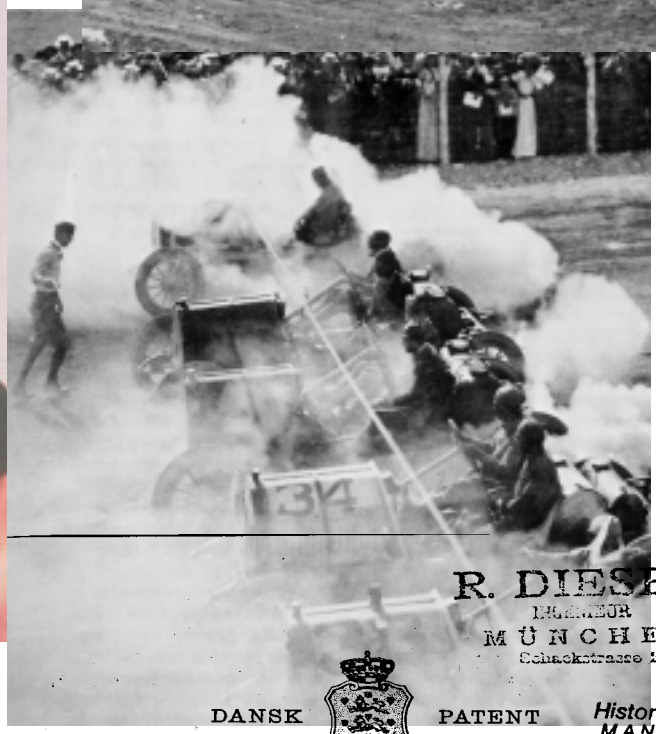
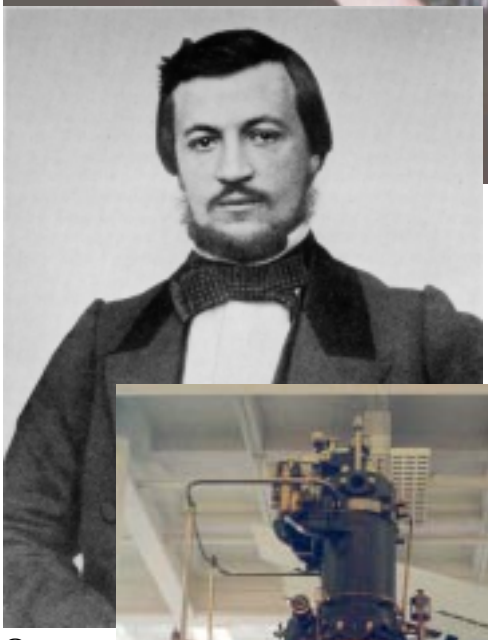
1 - The story of real men, their smell from engine and gun exhaust!

Bond !



R. DIESEL.
INGENIEUR
MÜNCHEN
Schackstrasse 2.



Otto

DANSK PATENT Nr. 38.

Historisches A
M.A.N. AG Aug.

BESKRIVELSE

MED TILHØRENDE TEGNING,

BEKENDTGJORT DEN 29. APRIL 1895.

Ingeniør RUDOLF DIESEL,
CHARLOTTENBURG, TYSKLAND.

Forbrændingsmaskine og dens Arbejdsmaade.

Patent udstedt den 20. April 1895, beskyttet fra den 10. Juli 1894.

(Klasse 47: Luft- og Gasmaskiner m. m.)

Arbejdsmaaden ved de hidtil kendte Motorer, der direkte i Cylinderen omsætte Brændstoffers Forbrændingsvarme til Arbejde, pludselig indføre Brændmateriale under samtidig Antænding, samt ved de Motorer, der komprimere saa højt fra 1 til 2, at Antændingen sker af sig selv, er Trykstigningen 2—3 altid forbunden med betydelig Temperaturstigning.

