Unleaded 95 and 93 contribute to better urban air quality?

- ▶ High levels of vehicle exhaust emissions have been linked to a range of urban air quality issues. With our new fuel you can reduce your vehicle's emissions of NO_x and CO₂ by up to 5%, ^[1] *TOTAL EVOLUTION* Unleaded 95 and 93 reduces your vehicle's impact on the environment.
- ▶ ^[1] Compared to SABS standard quality

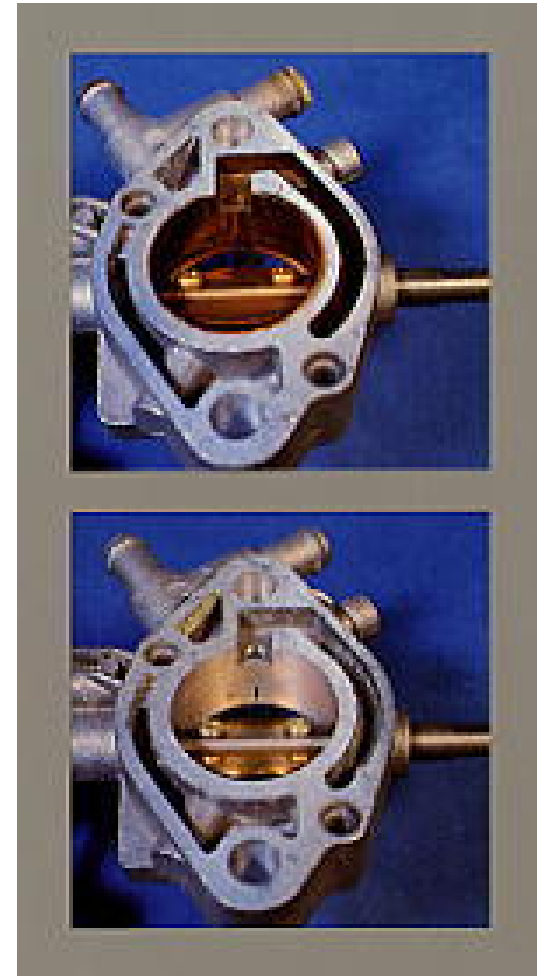
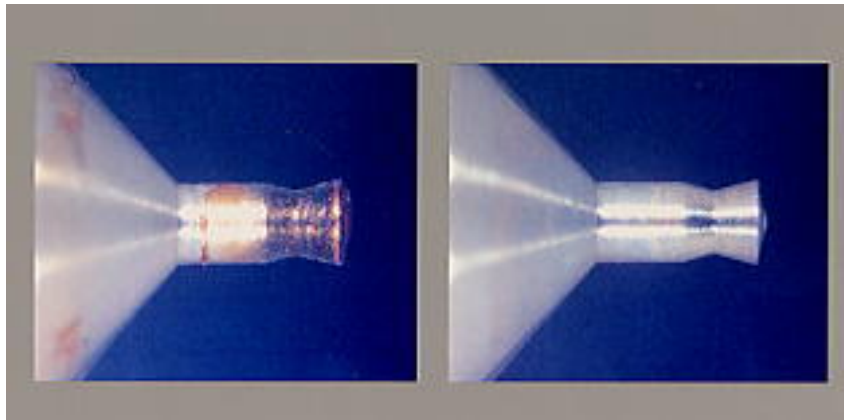
Engine Test Work

<u>Test</u>	<u>Procedure</u>
<i>Gdi Injector cleanliness</i>	<i>Peugeot EW10D / Renault F5R</i>
<i>Intake valve cleanliness</i>	<i>Ford 2.3 L (ASTM D 6201 – 97) Mercedes M102E (CEC F-05-A-93) Mercedes M111</i>
<i>Fuel Economy</i>	<i>Mercedes M111 FE (CEE70220)</i>
<i>Valve sticking</i>	<i>Volkswagen boxer (CEC PF 016)</i>
<i>Black sludge</i>	<i>Ford Crown Victoria</i>
<i>Combustion Chamber Deposits</i>	<i>Mercedes M111 (CEC F-20-A-98)</i>



