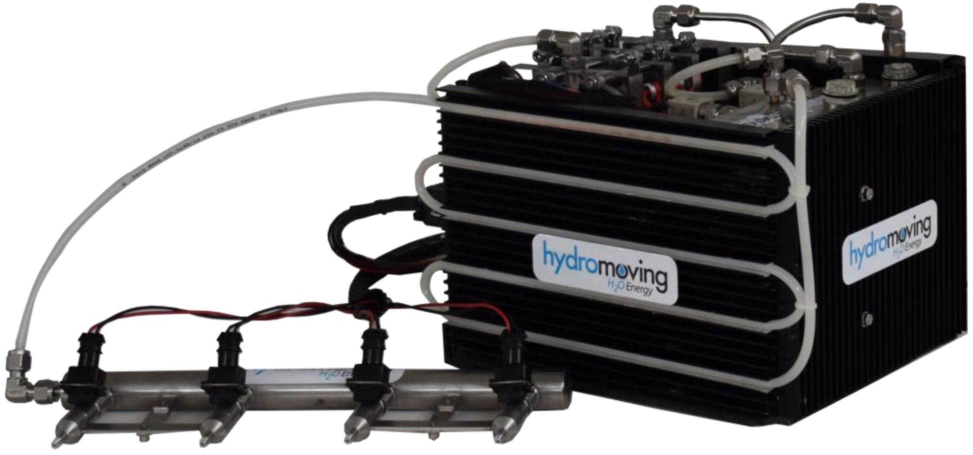
Water system For Engine’s Improvement
Hydrogen-Oxygen mixture generator

Patent: 0001404965
Patent: 0001405327

Hydromoving

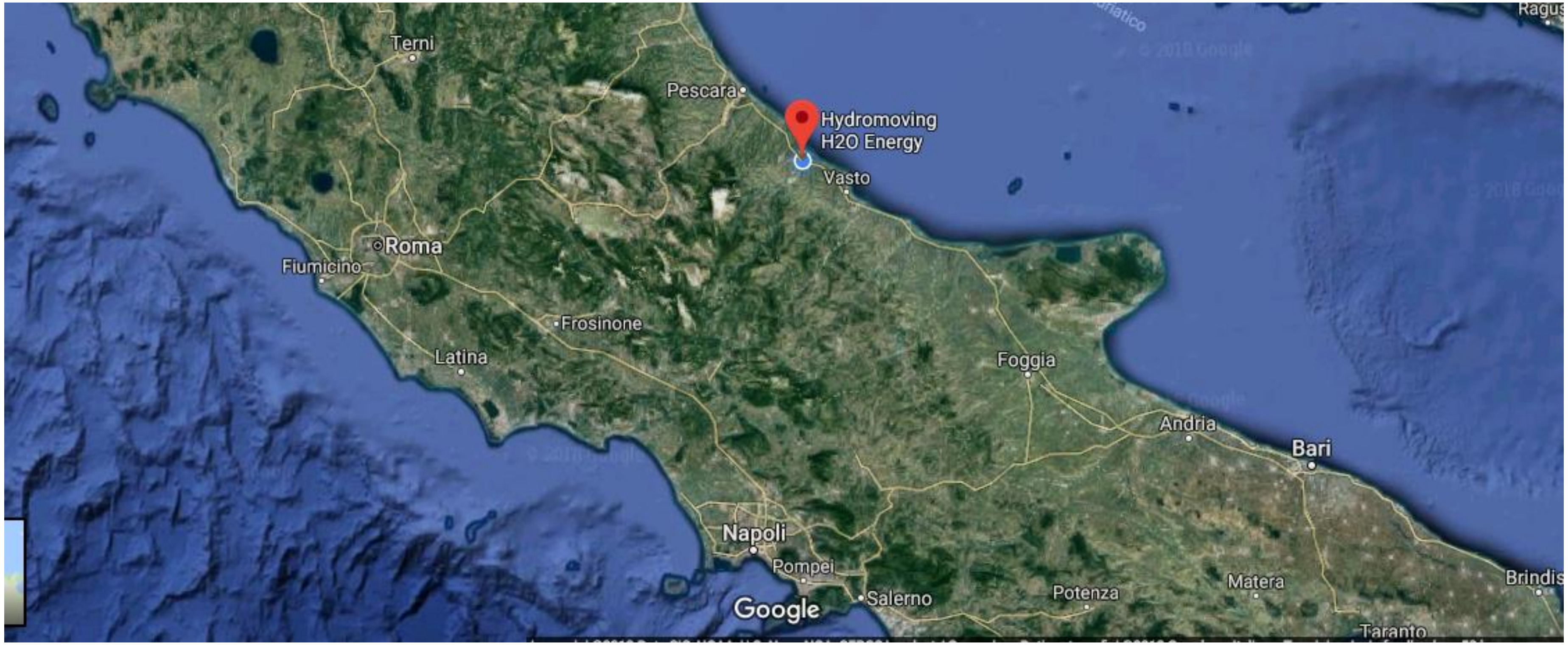
Water’s Energy

Compact System – hm01
Fap/Dpf Cleaner ver. 2016



Compact System Pro- hm3250 ver. 2018
Fap-Dpf Cleaner, Engine Displacement 3200-5000

The company "Hydromoving srl" is located in **Fossacesia (CH), Italy**



For info and more

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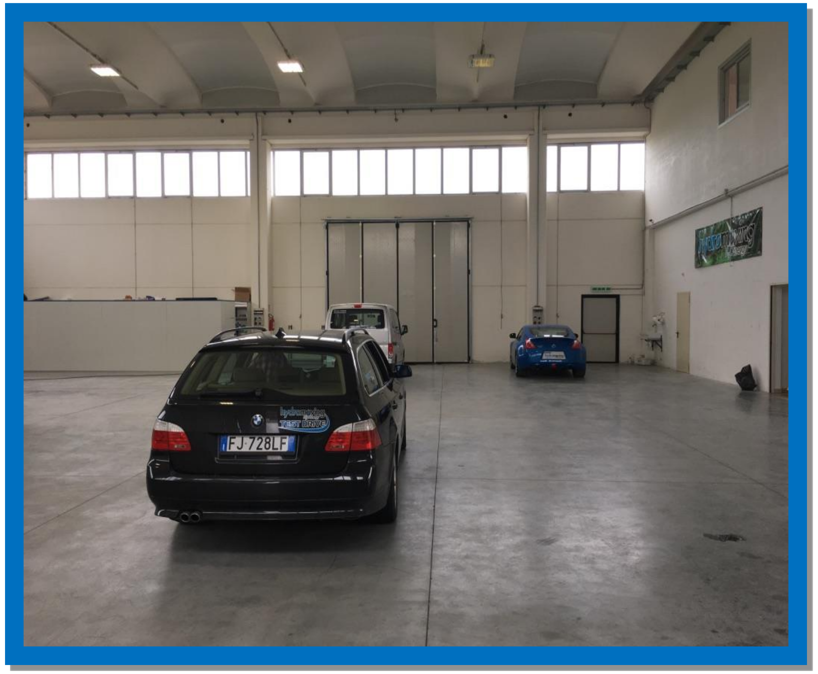
+39 331 2404681

info@hydromoving.com

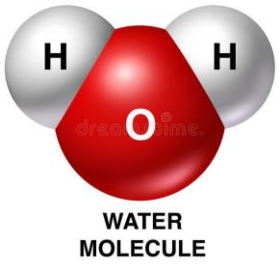
The company Hydromoving Srl was founded thanks to the commitment of Lorenzo Errico and his passion for engines, electronics and innovations bound to "green technologies“. In this path several enthusiasts join in his own sector, creating the HydroMoving project.

We are the only ones in the world to have a patented, tested and certified technology for the production of oxygen hydrogen gas (gas produced by distilled water) on board and on demand with an electronic injection system in the combustion chamber of any type of internal combustion engine that **reduces pollutant emissions by 90%.** The system guarantees a CO_2 reduction of **$CO_2 \geq$ 30%.**



The Hydromoving System

an innovative device for producing and adding a mixture of H_2, O_2 and a minimum calculated amount of water droplets to the conventional fuel flow of an internal combustion engine.



H_2

O_2

The injected gas into the ICE:

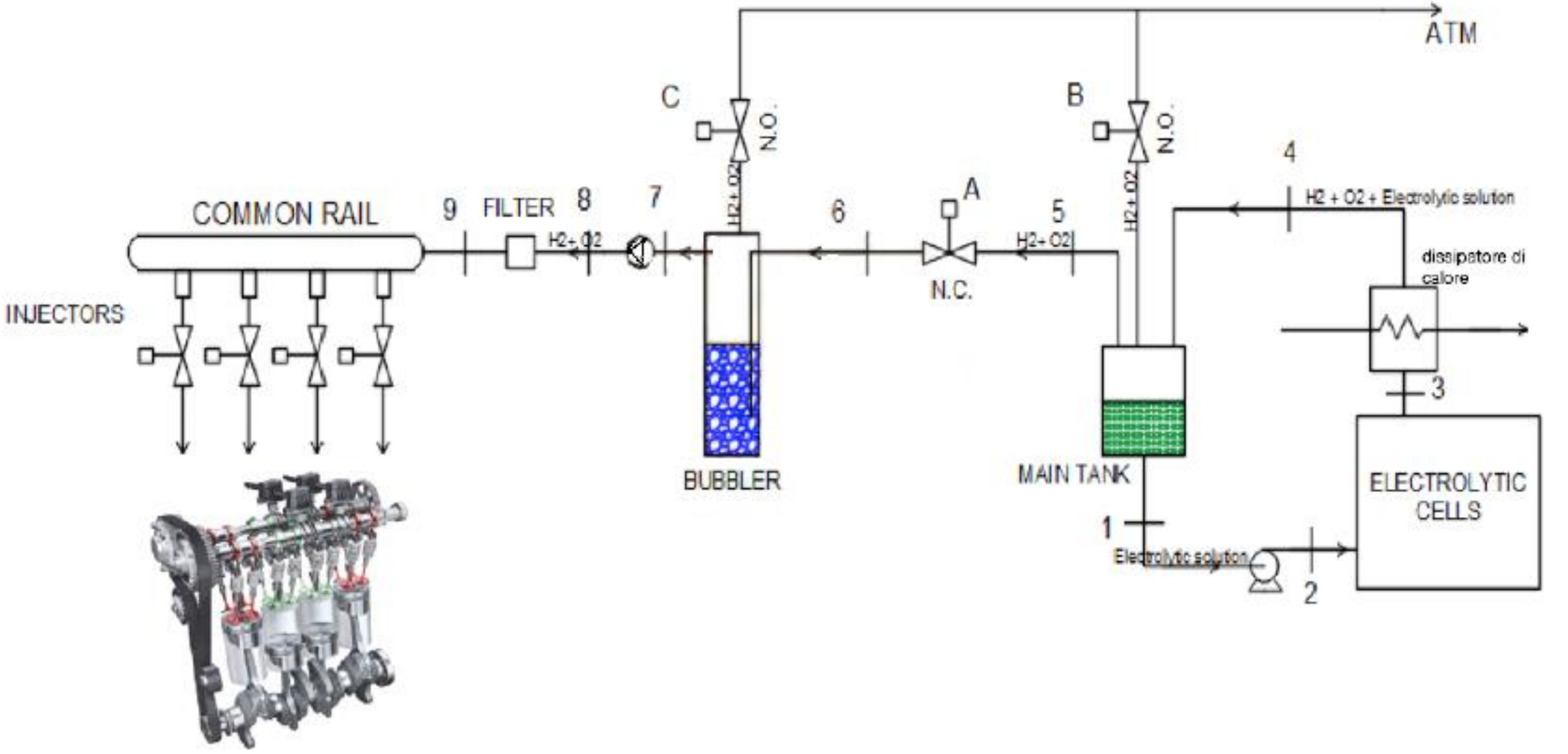
- It is produced by an innovative approach on the principle of classical electrolysis
- It determines an improvement in engine power
- It improves and optimizes the fuel consumption
- Reduces the polluttant concentration relaesed at the exhaust

- Recombination of chemical compounds
- Combustion improvement (PM, HC, CO, NO_x)
- Efficiency improvement
- Reduction of consumption

Patent: 0001404965
Patent: 0001405327

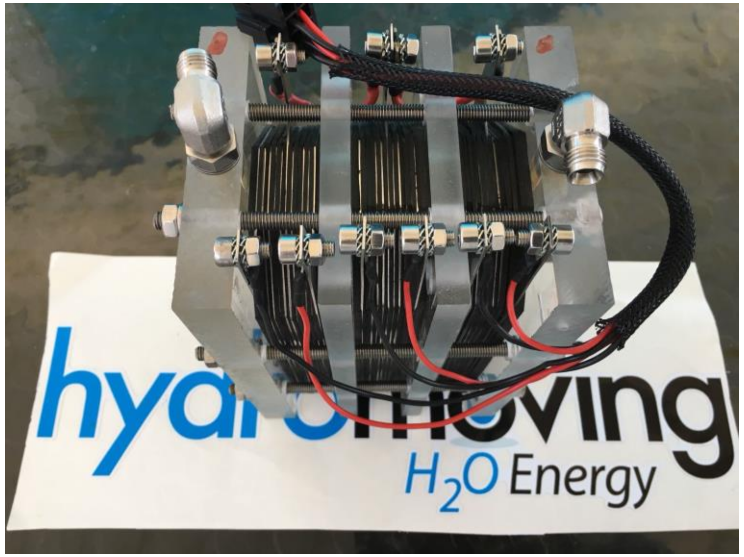
System Operation Circuit Schematic

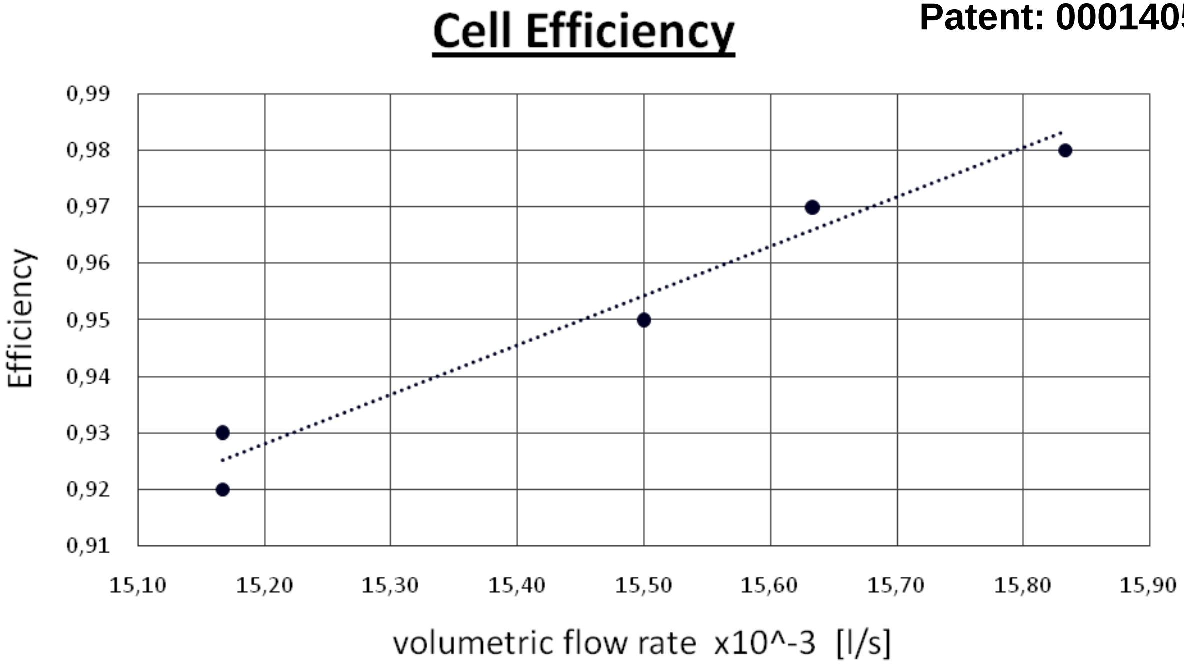
Patent: 0001404965
Patent: 0001405327



Patent: 0001404965
Patent: 0001405327

Hydromoving Electrolytic Cells Efficiency diagram until 98%





Several test-run in our laboratory show the efficiency of gas production rate in a range between 92% and 98%. The efficiency is intended as a comparison with theoretical process (for which the efficiency is 100%)

The HM System is the only one in the world that uses 1 mm² cables for the supply of electrolytic cells.