I Praksis tager Forbrændingen en kendelig Tid; derfor bliver Linien 2—3 i Virkeligheden ikke ganske lodret, men skraa og afrundet ved 3. Det karakteristiske ved de hidtil kendte Fremgangsmaader er altsaa Stigning af Tryk og Temperatur ved og under Forbrændingen og derpaa følgende Arbejdsafgivelse ved Expansion; desuden er Forbrændingen efter Antændelsen overladt til sig selv.

Den i det følgende beskrevne Fremgangsmaade adskiller sig fuldstændigt fra alle hidtil kendte; den er anskueliggjort i Diagrammet Fig. 2. Der bliver fra 1 til 2 ren Luft komprimeret saa stærkt i en Cylinder, at der før Forbrændingen opstaar det højeste Tryk og dermed ogsaa den højeste Temperatur, altsaa den Temperatur, hvorved Forbrændingen senere skal foregaa, med andre Ord Forbrændingstemperaturen. Skal f. Eks. Forbrændingen foregaa ved 700°, er Trykket 64 Atm., for 800° 90 Atm. o. s. v. I denne komprimerede Luftmasse indføres nu efterhaanden udefra fint fordelt Brændstof, der, efterhaanden som det indføres, antændes af den høje Temperatur; samtidig foregaar en Expansion af Luftmassen, der er saaledes reguleret, at den ved Ekspansionen fremkaldte

Diesel

History behind the combustion engine catalyst and particle trap - 2003 - Per Stobbe

2- Additives for gasoline improving our life!

Quite funny or perhaps interesting ads from the 20s USA where there was interest in higher compression ratios for Otto engines. High-octane gasoline was therefore required. The fact is that when GM invented the lead additive for gasoline, the first 7 people at the factory died before they found out how dangerous it was. However, it took many years before it was banned for the rest of us!

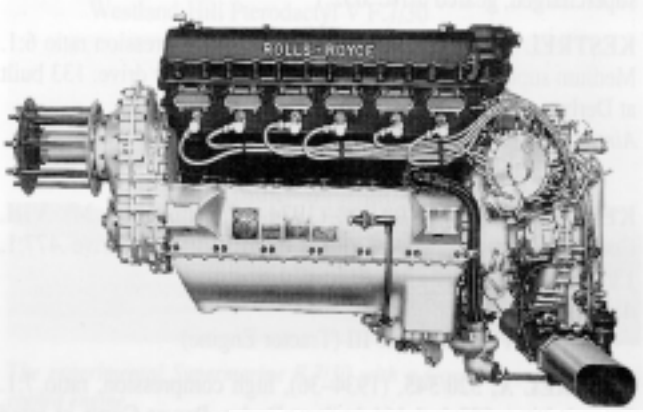
3- A war won as to the use of additives for gasoline used in fantastic engines

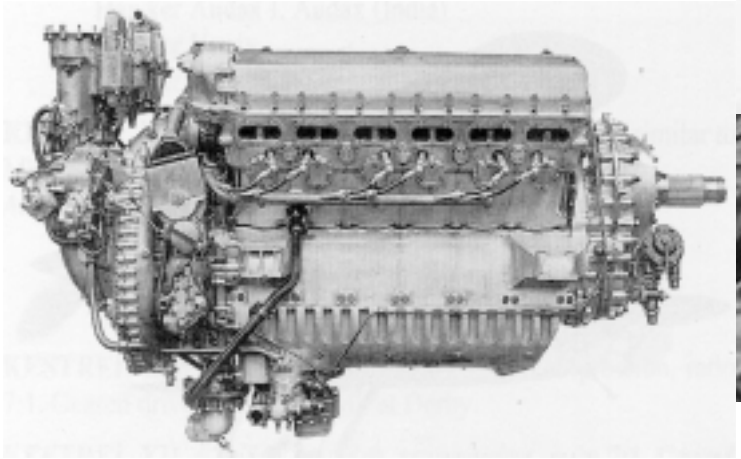
There was by no means enough 110 Octane gasoline to win the war. Only 70 octane was available, which did not give the desired effect on the high-flying aircraft engines equipped with compressors. Churchill and Roosevelt got an agreement so that the company Octel could supply additives to aviation gasoline. The Allies simply won World War II with Rolls Royce engines and high octane gasoline!