The objective of Engine Testing

- ▶ **To demonstrate that the Total Evolution Additive package:**
 - Keeps new fuel inlet systems clean
 - Cleans up dirty fuel systems
 - Carburetors
 - Injectors
 - Valves
 - Combustion chambers
 - Verify all fuel economy and emission claims
 - Compatibility testing to demonstrate no negative side effects



A typical Engine Test cycle – CEC F-05-A93 (M102E)



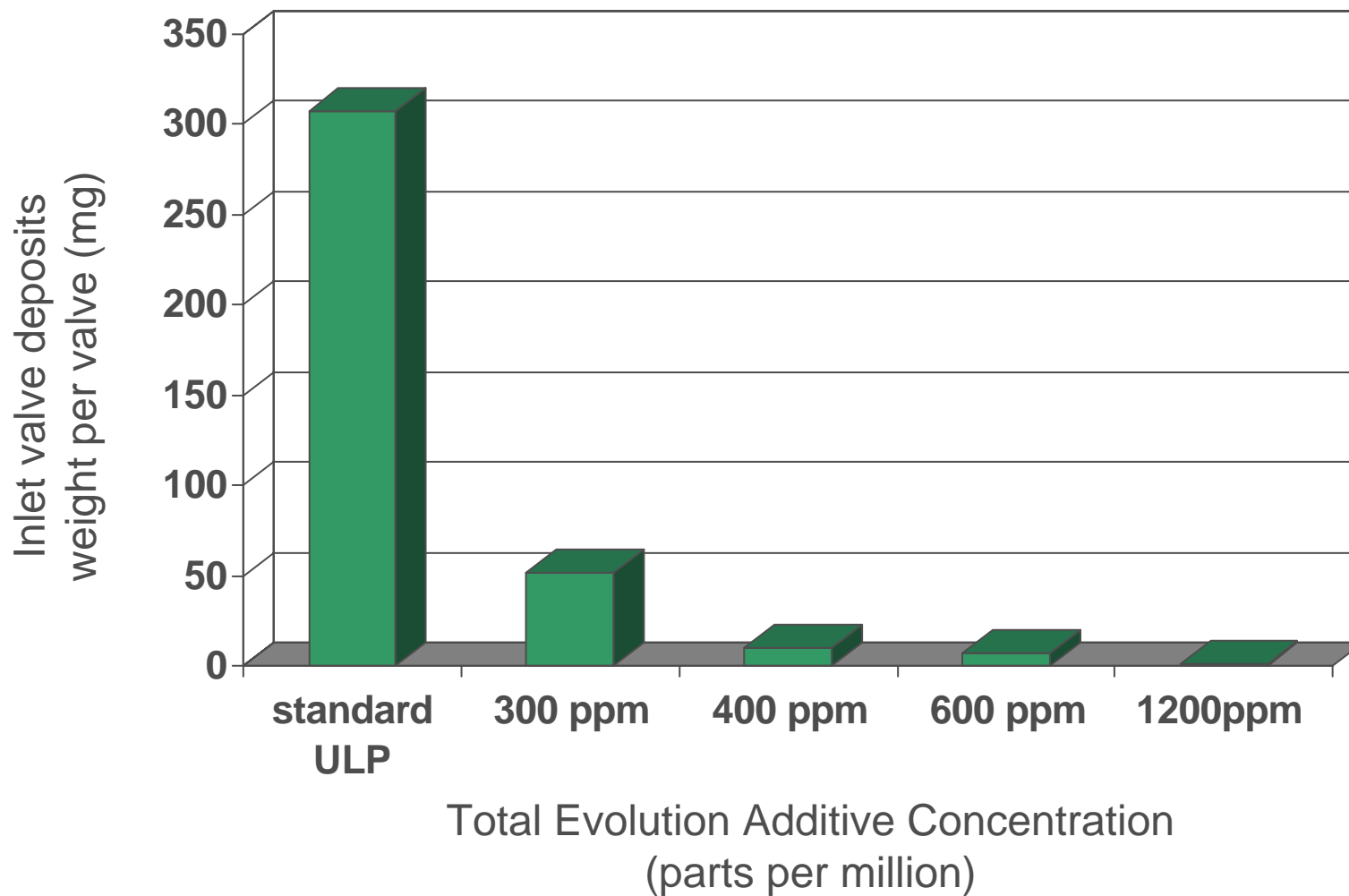
Same cycle 265 times = 20 hours test



TOTAL

Intake valve cleanliness

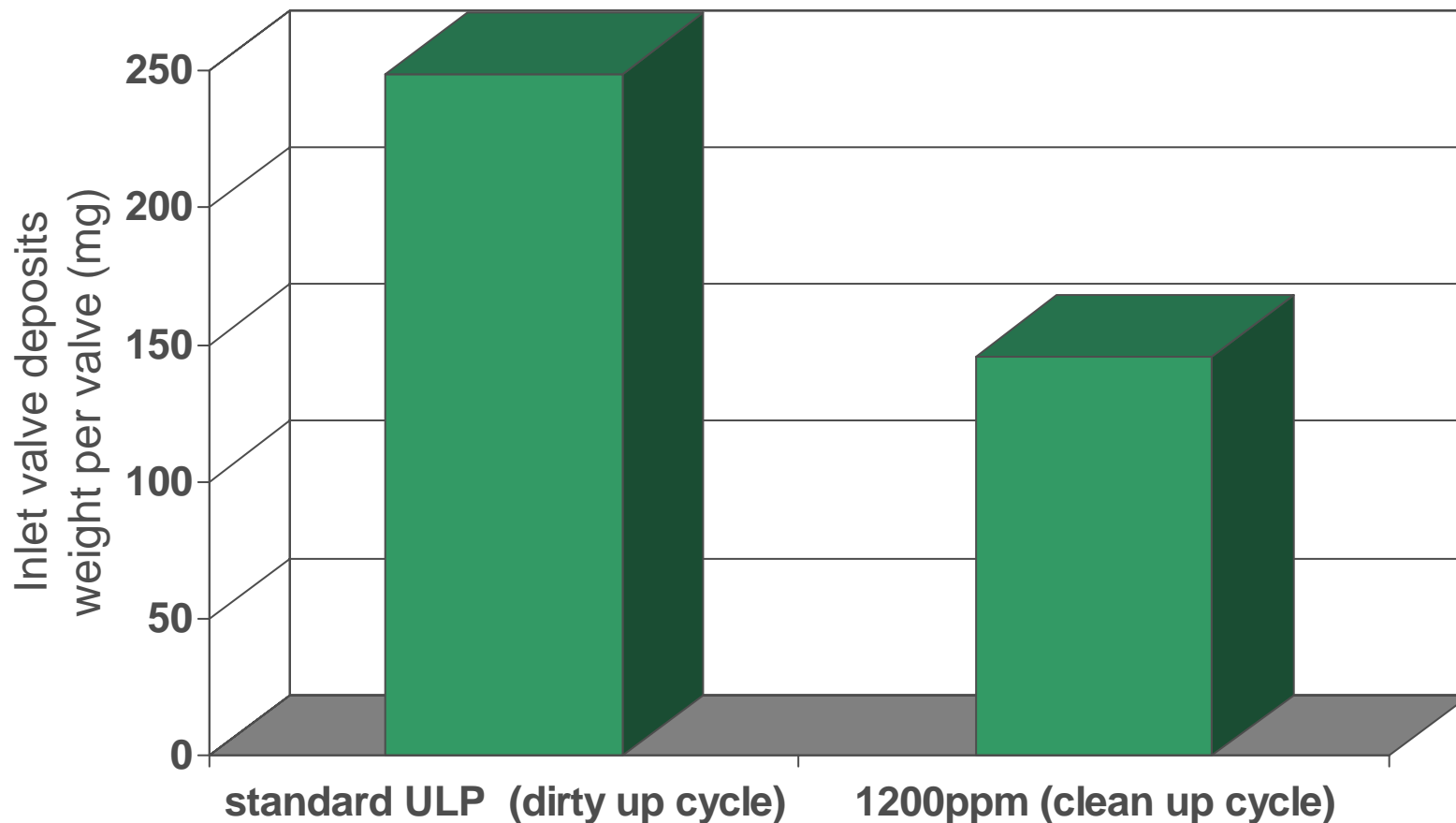
Mercedes Benz M102 E Intake valve deposits