Suche results came from the application of the approach suggested by the theory of ”Coherence Domains" of water, released by the Italian physicists Prof. Emilio Del Giudice and Prof. Giuliano Preparata.

Historical Notes

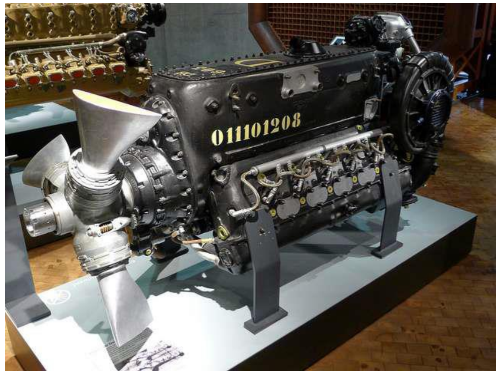
Water in ICE – historical notes

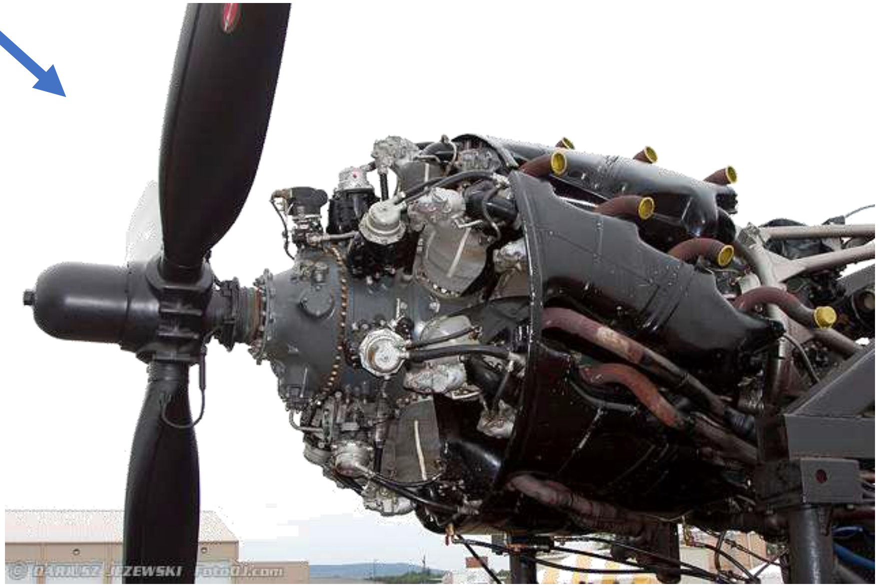
Engine with water injection (WWII)

❖ **Aviation Engines**:

- **BMW 801** (14 cylinders – radial – double star – 1600Hp – 41 liters)
- **Daimler-Benz DB 605 with MW 50** (12 cylinder – V revers 60° – 2100Hp – 36 liters)
- **Pratt & Whitney R-2800** (18 cylinders radial – double star – 1474Hp – 46 liters)

This system allowed to increase the available engine power through the injection into the cylinder of fuel with a mixture composed by 50% water and methanole, for a short time period (10’). Without water the DB 605DC engine generated a maximum power around 1’474 Hp (1’099 kW), with water system switched on, called MW 50 , this power went up to 2’000 Hp (1’491 kW)





hydromoving H_2O Energy

Water in ICE – historical notes

Engine released with water injecton system

❖ **Automotive:**

- **Escort Cosworth 4wd** – (fino a oggi, racing)
- **Oldsmobile F-85** (1962)
- **Saab 99 Turbo S** (1978)

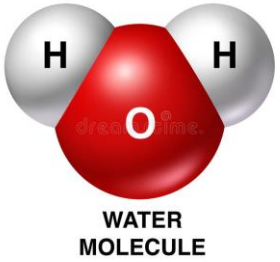
These systems were used with two purposes:

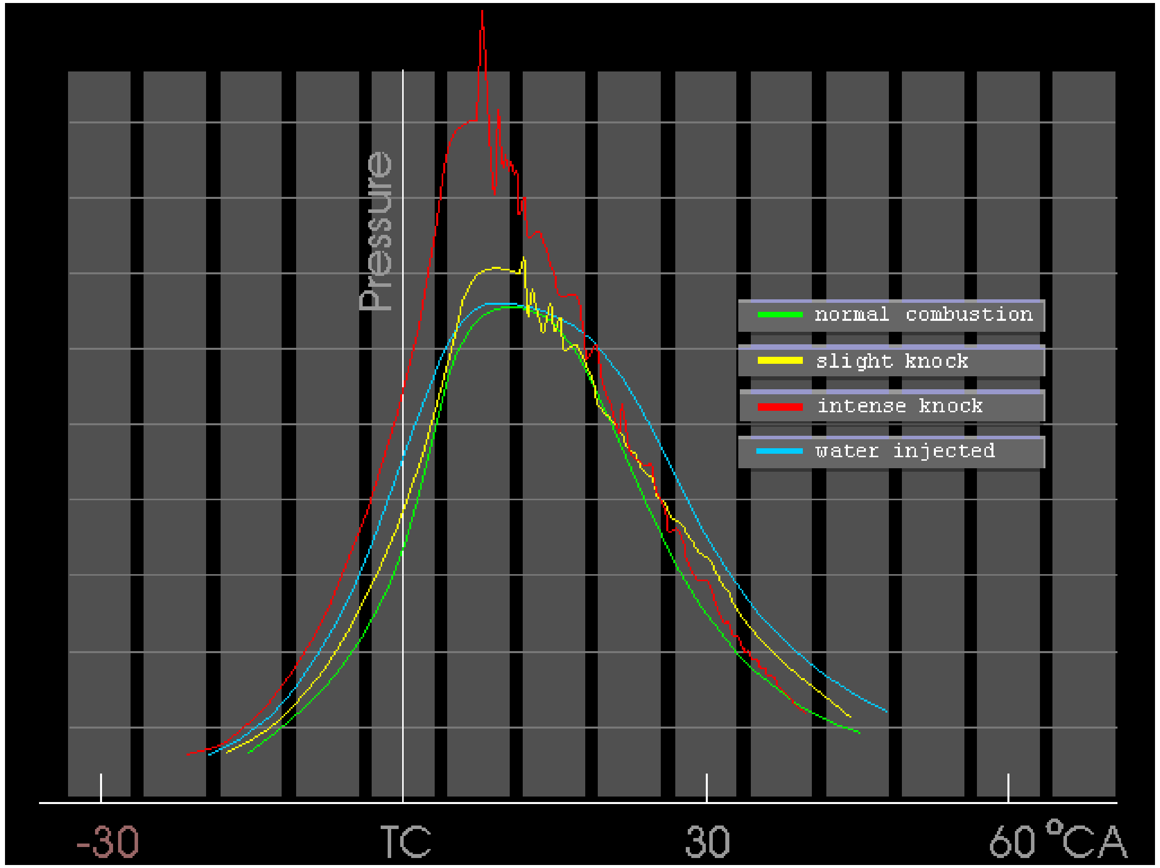
- Reduce the inlet air temperature (for turbo and naturally aspirated)
- Let the increase of engine compression ratio (Otto cycle)

Water in ICE

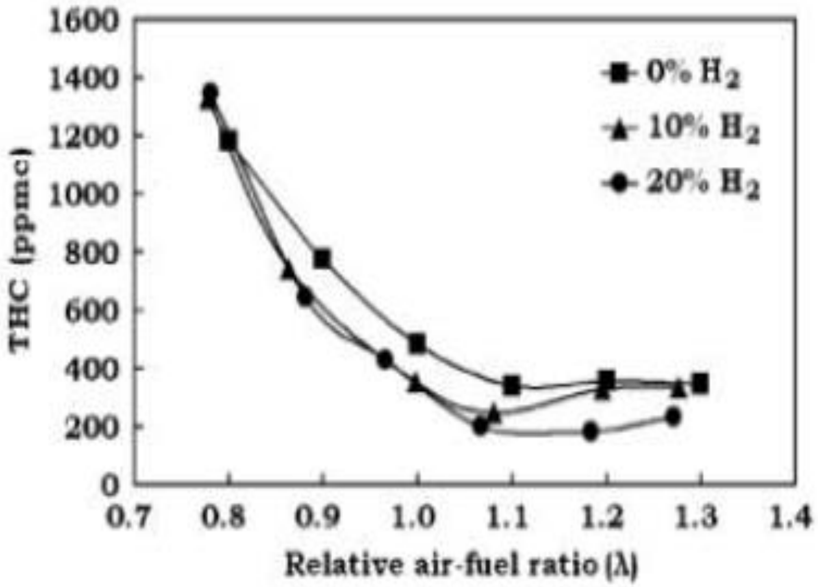
RESEARCH AND STUDIES REFERENCES

Active role fo Water and Hydrogen





Hydrogen in ICE

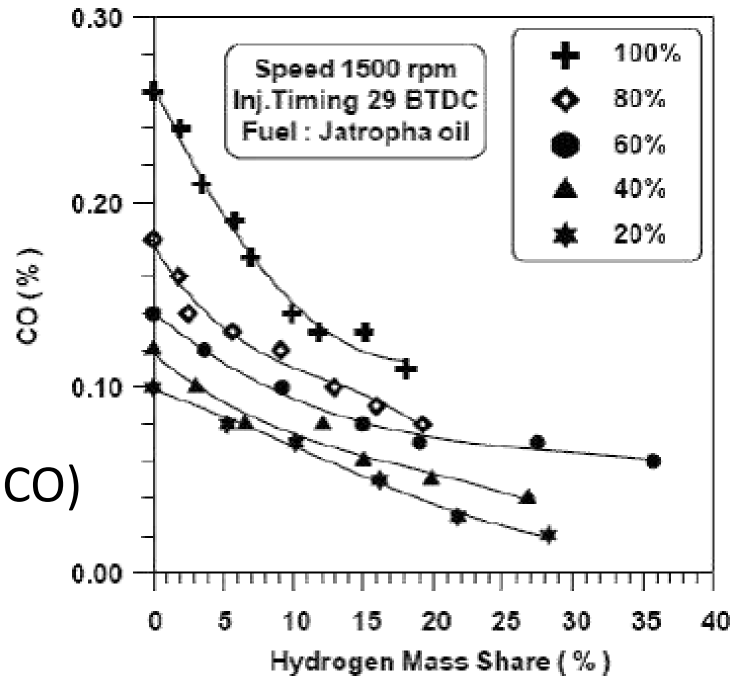


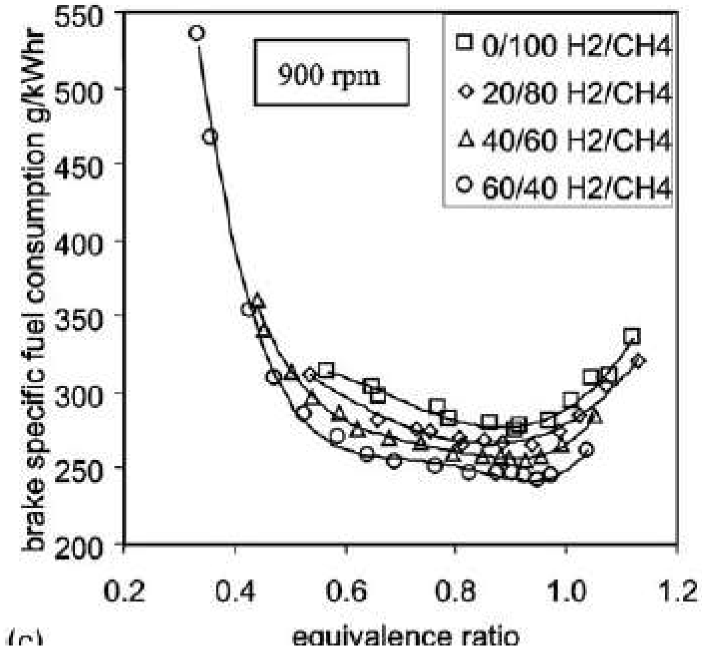
Effect of Hydrogen Enriched Hydrocarbon Combustion on Emissions and Performance