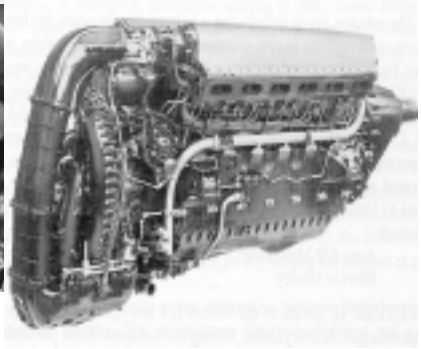
One of 20.000 Spitfires

The incredible 27 litre V12 Merlin Rolls Royce engines manufactured in 160.000 piece in England and 60.000 pcs by Packard in USA

Only two diesel engines was seen during the world war 2 - Junkers and an early Rolls Royce. A quite difficult engine technology for a more tolerant and less dangerous fuel.





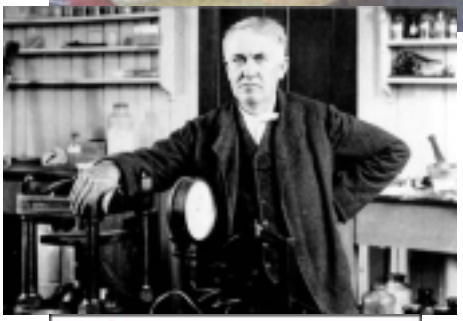


4 - The father of the catalytic converter

Engelhard, Charles (1917-1971) - Few people know that Scottish author Ian Flemming immortalized the person who actually marketed the automobile catalytic converter in his James Bond novel "Goldfinger". - It all began just before the turn of the century, when his father, Charles Engelhard Senior, a quiet and industrious man, traveled from Europe to the United States, where he settled in the state of New Jersey. From Germany, he brought his knowledge of precious metals with him with the aim of starting a branch of Heraeus AG in the United States. The market was favorable for trading in, and especially the remelting and refining of, gold and silver. Therefore, in 1920, he bought with private funds the established company Baker & Co. Inc., which made metals for the jewelry industry and the country's dentists. After making a fortune in what was now his own company, he married none other than the daughter of the director of the German Heraeus AG. Thus, their little son Charles W. Engelhard Jr. had plenty of precious metal in his blood when he was born during World War I. During World War II, Charles Jr. participated as a pilot in the US Airforce, was decorated and 5 years after the war, he joined his father's company, which at that time had 1,500 employees. With the boy's great ability for business, the staff increased to no less than 20,000 when it peaked in the late 1960s! Charles Engelhard Jr. took over the business from his father, and it is remarkable that he both owned and ran the store as a sole proprietorship, from 1960 under the name Engelhard Corp. He was a man of great charisma and always on the move to inspect the company's many departments. His formidable business talent was supplemented by a talent for promoting himself and for creating publicity. He only traveled in dark blue Rolls Royces - he had two! The license plate modestly enjoyed the inscription Pt 999 (Pt for Platinum and 999 for purity). The English authorities would not allow more than 9 figures! One Rolls was always in his BAC/ 111 private plane, which he himself had a license to fly. The other Rolls was ready at the airport at the next destination. It goes without saying that he always brought a large number of gold bars with him in both cars. Charles Engelhard Jr. traveled all over the world, traded in precious metals and bought up a number of mines in South Africa. To circumvent the local government's ban on the export of gold, he found a loophole in the law that allowed the export of religious gold figures. These were transferred in large numbers to Hong Kong and melted down into coins and bars. This activity led to the accumulation of significant amounts of Platinum in the company's factories as a "residue" from gold mining. Unlike gold, platinum was not yet classified as valuable and was therefore stored in wooden boxes outside the gold vault. Silver was stacked on pallets outside the factories, behind fences! Charles Engelhard Jr. eventually became known as “Mr. Platinum”. He had simply vacuumed the market for Platinum. However, Junior also knew how to live a rich social life. Among other things, he got to know Ian Fleming. They probably knew each other from the war. It is said that Fleming even had shares in the most famous racehorse of the time, Nijinsky, of course owned by Engelhard. One result of this acquaintance was the book “Goldfinger” from 1960, later made into a film with Sean Connery in the lead role as James Bond Agent 007. Who does not remember the recently deceased Gert Frobe as Mr. Goldfinger, big, strong and red-haired in a yellow Rolls with doors and screens of pure gold. Incidentally, a very likeable actor. Parts of the film were also shot on Charles Engelhard Jr.’s horse ranch in the USA. In another part of the entertainment industry in the late 1960s, we heard the dark singer Eartha Kitt sing about a great desire for shares in a mining company, clearly inspired by Engelhard Corp. and the very extensive social life that Mr. Platinum led. In the late 1960s, Charles Engelhard Jr. was “pressured” to find a use for all the Platinum he had “in stock”. The city of Los Angeles began to have serious problems with air pollution caused by the many “dollar cars”, which were often equipped with gasoline-hungry 6 and 8 liter Otto engines. The combination of these two facts is the background to the invention of the “Catalytic Converter”, which is able to convert CO and HC in the exhaust gas into CO2 and water.