Intake valve cleanliness

Mercedes Benz M102 E Intake valve deposits

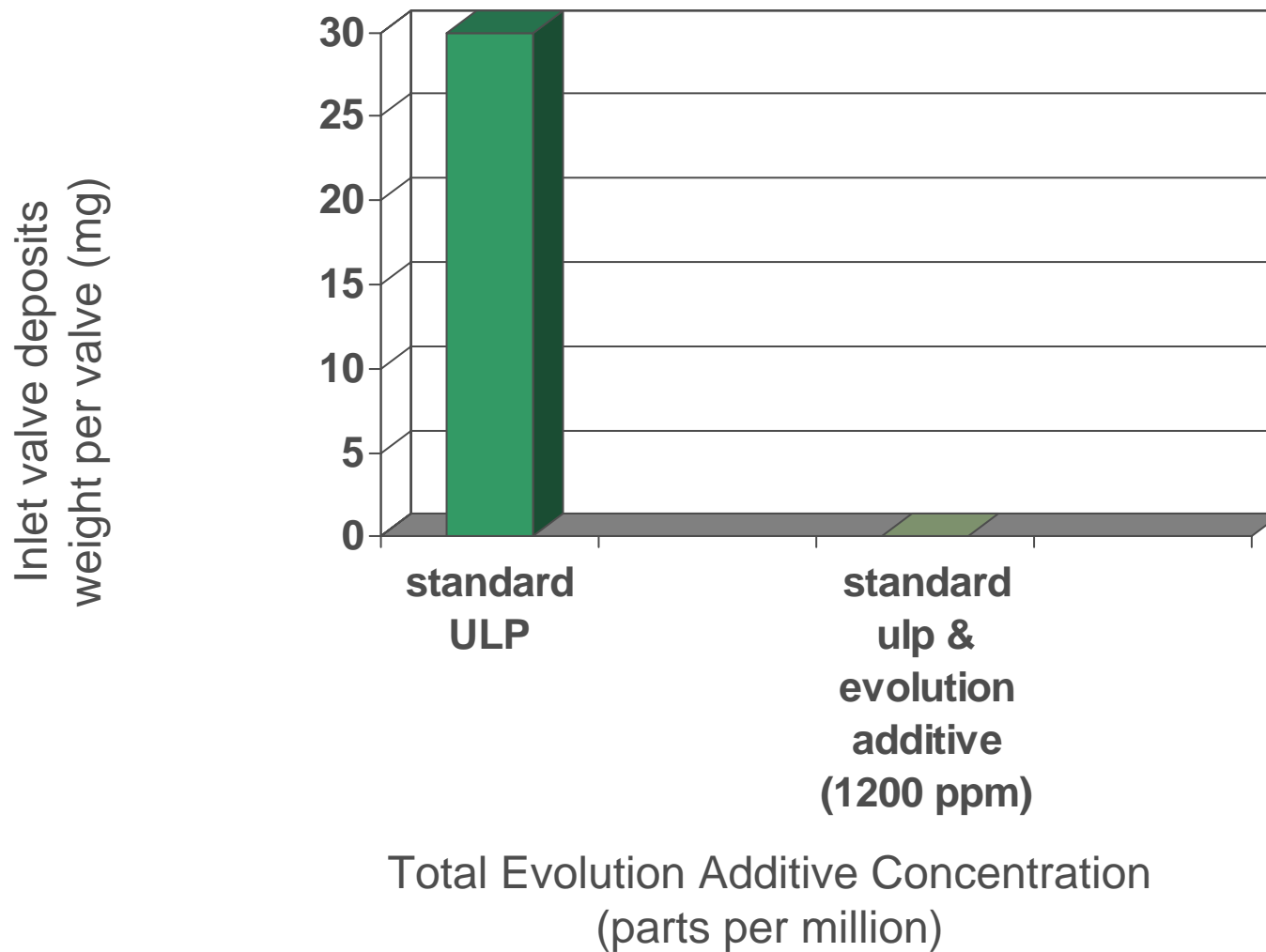
Clean Up cycle



Total Evolution Additive Concentration
(parts per million)