Jacob Wall

Department of Biological and Agricultural Engineering

University of Idaho 1970



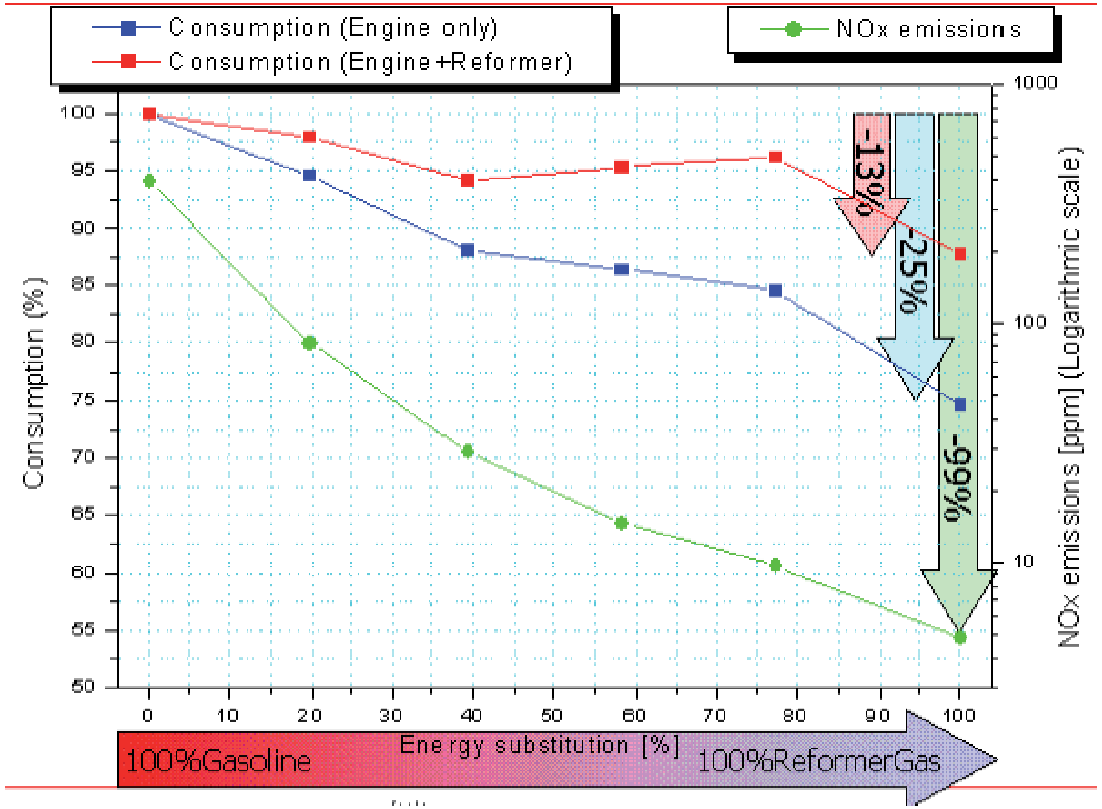


- Exhaust recombination
- Combustion improvement (PM, HC, CO)
- Active role on nytrogen oxides
- BSFC improvement

Hydrogen in ICE

Investigation of turbulent combustion in SI-homogeneous charge engines using hydrogen-gasoline mixtures
Enrico Conte
LAV - Institut fuer Energietechnik
ETH Zurich
2006

- Exhaust recombination
- Combustion improvement (PM, HC, CO)
- Active role on nytrogen oxides
- BSFC improvement



Here are investigated NOT engine hydrogen fed, but around <u>Hydrogen added to combustion</u>.

Hydrogen in ICE

Effect of H2/O2 addition in increasing the thermal efficiency of a diesel engine

S. Bari , M. Mohammad Esmaeil
Sustainable Energy Centre, School of Advanced Manufacturing and Mechanical Engineering, University of South Australia, Australia
2010

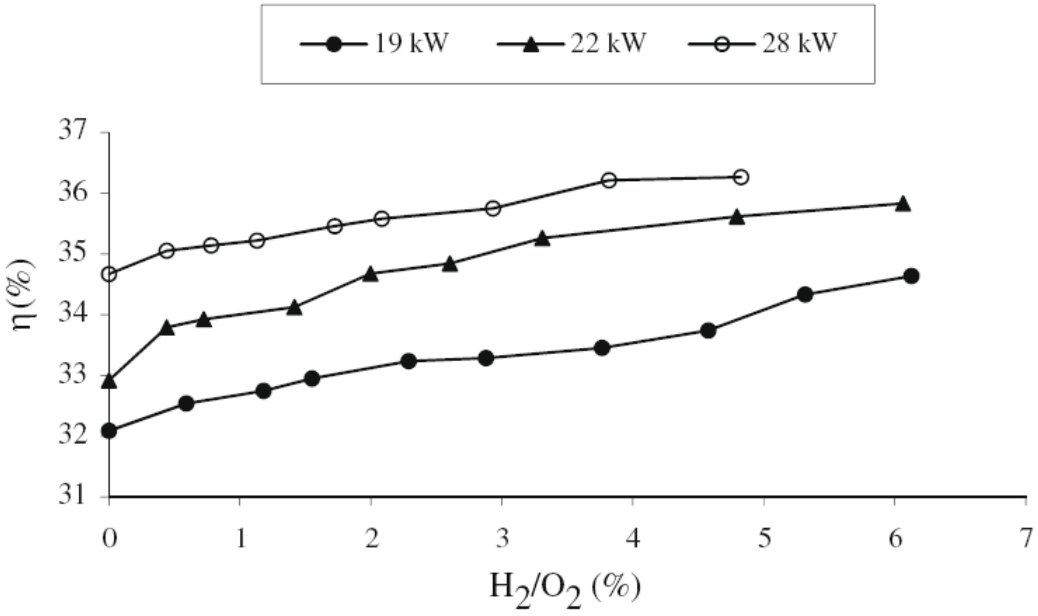


Fig. 2. Variation of brake thermal efficiency with H_2/O_2 percentage.

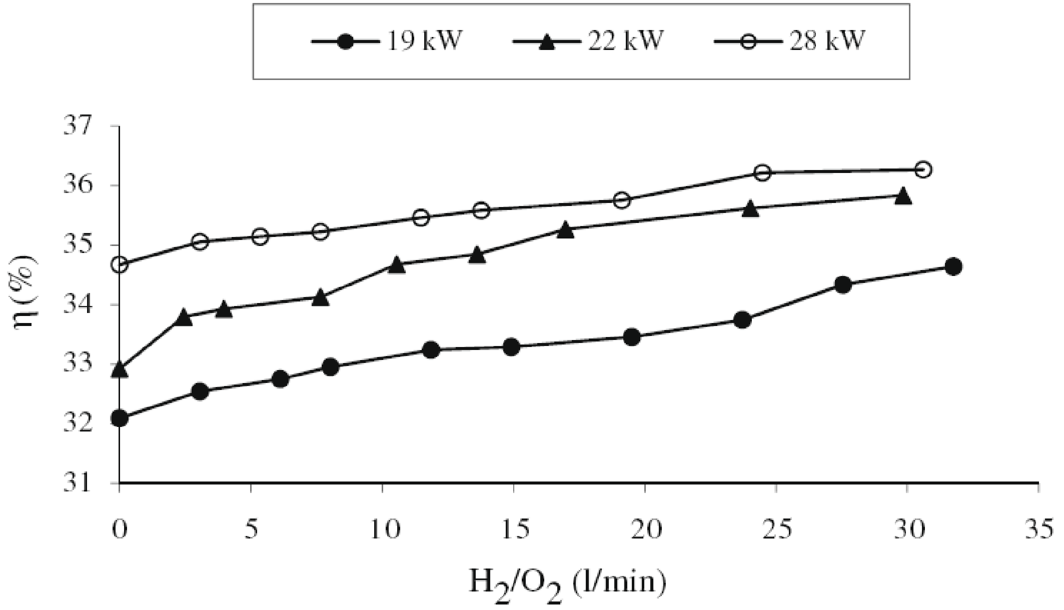


Fig. 3. Variation of brake thermal efficiency with H_2/O_2 flow rate.

Hydrogen in ICE

Effect of H2/O2 addition in increasing the thermal efficiency of a diesel engine
S. Bari , M. Mohammad Esmaeil
Sustainable Energy Centre, School of Advanced Manufacturing and Mechanical Engineering, University of South Australia, Australia
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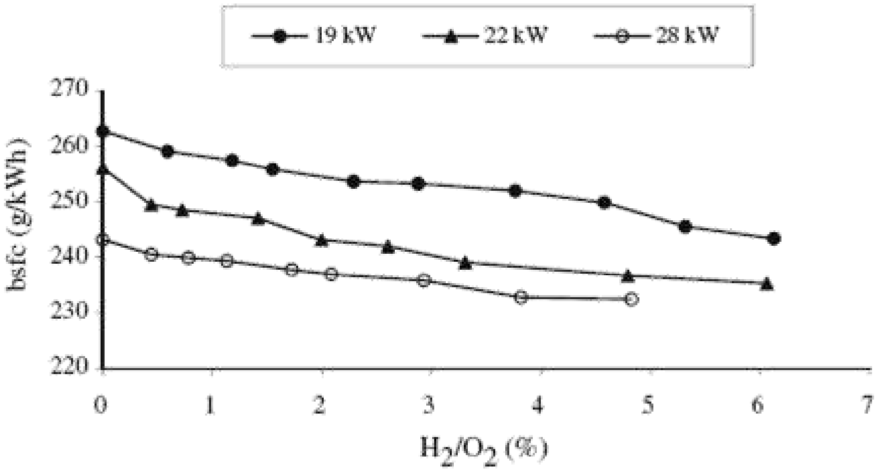


Fig. 4. Variation of brake specific fuel consumption (bsfc) with H_2/O_2 percentage.

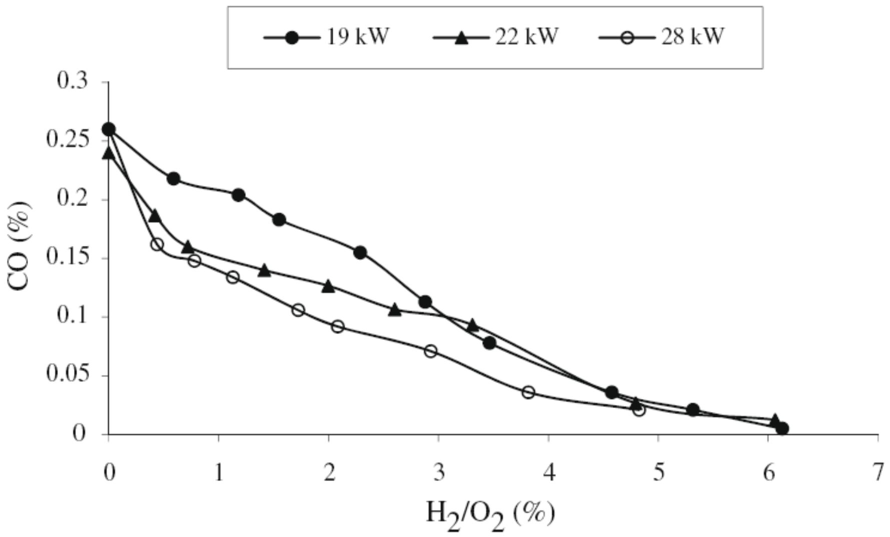


Fig. 11. Variation of the CO with H_2/O_2 percentage.

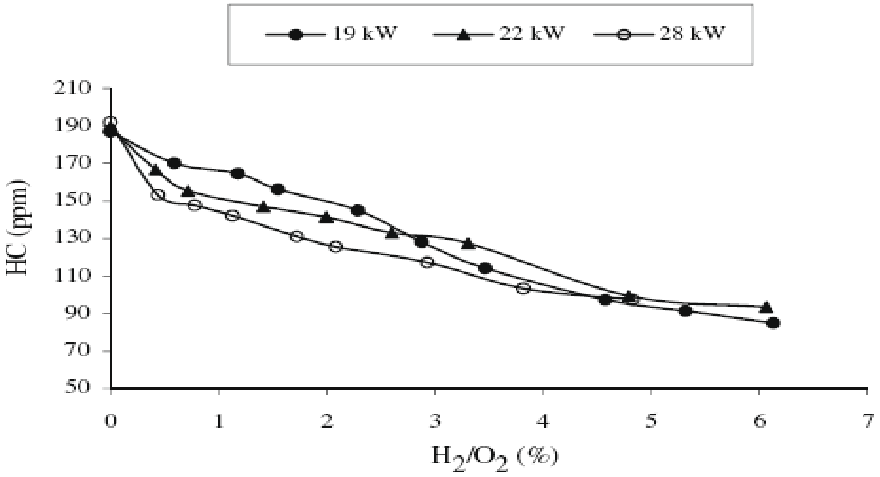


Fig. 8. Variation of HC emission with H_2/O_2 percentage.

Hydrogen in ICE

Effect of HHO gas on combustion emissions in gasoline engines
Sa'ed A. Musmar , Ammar A. Al-Rousan
Department of Mechanical Engineering,
Faculty of Engineering,
Mutah University, Mutah, Jordan
2011

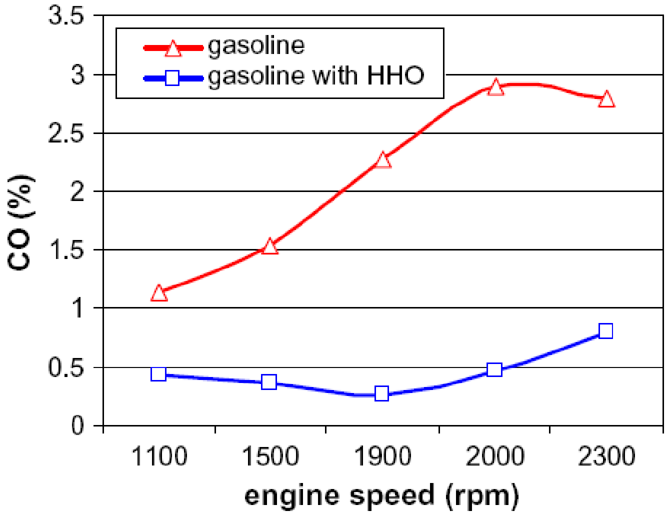
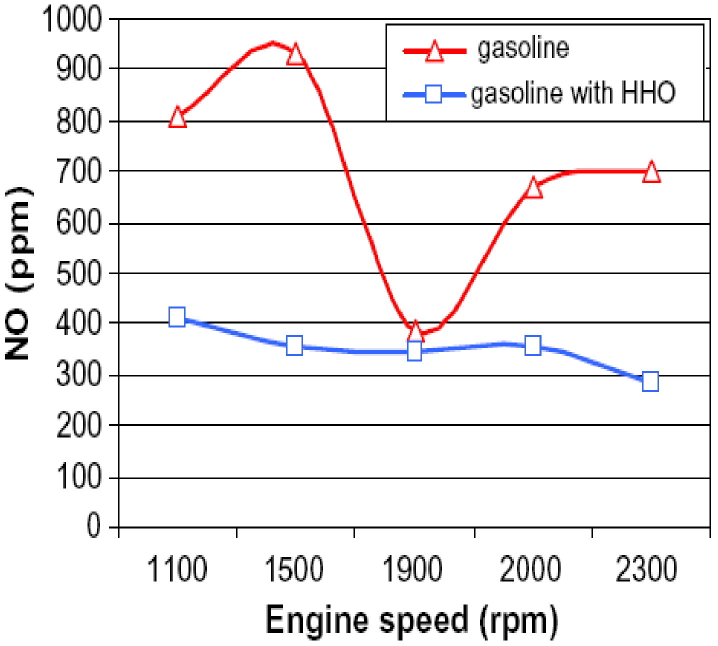


Fig. 4. Variation of carbon monoxide concentration with engine speed.