5 - Engelhard og Goldfinger

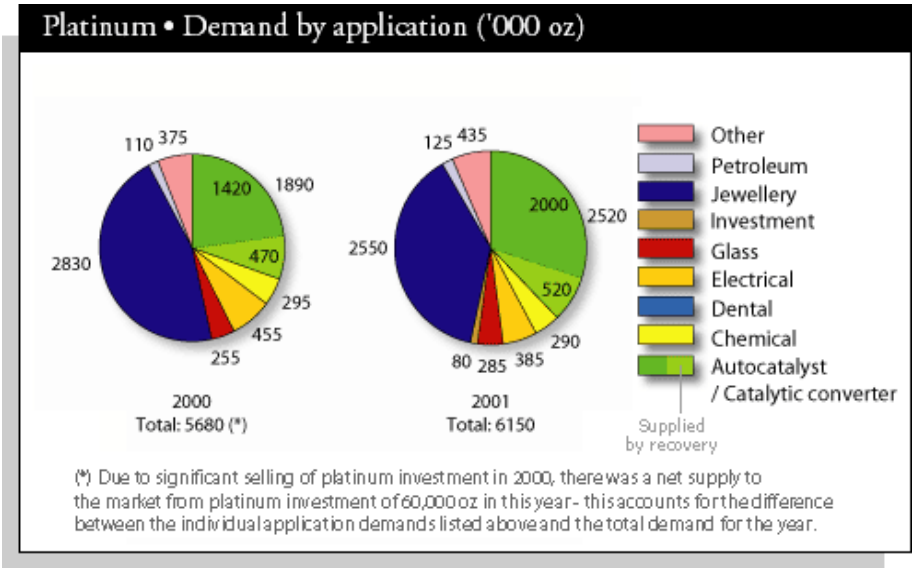
Its quite difficult to see any difference from the actor Gert Frobe as „Goldfinger“ and the real Engelhard som „Mr. Platinum“!