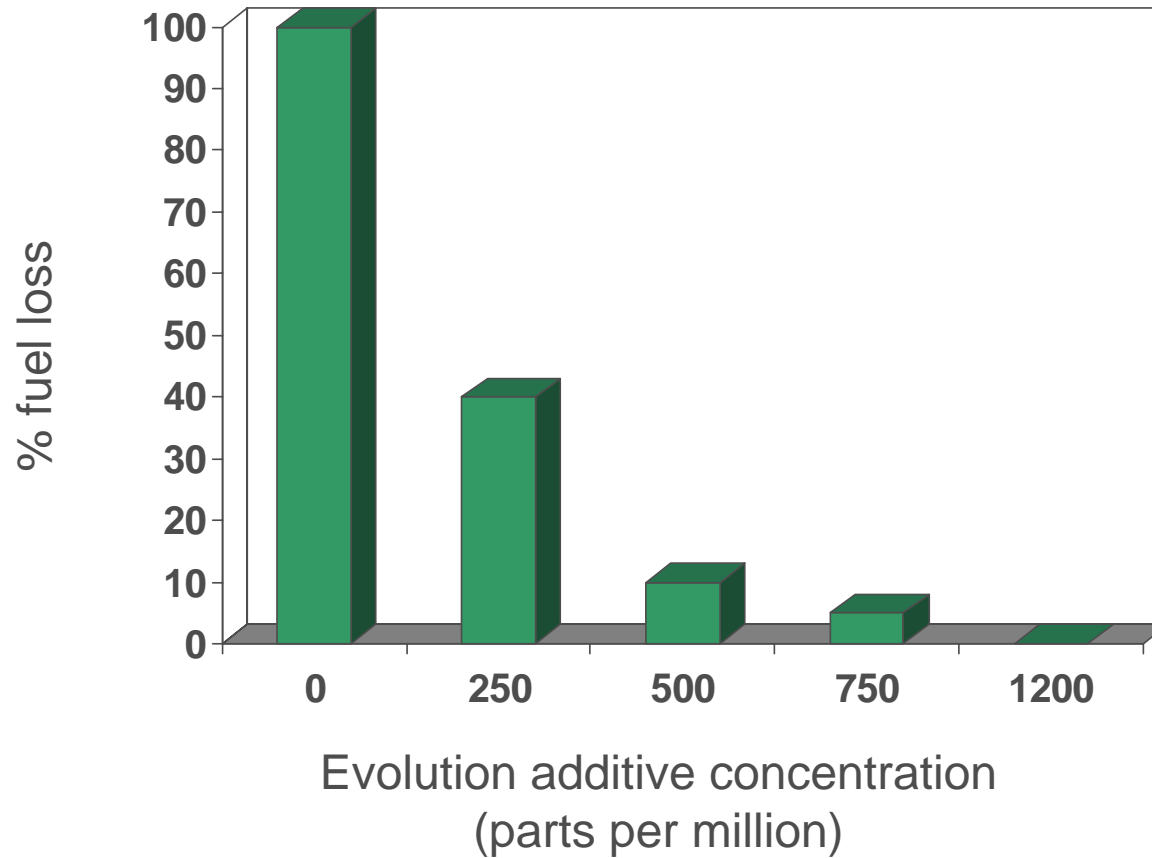
Intake valve cleanliness

Mercedes Benz M111 IVD Intake valve deposits



Keep Clean Results

Renault F5R



Fuel economy : Rolling Road Tests