. Variation of nitrogen oxide concentration with engine speed.

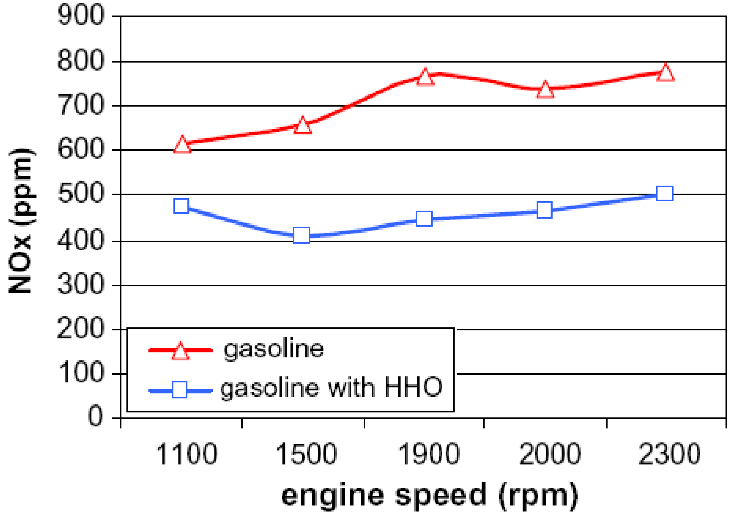


Fig. 6. Variation of nitrogen oxides (other than NO) concentration with engine speed.

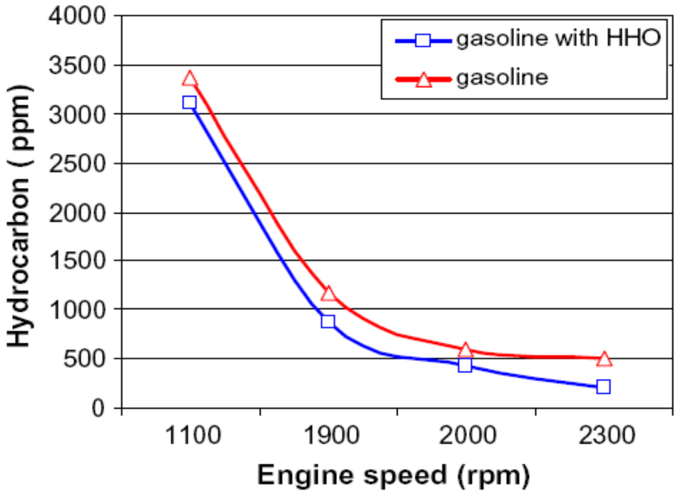


Fig. 9. Plot showing the effect of using HHO on hydrocarbon concentration in exhaust gas with variable engine speed (rpm).

Hydrogen in ICE

Effects of On-board H2 and Water Injection in a Diesel Generator

Rick Cameron
University of Southern Queensland
Faculty of Engineering and Surveying
2012

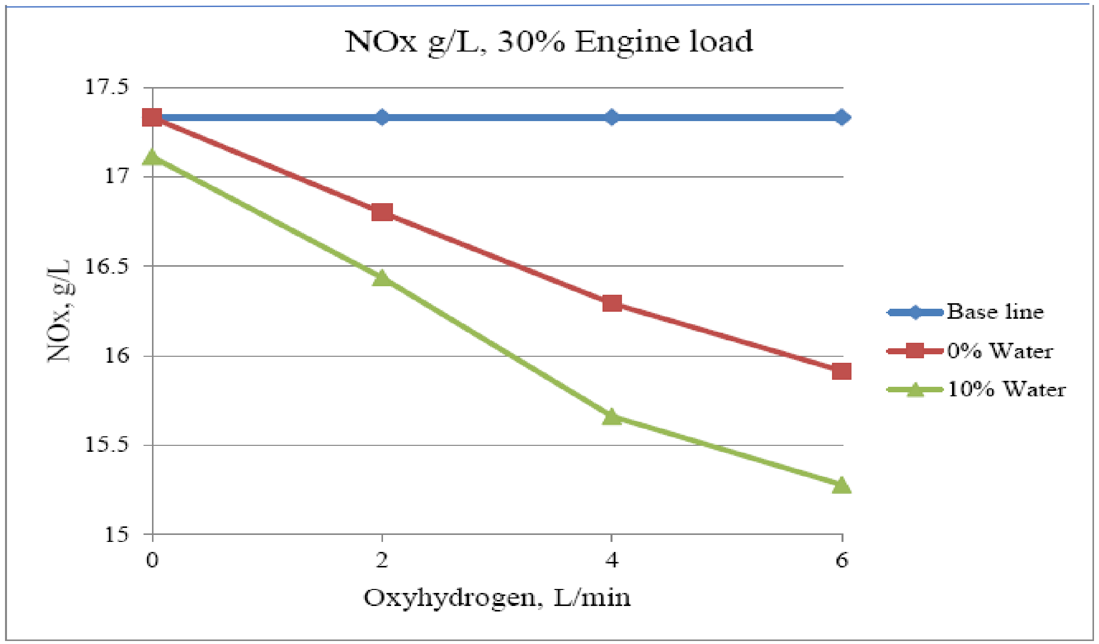


Figure 23: The effects of HHO and water injection on NOx at 30% engine load.

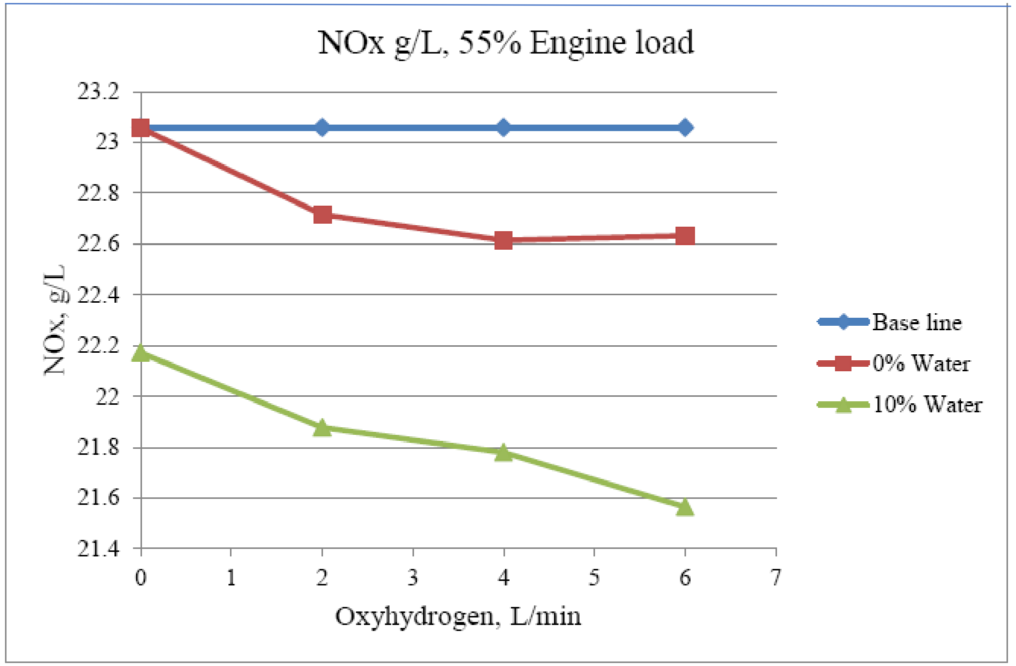


Figure 24: The effects of HHO and water injection on NOx at 55% engine load.

- Exhaust recombination
- Combustion improvement (PM, HC, CO)
- Active role on nytrogen oxides
- BSFC improvement

Hydrogen in ICE

PERFORMANCE CHARACTERISTICS OF OXYHYDROGEN GAS ON TWO STROKE PETROL ENGINE

G.Ajay Kumar, G.VenkateSwara Rao
Dept.of ME, Bonam Venkata Chalamamaiah
College of Engineering &Technology, Odalarevu, AP, India
2013

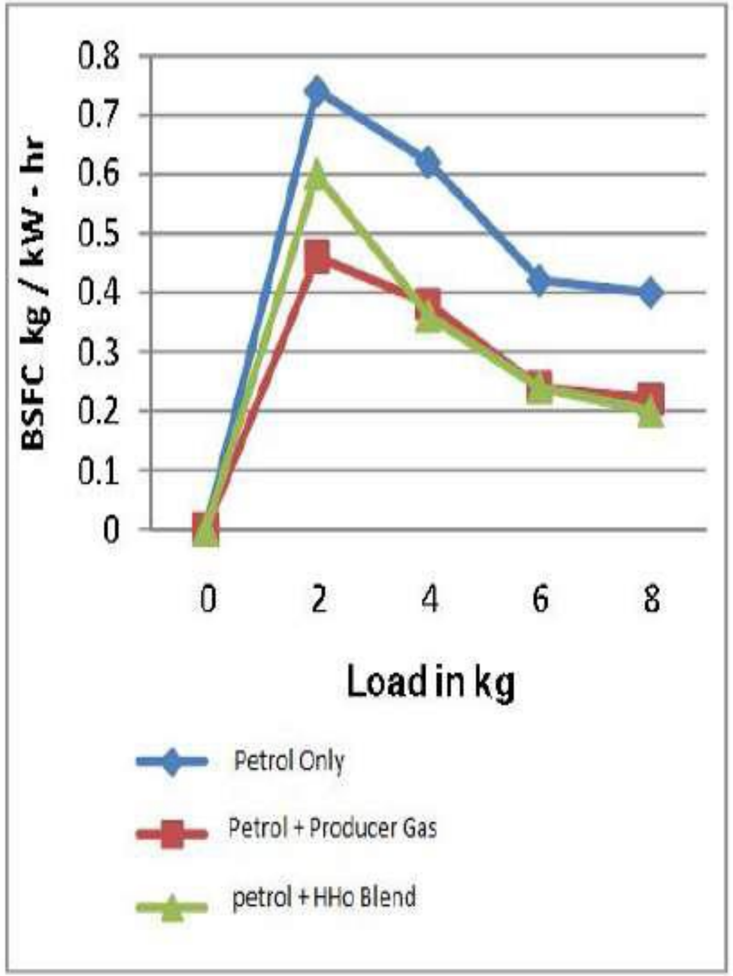


Figure 7 Variation of Brake Specific Fuel consumption in kg/kW-hr v/s load in kg

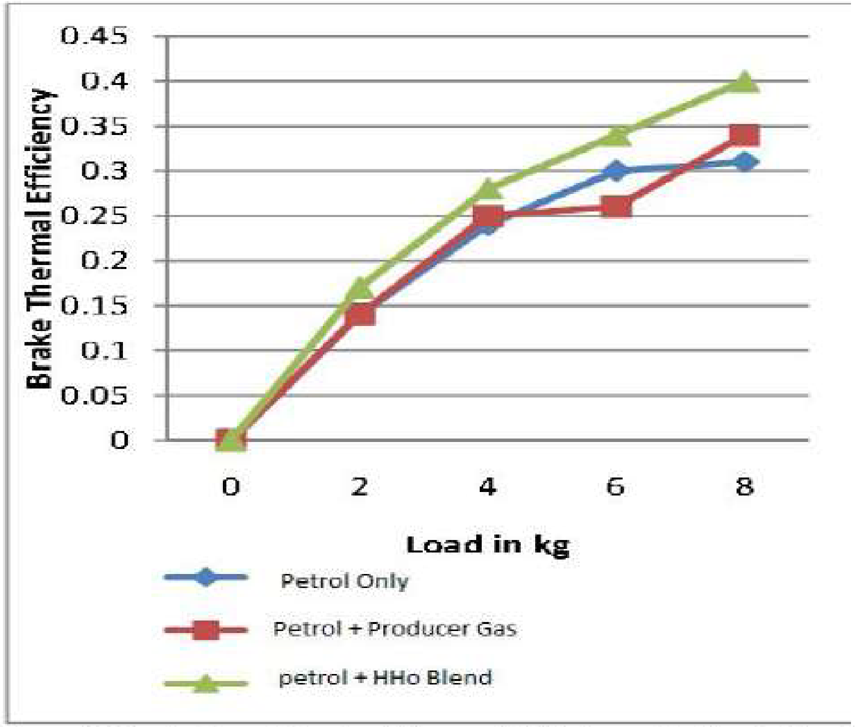
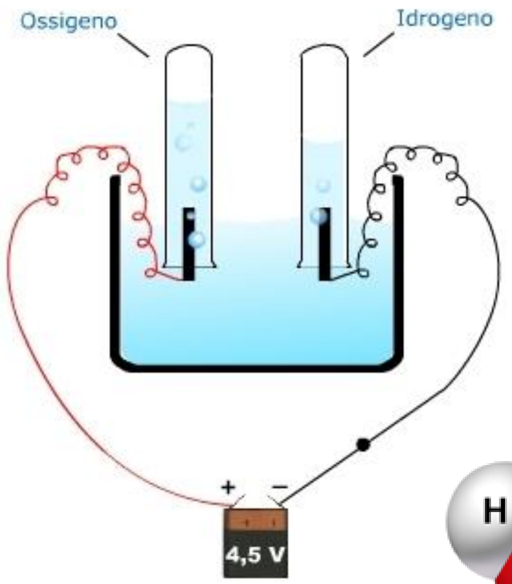


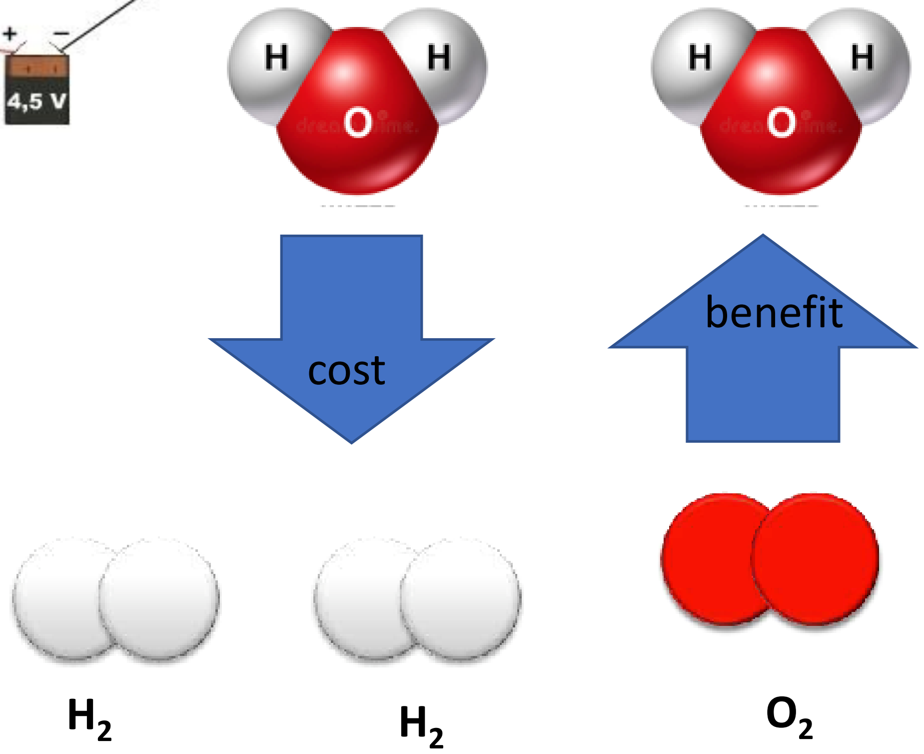
Figure 8 Variation of Brake Thermal Efficiency in % v/s Load in kg

- Exhaust recombination
- Combustion improvement (PM, HC, CO)
- Active role on nytrogen oxides
- BSFC improvement

Conventional System for Hydrogen Generation



Typical Basic Electrolitic Cell



Supplying electric energy it's possible the scission of water mulecules obtaining hydrogen and oxygen, as demonstrated by electrochemical Faraday laws.