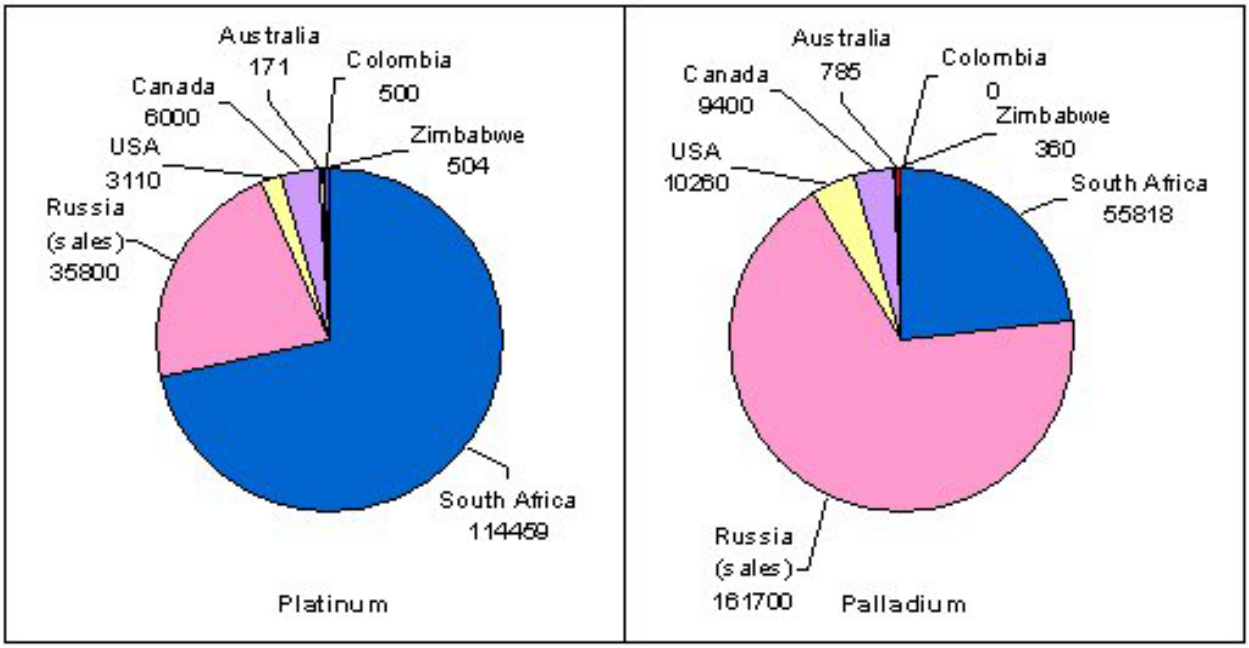
Corning Glass Works Inc. was founded in Brooklyn as early as 1851 by Mr. Armory Houghton. In 1868 the plant moved its fabrication of window glass from Brooklyn to the city Corning north west in New York state. When Thomas Edison in 1879 started to manufacture and install electrical elumination in USA, this was based on glass bulbs from Corning Glass Works Inc. In 1908 Corning launced the first scientific glass lab in USA, and Corning Glass Works has since contributed with a range of breathtaking and patented inventions. CGW was in the late 1960ties contracted by Engelhard for extrusion of the ceramic monolith for the catalytic converter. Since 1971 Corning has manufactured > 500 million monoliths.

6 - Precious metall and early catalysts

The above photo from 1954 show a CAT dozer in USA equiped with a oxidation catalyst



World annual production of Platinun is presently around 90 m3 or 1800 ton.



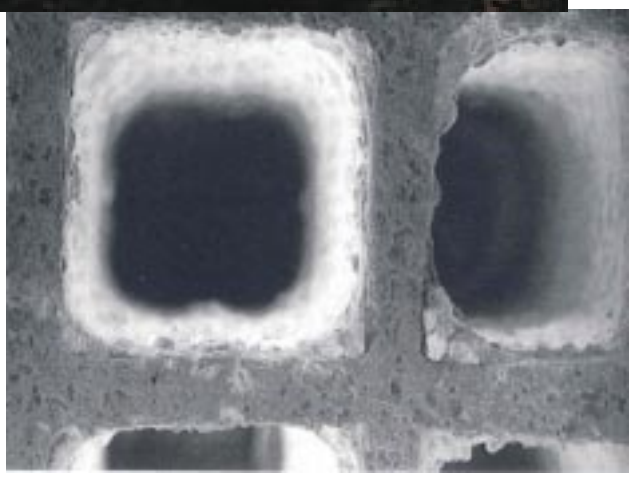
7 - Precious metall and early catalysts

Far north in Sweden the mine at city Kiruna was the first facility in europe introducing the catalytic converter on large scale underground trucks. Typically based on the alumina pellet principle.