Europe Test Procedure : CEE 70220

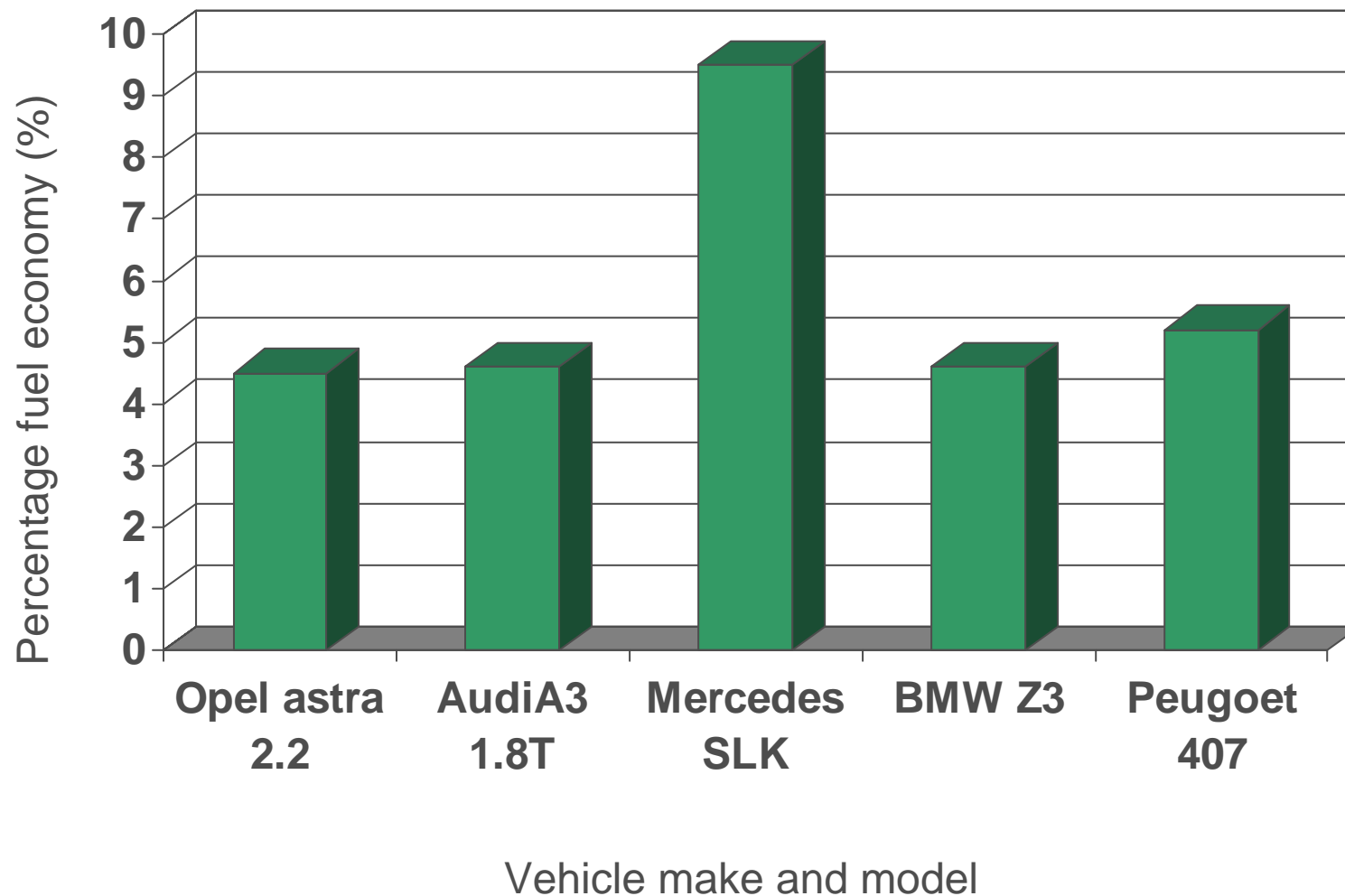
Engine : Audi A4 1.8T

<i>Cycle</i>	<i>Fuel economy</i>
ECE 1	4.3%
ECE -2 -3 -4	3.4%
EUDC	0.9%
NMVEG	2.3%