But….

Such process requires

$$H_2O_{(l)} + 44{,}1\ \text{kJ/mol} \rightarrow H_2O_{(g)}\ (0.01225\ \text{kWh})$$
$$H_2O_{(g)} + 242\ \text{kJ/mol} \rightarrow H_{2\,(g)} + O_{2\,(g)}\ (0.06722\ \text{kWh})$$

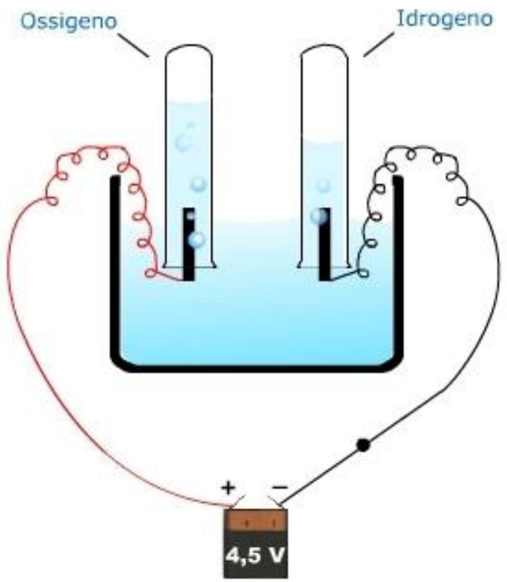
Total energy given: 286,1 kJ/mol (0.07947 kWh)

$$H_{2\,(g)} + O_{2\,(g)} \rightarrow H_2O_{(g)} + 242\ \text{kJ/mol}\ (0.06722\ \text{kWh})$$

[242 kJ/mol is equivalent to 2.5 eV referred at single molecule]

Total energy available (ideally): 242 kJ/mol (0.06722 kWh)

In ideal combustion conditions of produced hydrogen, it's possible use just the 85% of used energy for its production



Supplying a cell using the engine's power:

UNIT OF POWER OF FUEL
100

ENGINE
(0,25)

USABLE POWER
25

ALTERNATOR
(0,90)

ELECTRIC POWER
22,5

ELECTROLITIC CELL
(0,70)

REAL AVAILABLE POWER
15,75
For electrolitic cell

ELETTROLITIC PROCESS
(0,85)

REAL FUEL POWER
H_2 e O_2
13,4…

Supplying a cell using the engine's power:

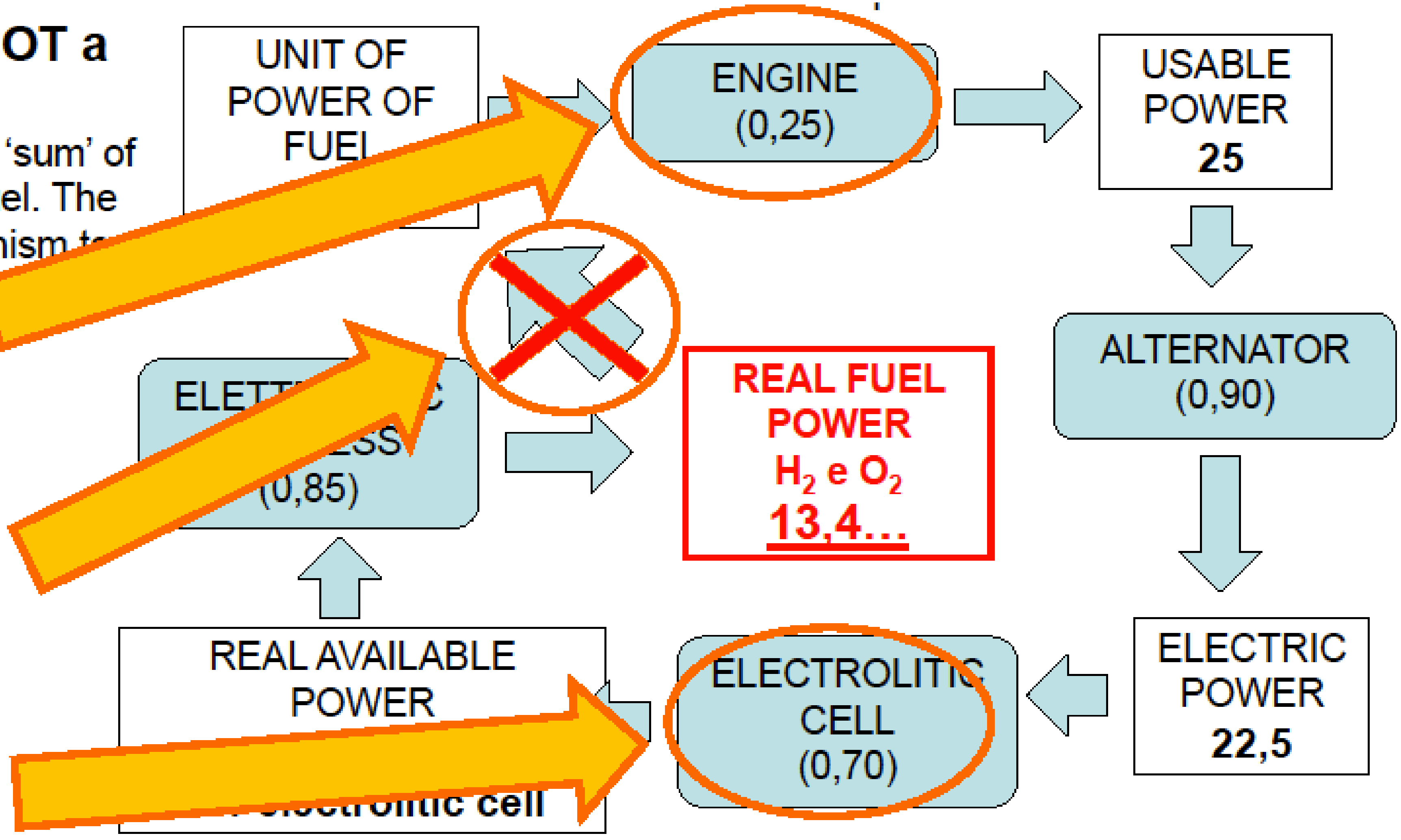
But the hydrogen is NOT a 'passive' actor.

The final effects are not simply 'sum' of calorific power with existing fuel. The hydrogen may trigger mechanism t improve the combustic

THE ENGINE EFFICIENCY IS INCREASED **(>0,25)**

THE HYDROGEN IS FINELY CALIBRATED

THE CELL CAN BE' MUCH MORE EFFICIENT **(>0,70)**



Theoretical Notes

Patent :
0001404965
0001405327

Hydromoving Technology

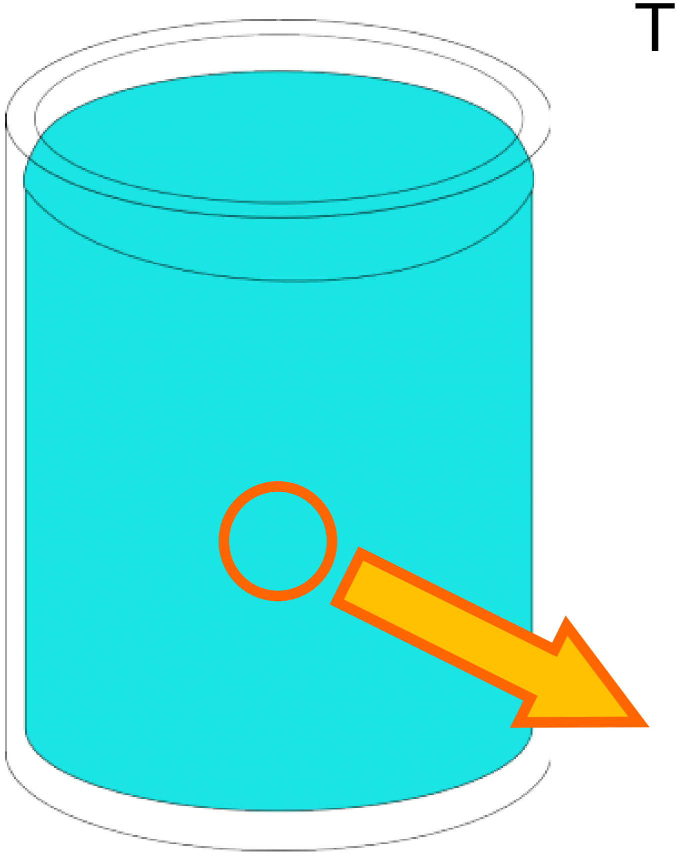
How it works and why

Requires very low power

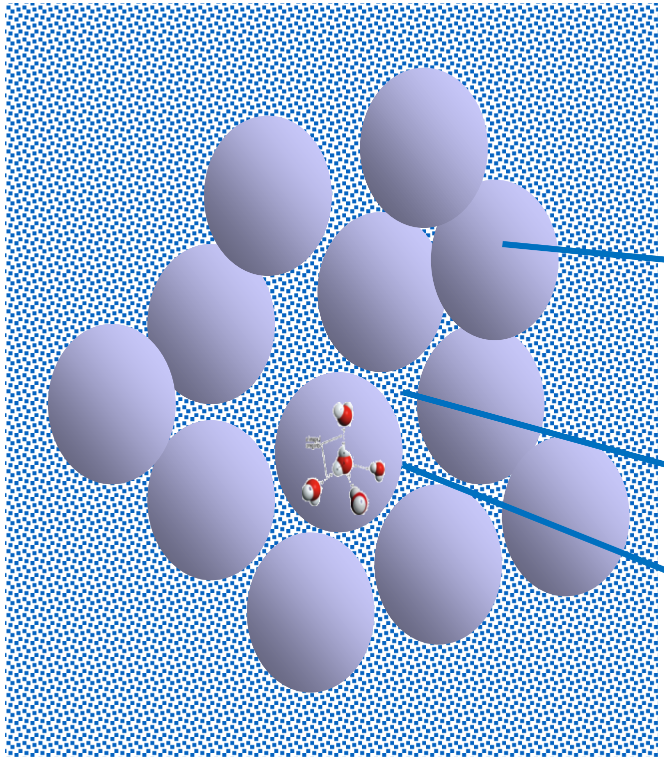
Efficient system for hydrogen supplying to the ICE
Patent- 0001404965/0001405327

The water is seen like a group of

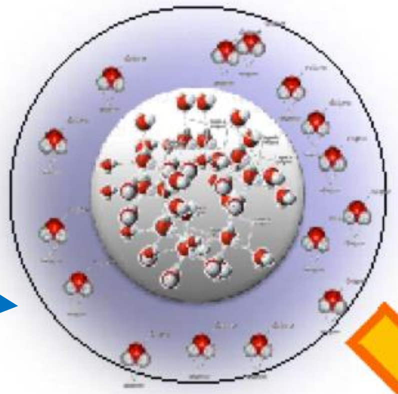
COHERENCE DOMAINS

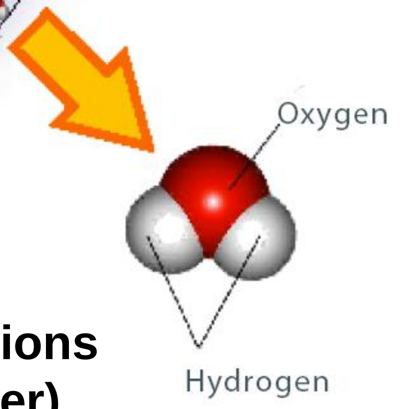


2-fluids model



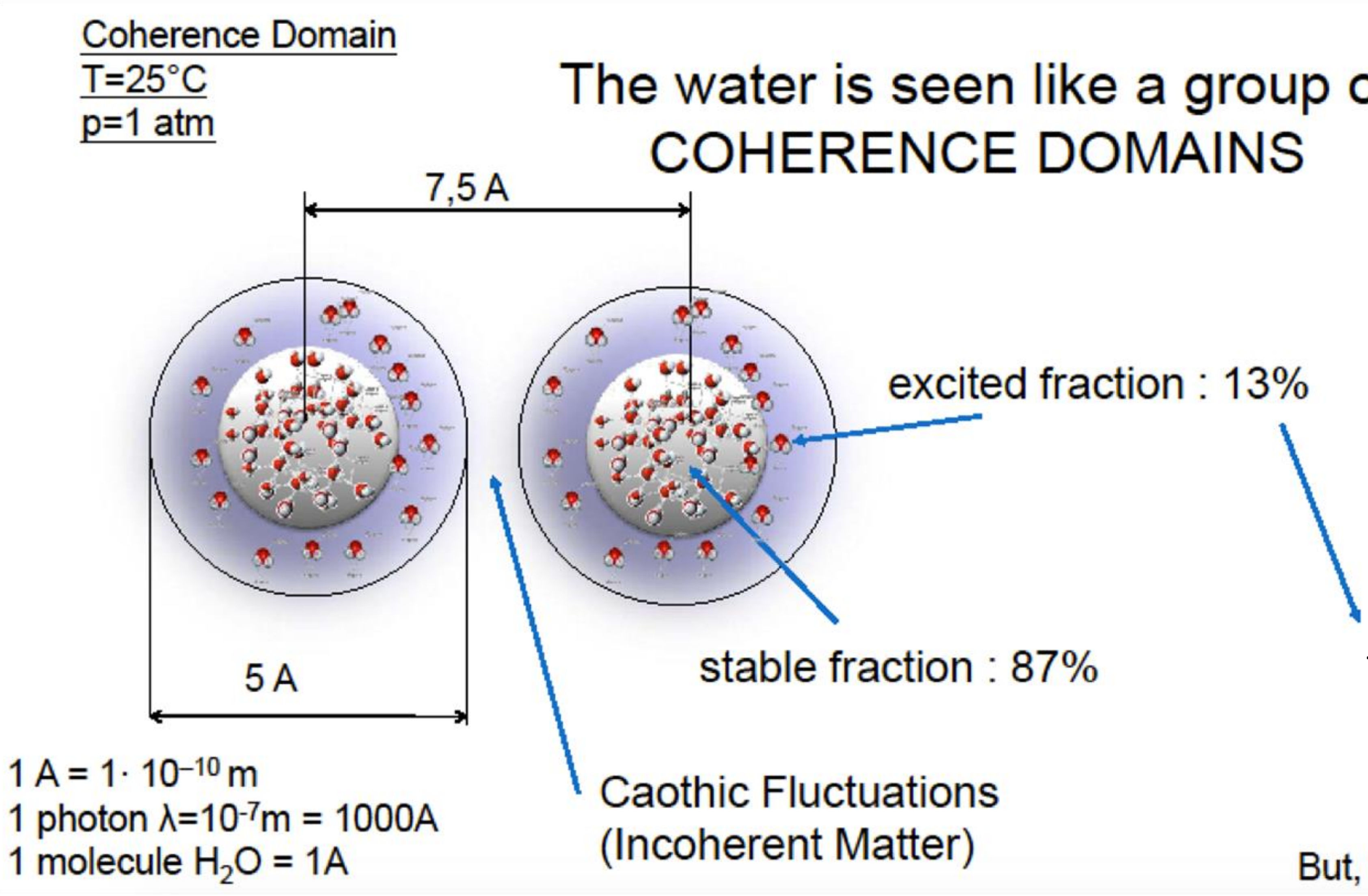
Domain
(Coherent Matter)