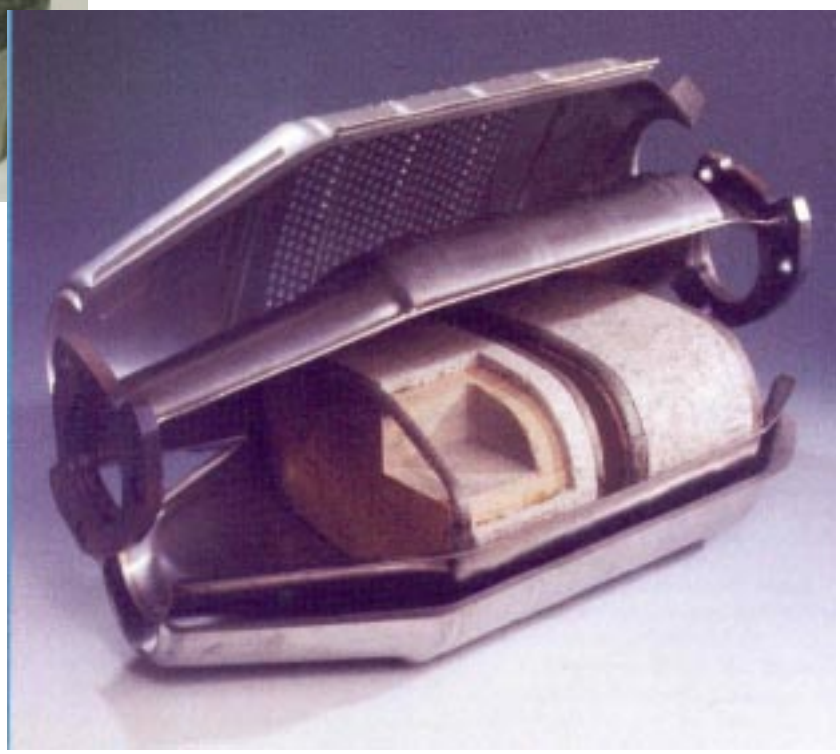
On this forklift truck seen at Johnsonn Matthey, Platinun at the marked value of >45 mio Euro or enough to equip 1 mio automobil catalyst with this fantastic metall - Platin

8 - The catalytic converter, which became a fantastic commercial success of ceramics for cars

Smog in Los Angeles in 1970 - before the catalysats!



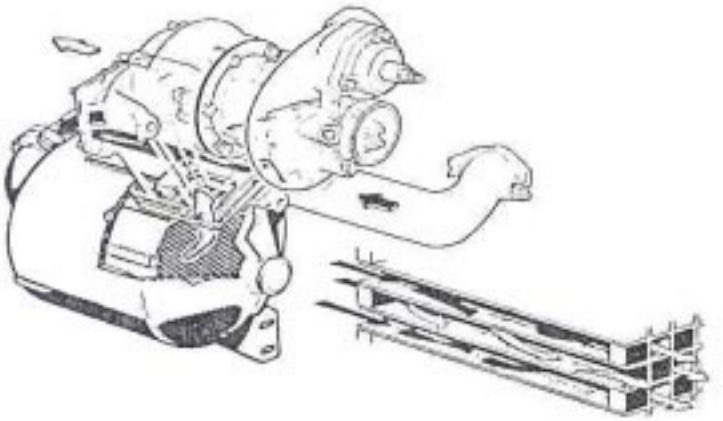
Elektron mikroscope catalyst channel photo



Typically 1-2 gram Platin is used in the automotive catalyst at app 25 • per gram.