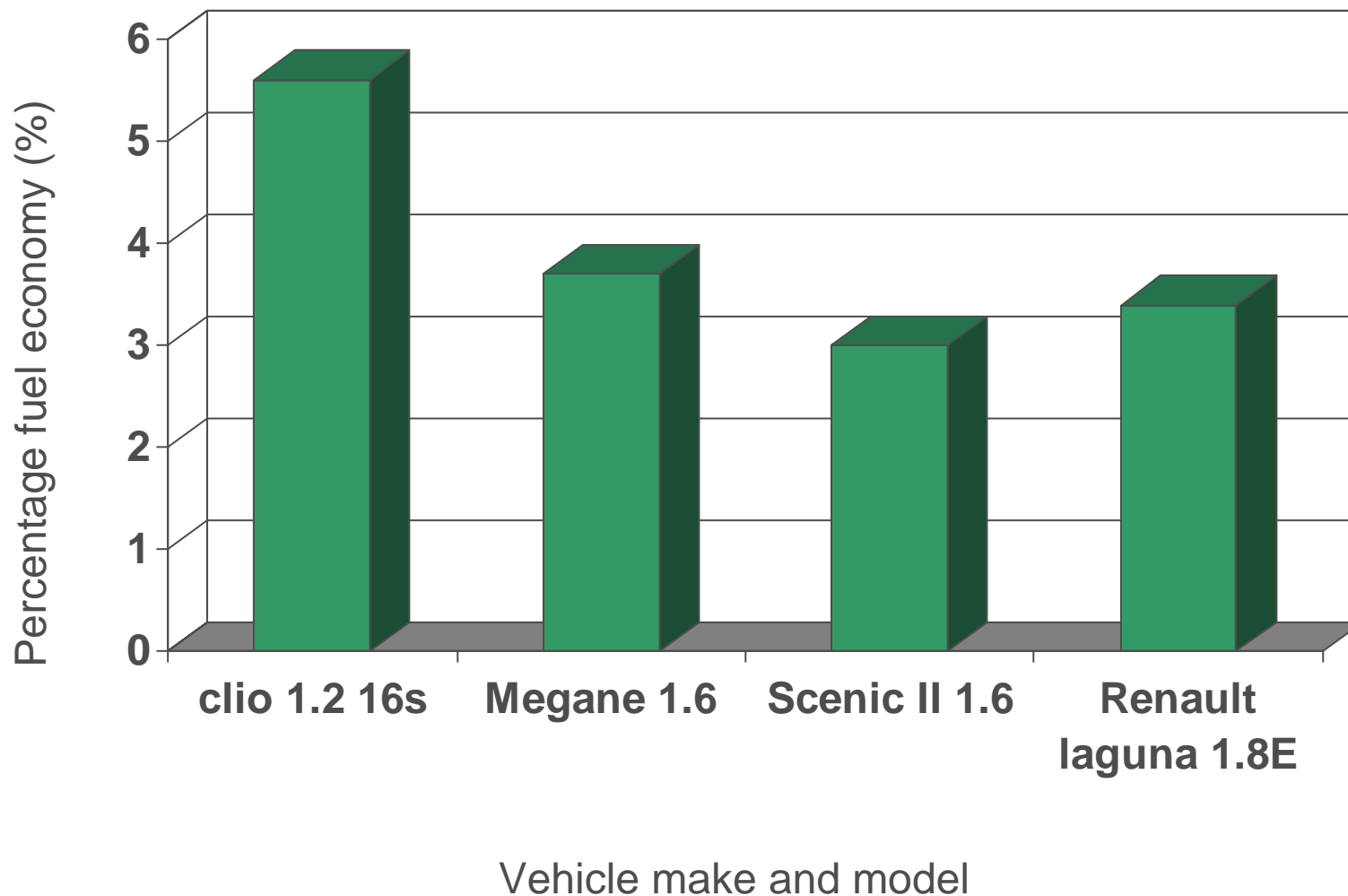
Fuel economy – circuit test results

Circuit where tests conducted:
Circuit du Lacquais



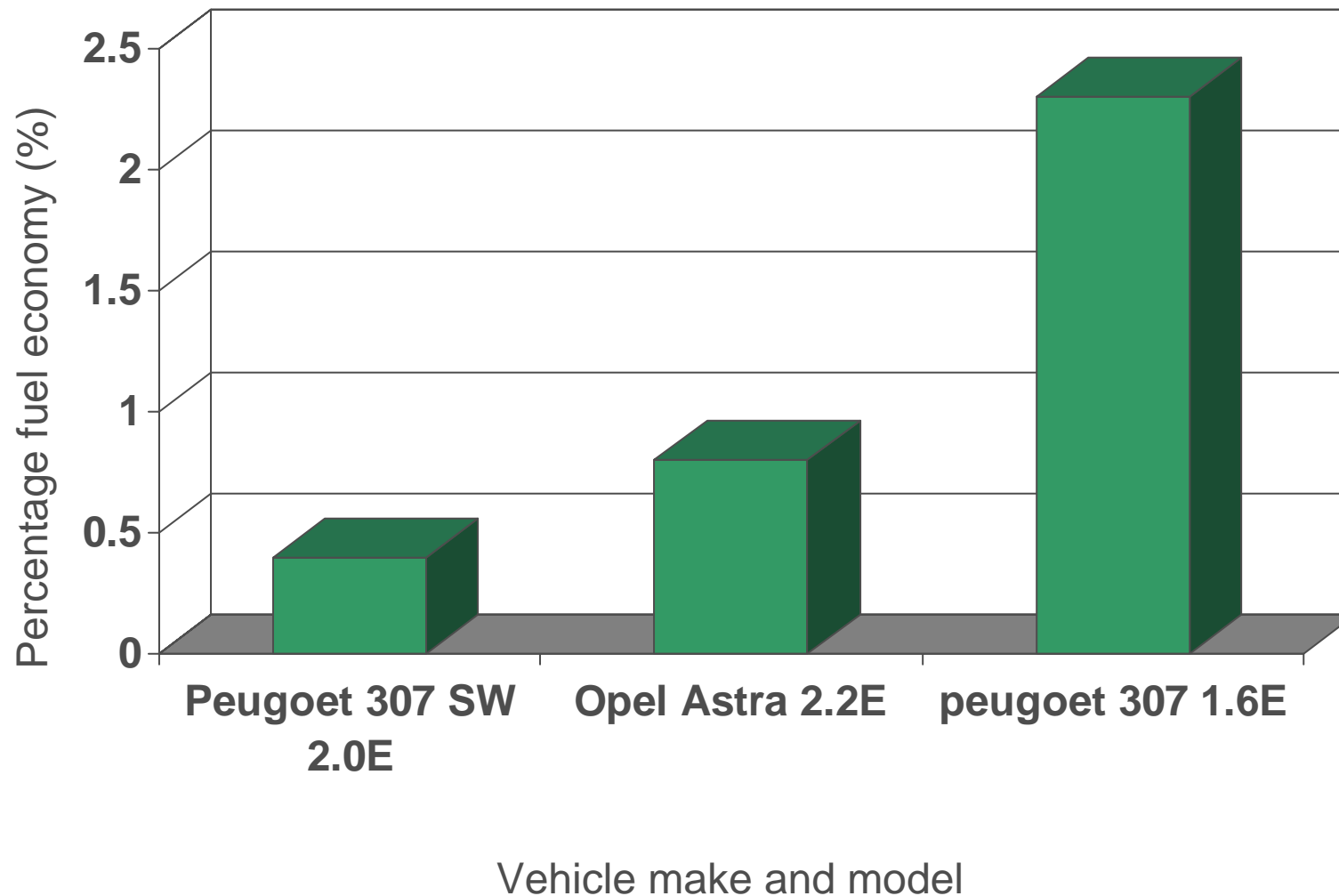
Fuel economy continued – circuit test results

Circuit where tests conducted:
Circuit du Lacquais



Fuel economy continued – circuit test results

Circuit where tests conducted:
Circuit du Lacquais



Additional Testwork

<i>Test</i>	<i>Procedure</i>	<i>Result</i>
<i>Valve sticking</i>	<i>Volkswagen Boxer engine test CEC PF 016</i>	<i>No sticking (after 3 cycles at 0°C)</i>
<i>Oil Thickening (Black Sludge)</i>	<i>Ford Crown Victoria</i>	<i>Merit > 9</i>
<i>Polyacetyl compatibility</i>	<i>ISO 175</i>	<i>No difference</i>
<i>Polyamide compatibility</i>	<i>ISO 175</i>	<i>No difference</i>
<i>Nitile – PVC Compatibility</i>	<i>ISO 1817</i>	<i>No difference</i>

Corrosion Protection – ASTM D665

- ▶ The ASTM D 665 test consists of measuring the risk of corrosion (and the efficiency of corrosion inhibitors) by immersing newly polished steel test rods into an agitated fuel-water blend for 24 hours

Standard
Unleaded petrol



Total Evolution
Unleaded petrol