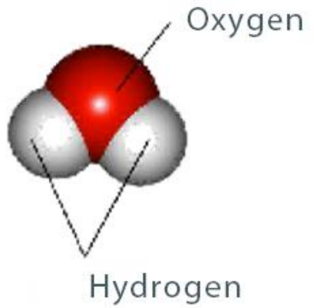




Caothic Fluctuations
(incoherent matter)

Efficient system for hydrogen supplying to the ICE





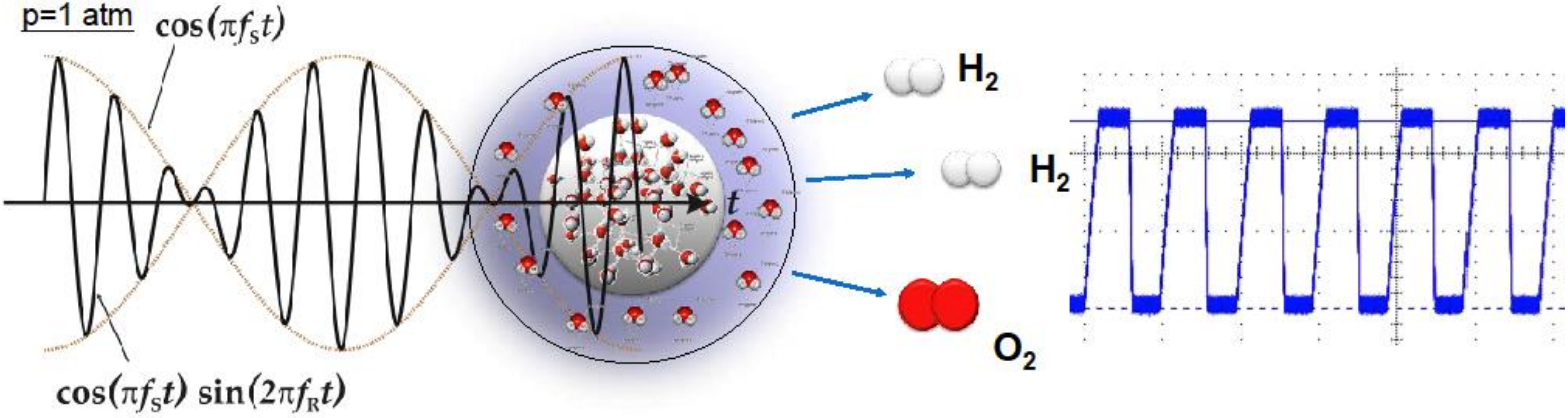
These mulecules require just 1/5 (0.5eV) of conventional amount of energy (2.5eV) to be separated in hydrogen and oxygen

But, how can we select them?

Efficient system for hydrogen supplying to the ICE

Coherence Domain
T=25°C
p=1 atm

Dimensions, characteristics, excited percentage depend by electrolitic solution parameters (T, p, ρ, [K]..)



Energy 'modulation'

stable fraction : 87%

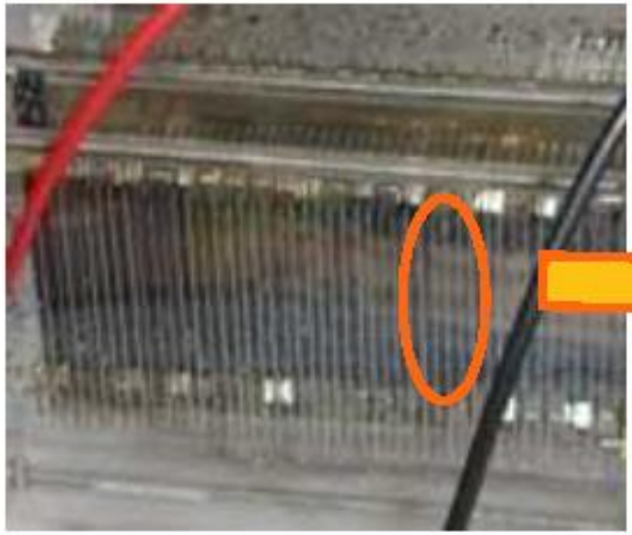
excited fraction : 13%

1 A = $1 \cdot 10^{-10}$ m
1 photon $\lambda = 10^{-7}$m = 1000A
1 molecule H_2O = 1A

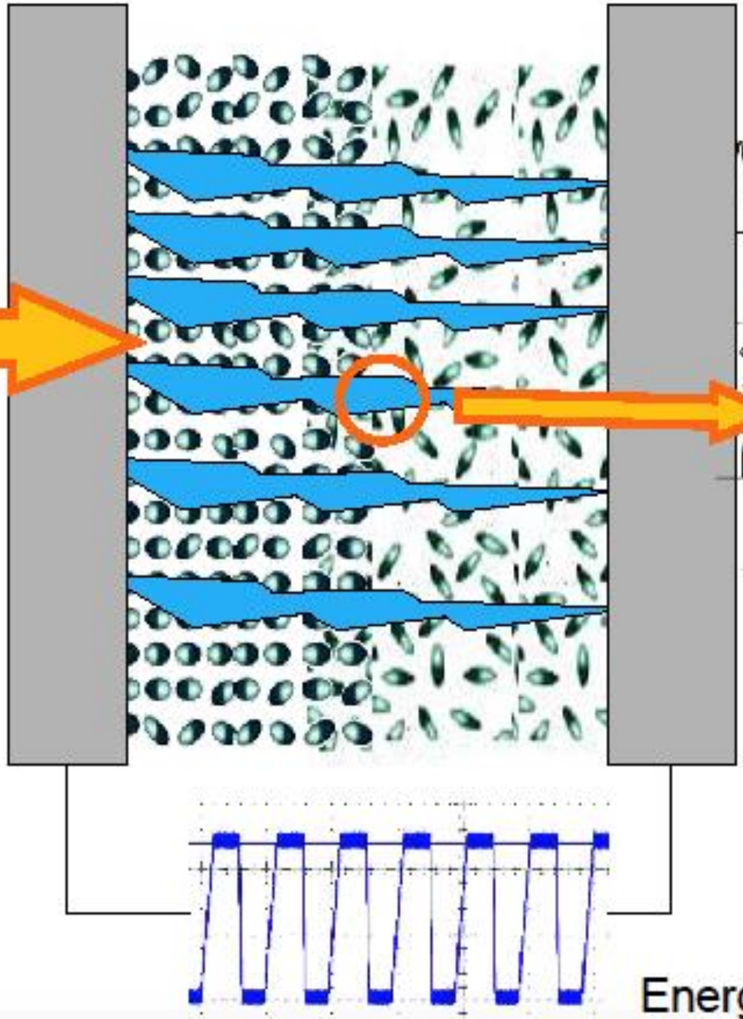
The Hydromoving system is based on these concepts

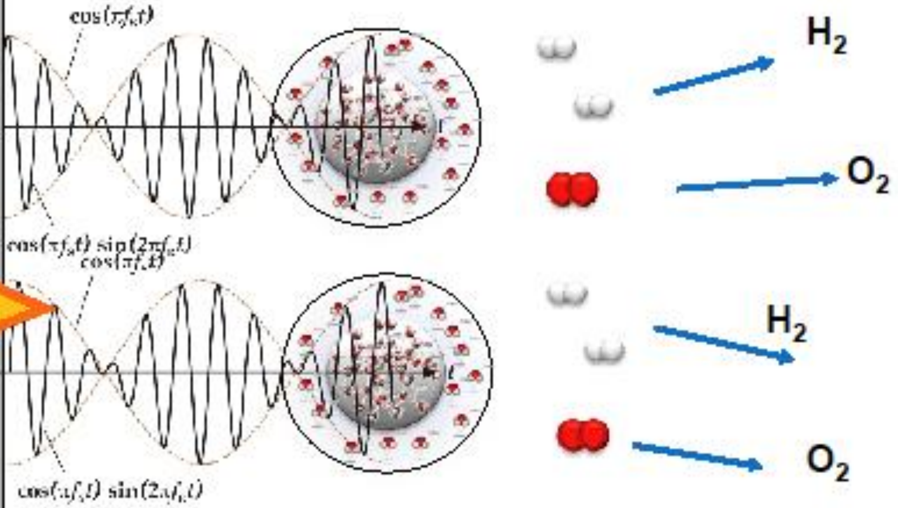
Efficient system for hydrogen supplying to the ICE

dry cell improved in material and surface threatment



Signal based on new water model





electrode's geometry

Specific injection system and related process control

(NOT just an injection for the steam of air inlet flow rate)

$1\ A = 1 \cdot 10^{-10}$ m
1 photon $\lambda = 10^{-7}$m = 1000A
1 mulecole H_2O = 1A

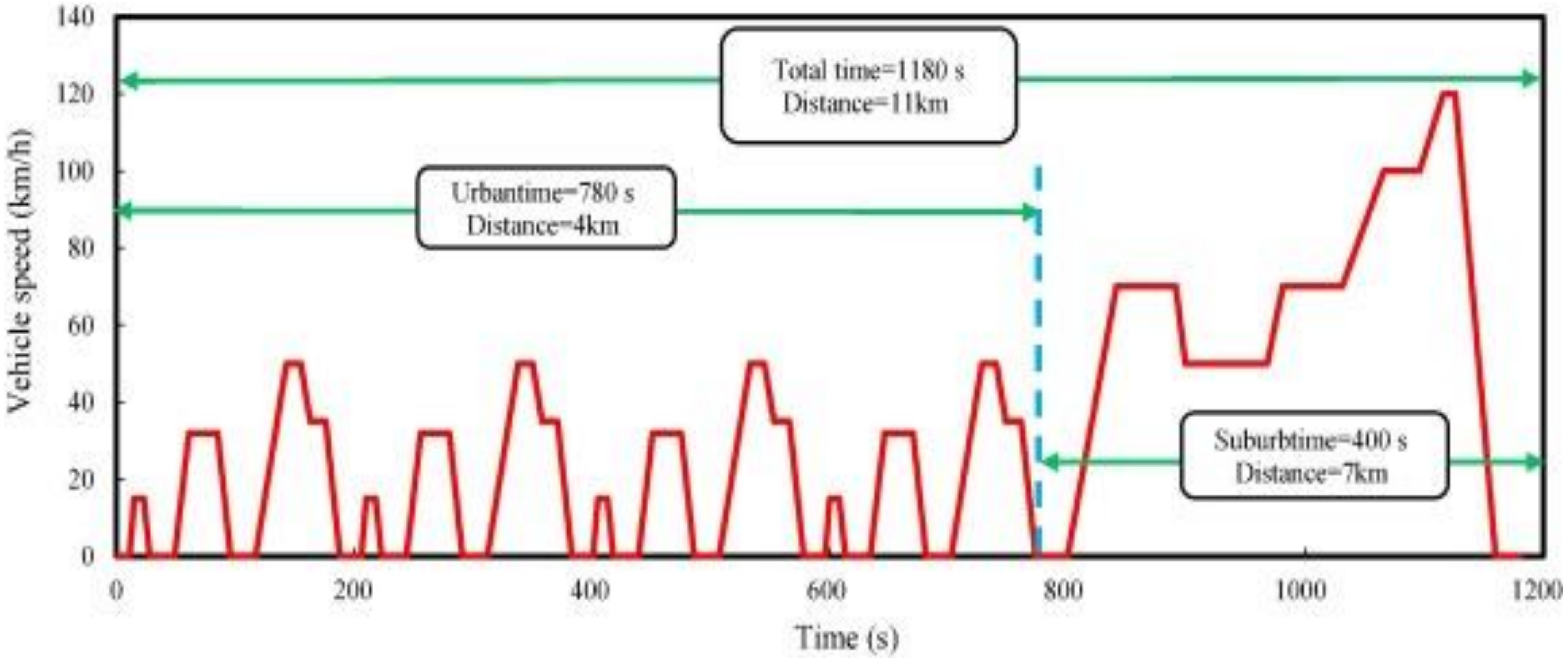
Energy 'modulation'

Result

Patent: 0001404965
Patent: 0001405327

Patent: 0001404965
Patent: 0001405327

European NEDC Cycle : the challenge



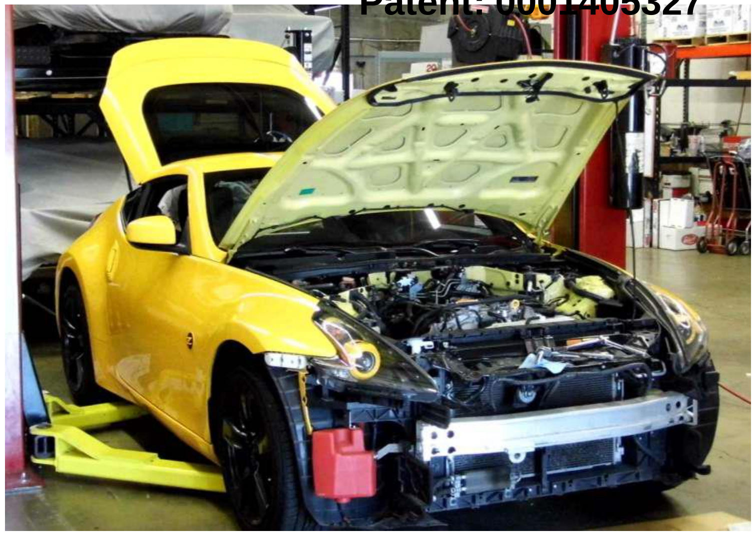
Tests performed at International Laboratories accredited with the Italian Ministry of Transport.
Control Sistem, MMarelli, FCA / Elasis.