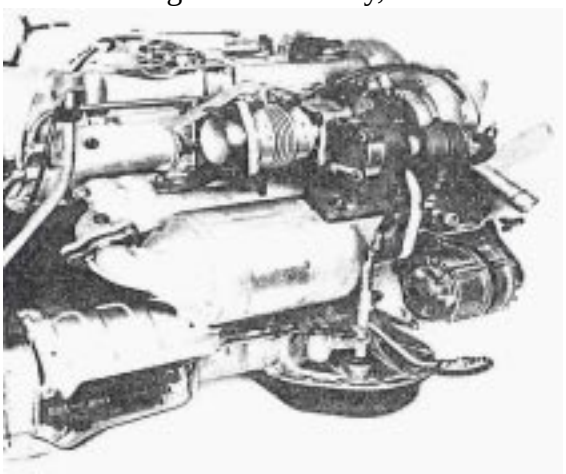
History behind the combustion engine catalyst and particle trap - 2003 - Per Stobbe

9 - The early soot traps trials!

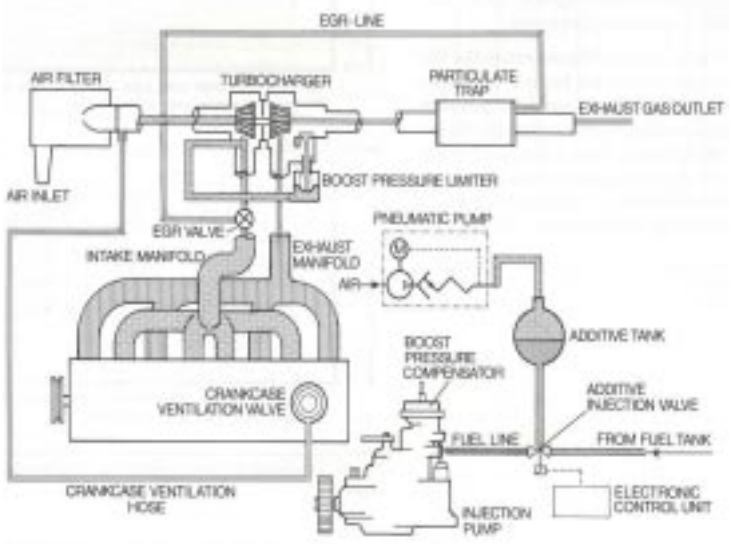


Mercedes Benz 300 TD for California market 1986 mounted with a 5.66x6“ Degussa catalyzed WFF Corning trap before the turbine. Worked great in Germany, but no in US!

First practical trials in Danmark with Diesel Partikel Filter, on a truck at Tinglev Beton elementfabrik in 1988 performed by the entertainer!



Wolkswagen Passat was 1986 certified in US with a additive dosing system and 5.66x6“ Corning trap.

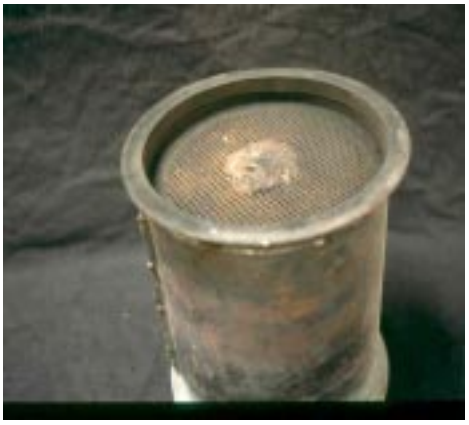


10 - Local work with exhaust gas cleaning

www.stobbe.dk

www.luftforurening.dk

11 - National development of the ceramic honeycomb



This is the actual Corning WFF testet on a Bukh diesel engine at DTU in 1986, which started the extensive development work for a more robust WFF

The team at Stobbe Engineering A/S developed the world first technology for the bi-modal Silicium Carbid porous honeycomb structures in 1990-91.

