

# Controlling Emissions From Spark Ignited Engines

*Bob Eycken*










**ENGELHARD**










# Engelhard Corporation A Brief Overview

- **A Global Corporation**
- **Over 100 locations in 28 Countries**
- **A Surface & Materials Science Company**
- **Fortune 500**
- **US\$3.7 Billion Turnover in 2003**
- **6,400 Employees Worldwide**
- **US\$90 million on R&D**

# Engelhard Corporation Products

-  **Platinum Rhodium & Iridium surface treatments**
-  **Refining of Platinum Metals.**
-  **Molecular gate technology from natural gas**
-  **Pigments surface whites and finishers for paper**
-  **Surface sprays for Fruit & Cotton crops**
-  **Automotive colour and pearlescence**
-  **Cosmetic colour pigments**

# Engelhard Corporation Products

-  **Fuel Cracking Catalyst for crude oils.**
-  **Adsorbent for lubricant & cooking oils**
-  **Desiccants for natural gases**
-  **High & Low level Ozone catalysts**
-  **Diesel & Gas Compression Engine Catalysts**
-  **Diesel Regenerating Catalytic Soot Filter**
-  **ULP LPG and CNG spark ignited engine catalysts**



## *Emission Control Technology Leader*

- 🌐 **Invented the Automotive Catalyst**
- 🌐 **United Nations Award for the environment**
- 🌐 **Invented the sulfur tolerant diesel oxidizing catalyst**
- 🌐 **1st Diesel Catalyst Certified by US EPA for Urban Bus Retrofit**
- 🌐 **Only Catalyst US EPA Urban Bus certified for 25% TPM reduction on 4-stroke engines.**
- 🌐 **The first approved diesel emission control product to be selected by the Hong Kong Government.**

# *Emission Control Technology Leader Auto Catalysts*

- 🌐 **Spark ignition of petrol and gas produces CO HC & NOx**
- 🌐 **In the late 1960's EC produced the very first 2 way oxidizing catalyst – Pt coated ceramic substrate reduced CO & HC**
- 🌐 **First customer Ford Motor company**
- 🌐 **Removal of lead from petrol to allow the use of catalysts**
- 🌐 **US Clean Air Act of 1970 required manufacturers to clean up emissions from spark ignited engines.**

# *Emission Control Technology Leader Auto Catalysts*

- 🌐 **As legislation required cleaner engines.**
- 🌐 **Second generation catalysts in the mid 70's were 3 way Pt Rh coated ceramics to reduce CO HC & NOx using engine management systems and oxygen sensors.**
- 🌐 **Third generation Catalysts in the 80's were 3 way Pt Rh Pd coated ceramics and metallic to reduce CO HC & NOx plus give early light off at low temperatures.**

# *Emission Control Technology Leader Auto Catalysts Today*

Today most spark ignited engines are fuel injected and computerized with oxygen sensors using at least 2 close coupled catalyst under floor plus small manifold catalysts to give maximum efficiency and early light off.



Most engines are running at higher temperatures – up to 950C



# *Emission Control Technology Leader*

## *Auto Catalysts - Tomorrows Technology*

- ① Hydrocarbon Traps to adsorb HC's at low temperatures and desorb at higher temperatures
- ① Triple close coupled catalysts to further reduce emissions
- ① Nano Technology Coatings allowing catalyst to have more PM area on smaller substrates.



# *Emission Control Technology Leader Auto Catalysts - Tomorrows Technology*

- 🌍 **Lean Burn catalyst that reduce NOx to allow more fuel efficient engines**
- 🌍 **Premair coated radiators to reduce low level Ozone.**
- 🌍 **Cars zero rated for emission regulations**
- 🌍 **Cars could become reducers of pollutants**



*Emission Control Technology Leader  
Auto Catalysts - Tomorrows Technology*

The most likely Future **CLEAN AIR** Technology



**Diesel Power**



*Thank you for giving me the  
opportunity to present an  
ENGELHARD Product.*

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