TESTED VEHICLE

Nissan 370 Z

Patent: 0001404965
Patent: 0001405327

Model	Engine	Displacement (cm³)	Power	Maximum Torque (Nm)
3.7 V6	gasoline NA	3696	241 kW (328 Hp)	366



Test results of 4 NEUDC cycles performed at Control System (Turin) May 2011.

Nissan 370 Z engine displacement 3700 cc. petrol. Hydromoving system integrated into the vehicle.

CONTROL SISTEM S.r.l.

via Cuneo n.7, 10044 Pianezza (TO) Italy

CYCLE DATA

Cycle number:	1162	Date:	05/02/11
Performed cycle:	ECE_EUDC 2 fasi BENZINA	Job number:	CS 022/11
Operator:	Cassano	Customer:	Biosolar
Driver:	Vendemiati		

VEHICLE

Manufacturer:	Nissan	Inertia [Kg]:	1650
Model:	370Z	Road resistance 20km/h [N]:	0
Code:	CD462528	Road resistance 40km/h [N]:	0
Chassis number:		Road resistance 60km/h [N]:	0
Engine:	3700	Road resistance 80km/h [N]:	0
Transmission:	Manuale	Road resistance 100km/h [N]:	0
Traction:	Posteriore	Road resistance 120km/h [N]:	565
Fuel:	Gasoline	F0 [N]:	8
Tyres pressure [bar]:	2,4	F1 [N/kmh]:	0,000
Kilometers [km]:	51575	F2 [N/kmh^2]:	0,0536

GENERAL DATA

	Phase 1	Phase 2		
Ambient temperature [°C]:	25,2	25,1	Violations [sec]:	2,0
Barometric pressure [mbar]:	968	968	Fuel density [kg/l]:	0,7478
Relative humidity [%]:	44,0	44,0	THC density [g/l]:	0,619
Absolute humidity [g/kg]:	9,18	9,13	CO density [g/l]:	1,25
Pd dry [kPa]:	3,205	3,186	CO2 density [g/l]:	1,964
NOx correction factor:	0,952	0,951	NOx density [g/l]:	2,05
Distance [m]:	4100	7000	NO density [g/l]	1,338
Duration [sec]:	780	415	NO2 density [g/l]	2,054
CVS volume [m^3]:	68,50	35,20	Secondary dil. factor	6
CVS dilution factor:	16,95	8,99		
Particulate sample volume [nl]:	126,0	64,9		

POLLUTANTS MEASUREMENTS

	THC [ppm]	CO low [ppm]	NOx [ppm]	CO2 [%Vol]	CO high [%Vol]	Particulate [mg]	
Phase 1						Filter	
Sample	5,2	1,0	47,7	0,79	0,0	Initial weight	
Dilution air	3,0	0,0	0,9	0,05		Final weight	
						Difference	0,0000
Phase 2						Filter	
Sample	4,8	2,0	200,1	1,49	0,0	Initial weight	
Dilution air	2,7	0,0	2,6	0,06		Final weight	
						Difference	0,0000

RESULTS

	THC [g/km]	NOx [g/km]	THC + NOx [g/km]	CO [g/km]	CO2 [g/km]	PM [g/km]	Cons [l/100km]
	BAGS						
Phase 1	0,025	1,528	1,553	0,021	243,8	0,000	10,3
Phase 2	0,007	1,938	1,946	0,013	141,9	0,000	6,0
Total	0,014	1,787	1,800	0,016	179,5	0,000	7,6
	DILUTED						
Phase 1	0,016	1,552	1,568	0,018	244,5		10,3
Phase 2	0,005	1,976	1,981	0,016	143,2		6,0
Total	0,009	1,819	1,829	0,017	180,6		7,6
	RAW 1						
Phase 1	2,155	2,455	4,609	9,413	243,5		11,2
Phase 2	1,292	1,612	2,904	3,430	142,6		6,4
Total	1,611	1,923	3,534	5,640	179,9		8,2
	RAW 2						
Phase 1							
Phase 2							
Total							

NOTES

benzina + idrogeno + Valori RAW 1 senza Catalizzatore

OPERATOR: CUSTOMER:

CONTROL SISTEM S.r.l.

via Cuneo n.7, 10044 Pianezza (TO) Italy

CYCLE DATA

Cycle number:	1161	Date:	05/02/2011
Performed cycle:	ECE_EUDC 2 fasi BENZINA	Job number:	CS 022/11
Operator:	Cassano	Customer:	Biosolar
Driver:	Vendemiati		

VEHICLE

Manufacturer:	Nissan	Inertia [Kg]:	1650
Model:	370Z	Road resistance 20km/h [N]:	0
Code:	CD462528	Road resistance 40km/h [N]:	0
Chassis number:		Road resistance 60km/h [N]:	0
Engine:	3700	Road resistance 80km/h [N]:	0
Transmission:	Manuale	Road resistance 100km/h [N]:	0
Traction:	Posteriore	Road resistance 120km/h [N]:	565
Fuel:	Gasoline	F0 [N]:	8
Tyres pressure [bar]:	2,4	F1 [N/kmh]:	0,000
Kilometers [km]:	51575	F2 [N/kmh^2]:	0,0536

GENERAL DATA

	Phase 1	Phase 2		
Ambient temperature [°C]:	24,9	24,9	Violations [sec]:	14,6
Barometric pressure [mbar]:	969	969	Fuel density [kg/l]:	0,7478
Relative humidity [%]:	45,0	45,0	THC density [g/l]:	0,619
Absolute humidity [g/kg]:	9,22	9,22	CO density [g/l]:	1,25
Pd dry [kPa]:	3,149	3,149	CO2 density [g/l]:	1,964
NOx correction factor:	0,953	0,953	NOx density [g/l]:	2,05
Distance [m]:	4090	6960	NO density [g/l]	1,338
Duration [sec]:	780	415	NO2 density [g/l]	2,054
CVS volume [m^3]:	68,23	35,25	Secondary dil. factor	6
CVS dilution factor:	13,35	8,02		
Particulate sample volume [nl]:	126,0	64,9		

POLLUTANTS MEASUREMENTS

	THC [ppm]	CO low [ppm]	NOx [ppm]	CO2 [%Vol]	CO high [%Vol]	Particulate [mg]	
Phase 1						Filter	
Sample	24,1	17,0	62,6	1,00	0,0	Initial weight	
Dilution air	3,2	0,0	0,9	0,05		Final weight	
						Difference	0,0000
Phase 2						Filter	
Sample	5,6	4,0	203,7	1,67	0,0	Initial weight	
Dilution air	2,9	0,0	2,8	0,07		Final weight	
						Difference	0,0000

RESULTS

	THC [g/km]	NOx [g/km]	THC + NOx [g/km]	CO [g/km]	CO2 [g/km]	PM [g/km]	Cons [l/100km]
	BAGS						
Phase 1	0,218	2,013	2,232	0,354	312,5	0,000	13,2
Phase 2	0,010	1,992	2,001	0,025	160,0	0,000	6,8
Total	0,087	2,000	2,087	0,147	216,5	0,000	9,1
	DILUTED						
Phase 1	0,208	2,045	2,253	0,301	318,3		13,5
Phase 2	0,006	2,036	2,042	0,023	161,0		6,8
Total	0,081	2,039	2,120	0,126	219,2		9,3
	RAW 1						
Phase 1							
Phase 2							
Total							
	RAW 2						
Phase 1							
Phase 2							
Total							

NOTES

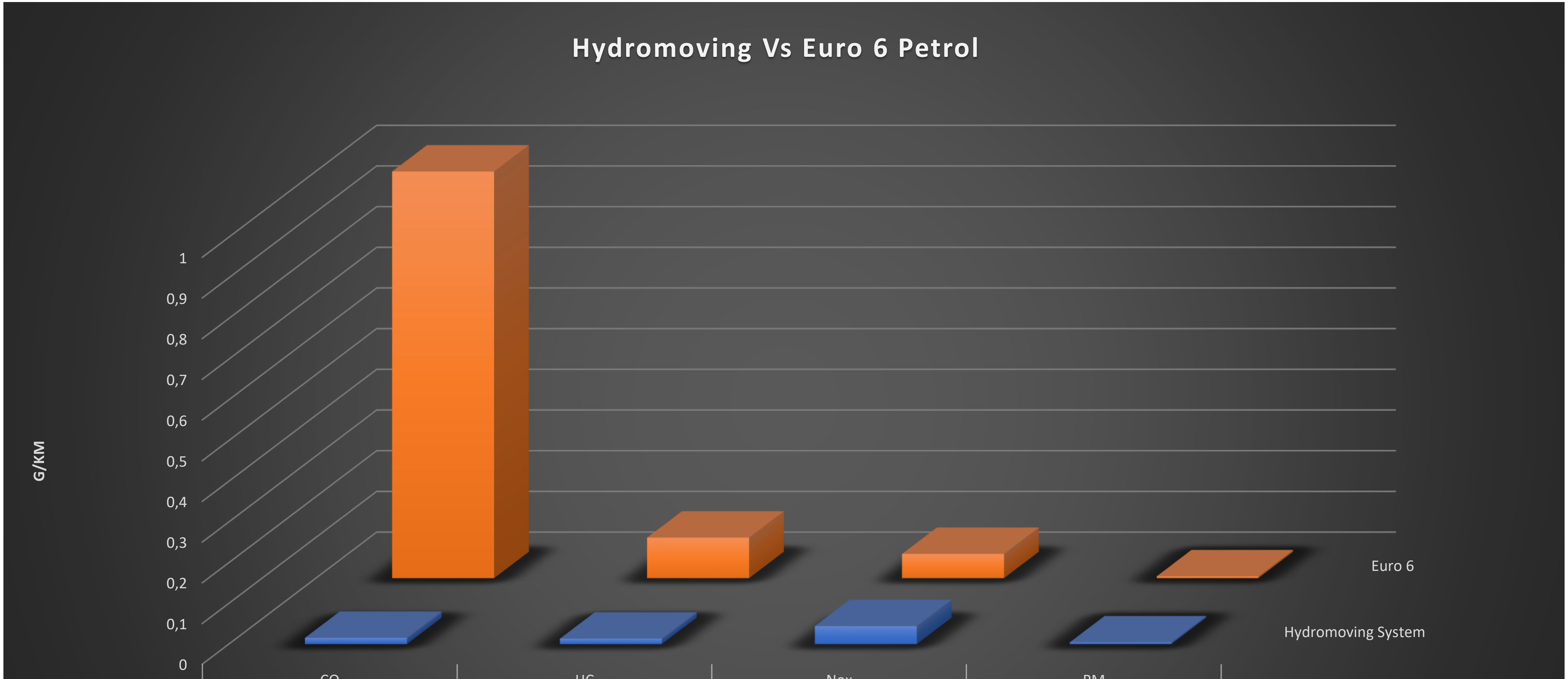
Benzina

OPERATOR: CUSTOMER

Emissions values declared by the manufacturer

46.1.	Exhaust emissions:	70/220/EEC*2003/76/EC (B)			
	CO	: 0.119	g/km		
	HC	: 0.037	g/km		
	NOx	: 0.037	g/km		
	HC + NOx	: -	g/km		
	Smoke	: -	m-1		
	Particulates	: -	g/km		
46.2.	CO2 emissions/fuel consumption:	80/1268/EEC*2004/3/EC			
	Urban conditions	: 359	g/km	15.2	1/100 km
	Extra-urban conditions	: 182	g/km	7.7	1/100 km
	Combined:	: 247	g/km	10.4	1/100 km

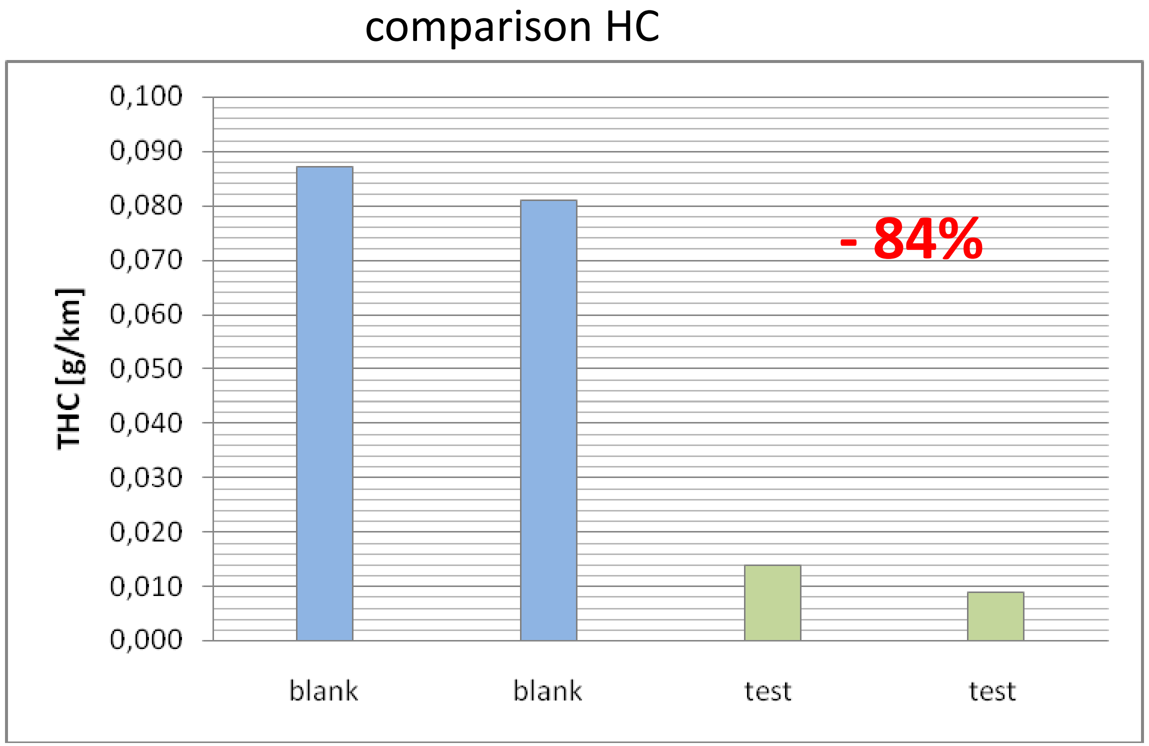
TEST PERFORMED IN MAY 2012 ON NISSAN 370Z 3700 cc ENGINE DISPLACEMENT