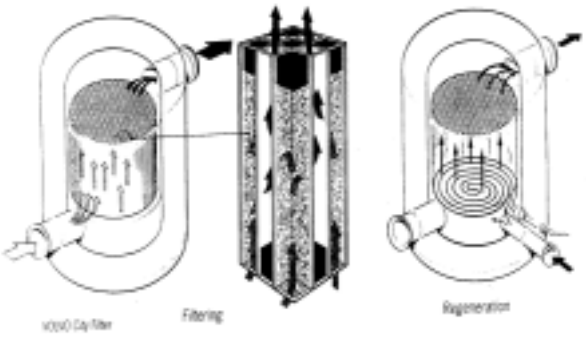
This stack of SiC DPF segmenters manufactured in 1994 for use on forklift trucks

The entertainer grap onto a SiC segment after firing at 2500°C

12 - Systems and experience

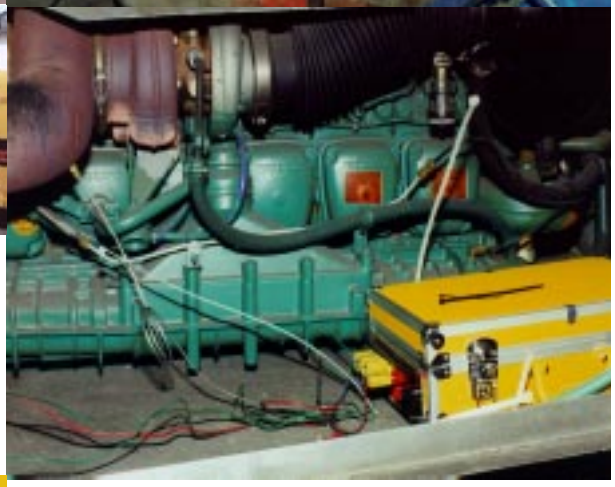
13 - Early experience with busses inter nationalt

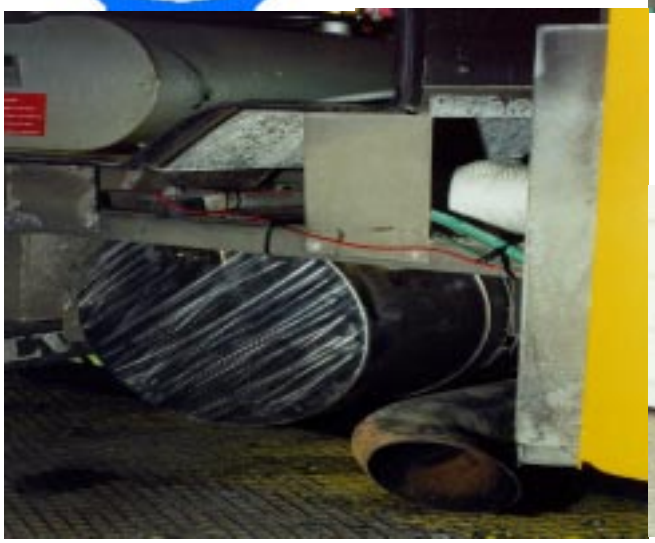
The first ever bus in Denmark equoped with swedish Unikat Combi-Filter i 1992. Performed OK, but had to be connected to main supply of 230 volt each night.



HT (Hovedstadens Trafikselskab) in collaboration with the municipality of Copenhagen tried to implement particle filters on city buses as early as the 90s. The chosen double City-Filter concept from Volvo unfortunately gave serious durability problems, and the project was cancelled. The biggest problems arose when the vehicles had to be connected to the power supply every evening, which was sometimes forgotten, whereby the filter was not emptied of soot daily. The following evening, the double amount of soot represented such a significant amount of energy that hot spots occurred and the filter melted during the clean-burning process. Great efforts were made to keep a check on the vehicles with PCs to eliminate errors in the system, but without success.

14 - Long time experience with busses





Its my experience, that my Silicium Carbide soot trap technology combined with the Octel fuel borne catalyst show few problems, low emission level and maintenance cost - in specific with busses with a difficult drive cycle.