

## Evonik Technologies in the 3-liter Golf Project (VOX-TV)

**REFERENCE VEHICLE:**

Series-Production Vehicle:	VW Golf V Diesel, 1.9 liter TDI, 66 kW, 5-door
Vehicle Weight:	1360 kg
Fuel Consumption:	5.6 liter/100km - 42 miles/US gallon, NEDC Test *
CO <sub>2</sub> Emission:	148 g/km CO <sub>2</sub>

**Targeted Fuel Consumption:** approx. 3 liter/100km - 78 miles/US gallon

**Project Measures:** Body weight reduction by innovative material concepts, 3 cylinder TDI engine, friction reducing lubricants and tires with lower rolling resistance.

**Cooperation Partners** Tier 1 and Tier 2 Automotive Suppliers

### Fuel Consumption Reduction: Results of Single Measures

	Diesel [liter /100km]	CO <sub>2</sub> [g/km]
Body weight reduction:	0.8	22
Tires with lower rolling resistance:	0.3	8
Friction reducing lubricants:	0.2	5
Other measures:	0.5	13
<b>Total:</b>	<b>1.8</b>	<b>48</b>

Innovative material concepts from Evonik for Fuel Consumption Reduction in detail	Weight Reduction [kg]	Fuel Cons. Reduction [%]
Lithium-Ion instead of Lead-Acid Starter Battery	16 kg	
Sandwich Composite CFR-EP, PMI-Foam: bonnet, roof, hatchback, front and rear doors, modification of rear seats, trunk hutch	96 kg	
Acryl glass for rear window, fixed side windows	6 kg	
<b>Total**</b>	<b>118 kg</b>	<b>3-5%</b>
Custom made tires, rubber formulation with innovative materials: 16" rim, 165 mm width		5-8%
Special blended engine- and gear oil with friction reducing polymers		3-4%

**FINAL VEHICLE:**

Final Vehicle:	modified VW Golf V Diesel, 1.2 liter TDI, 45kW, 5-door
Final Vehicle Weight:	968 kg, Reduction 392 kg (-29 %)
Achieved Fuel Consumption:	3.9 liter/100km - 60.3 miles/US gallon,
CO <sub>2</sub> Emission Reduction:	103 g/km CO <sub>2</sub> (-31 %)

\* NEDC (New European Driving Cycle)

\*\* Fuel Consumption reduction for 100kg weight reduction: 0.2 liter/100kg  
Source: IKA, RWTH-Aachen, Oct. 2007, Aachener Kolloquium vehicle and motor technique