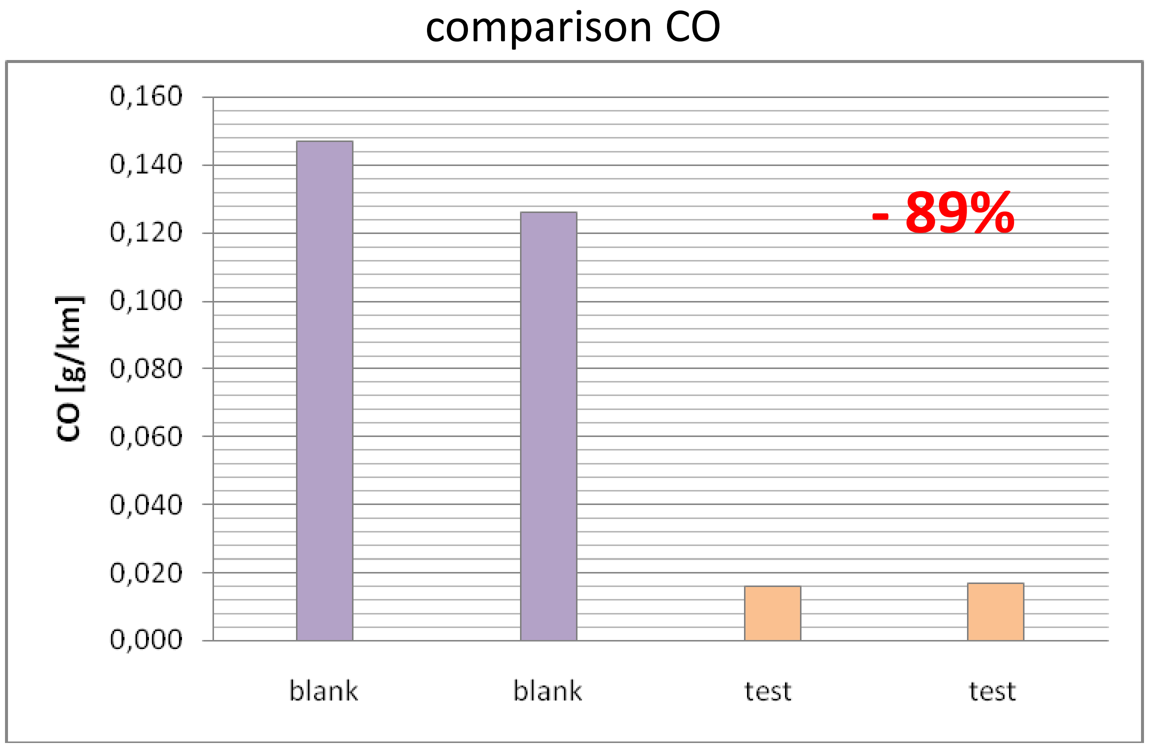
	CO	HC	Nox	PM
Hydromoving System	0,016	0,014	0,045	0,005
Euro 6	1	0,1	0,06	0,005

EMISSIONS IMPROVEMENT

Nissan 370 Z



<u>HC emissions</u> comparison between reference condition and new conditions given by Hydromoving system [REF.test 2011/2, CS]

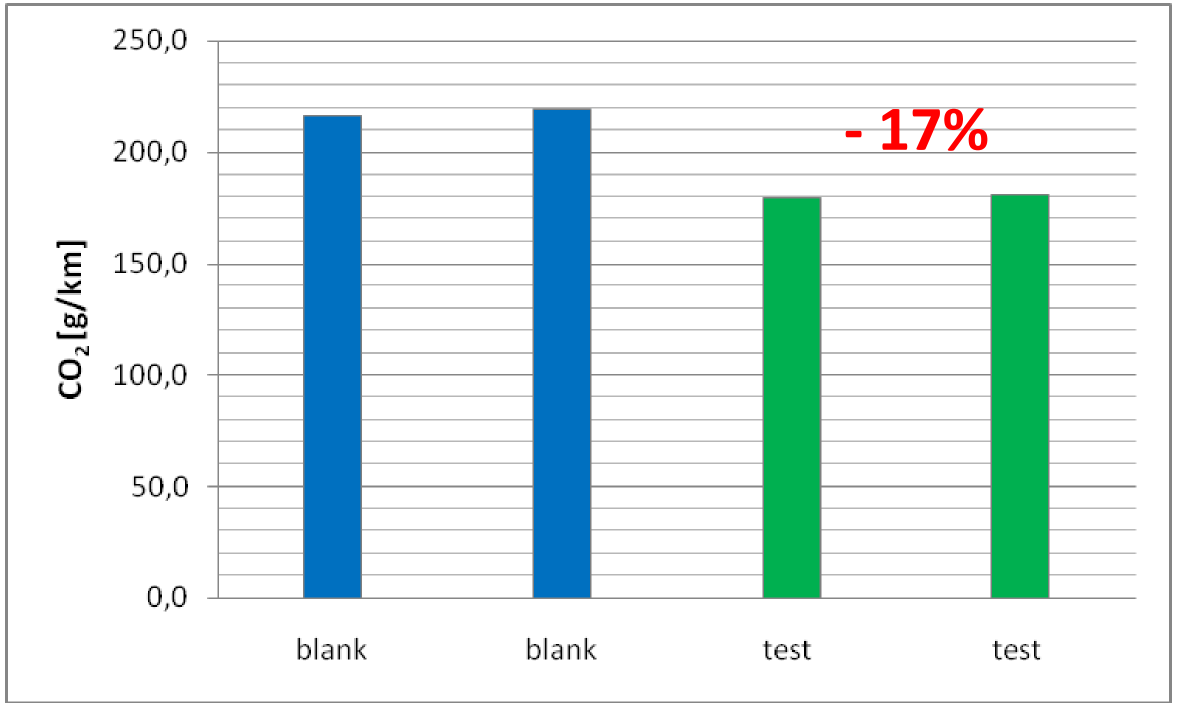


<u>CO emissions</u> comparison between reference condition and new conditions given by Hydromoving system [REF.test 2011/2, CS]

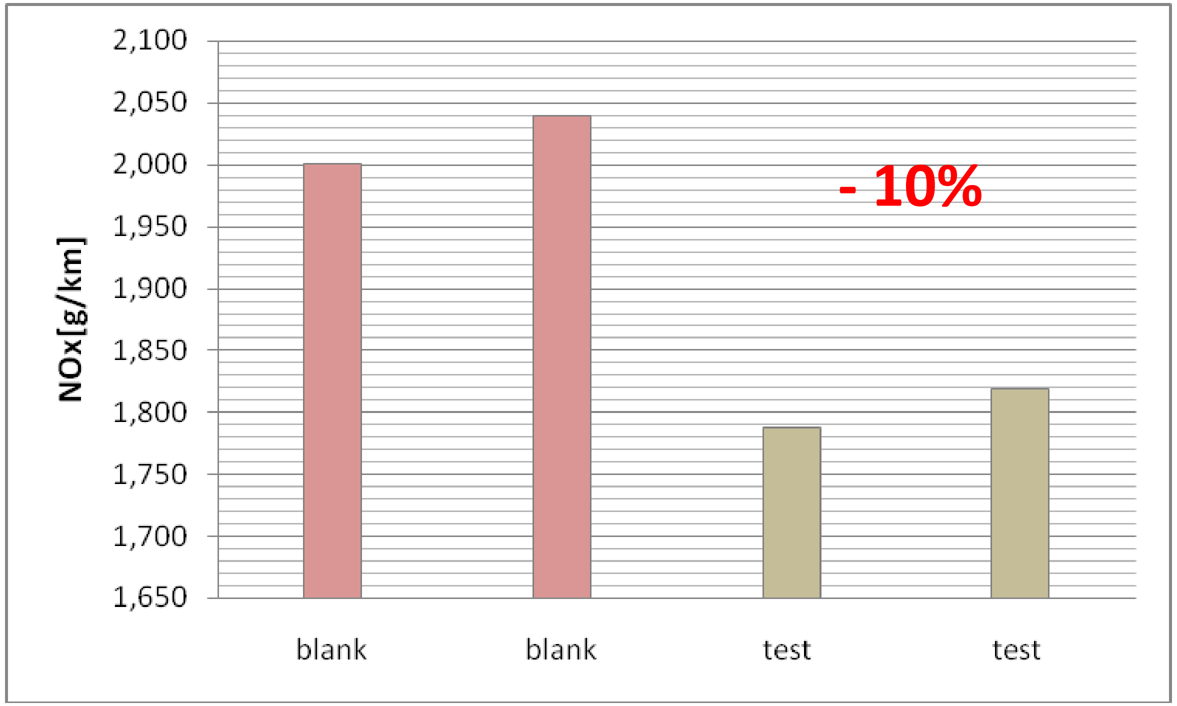
EMISSIONS IMPROVEMENT

Nissan 370 Z

comparison CO_2



comparison NO_x



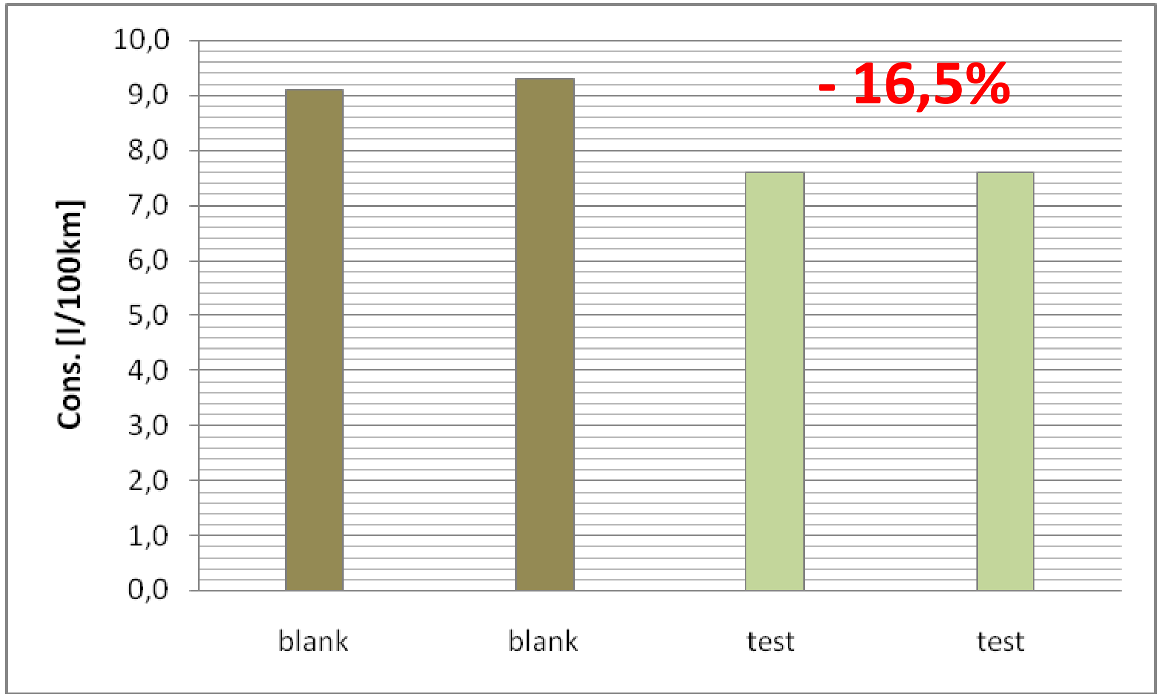
CO2 emissions comparison between reference condition and new conditions given by Hydromoving system [REF.test 2011/2, CS]

NO_x emissions comparison between reference condition and new conditions given by Hydromoving system [REF.test 2011/2, CS]

EMISSIONS IMPROVEMENT

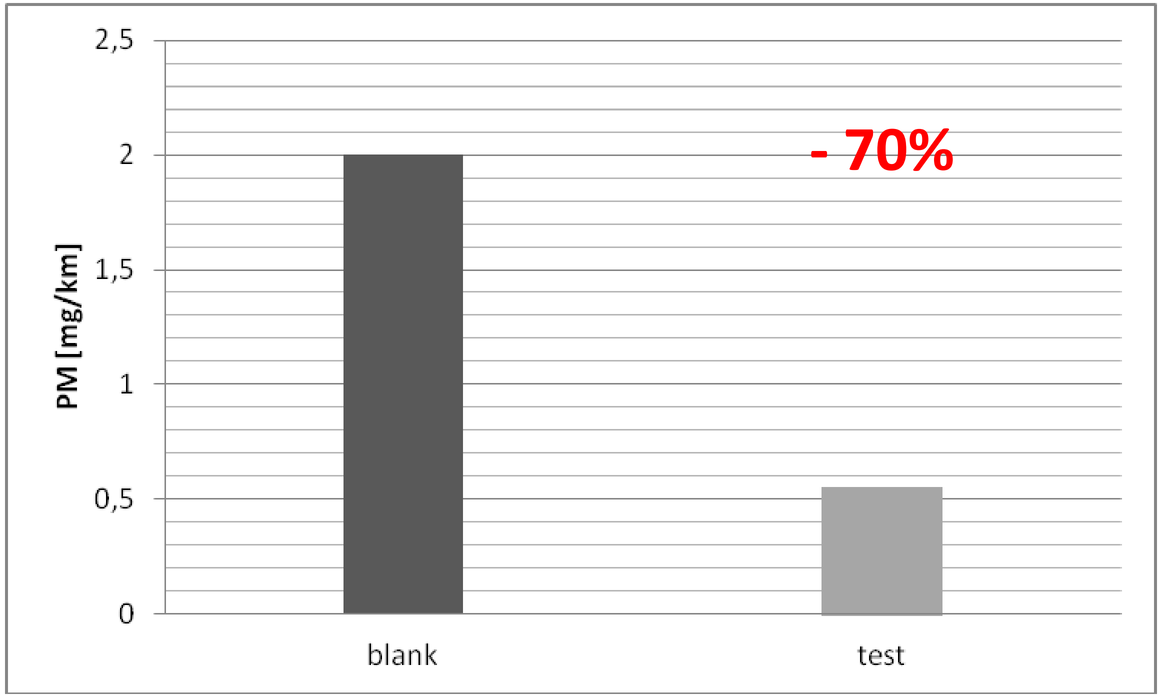
Nissan 370 Z

comparison consumption



<u>Gasoline consumption</u> comparison between reference condition and new conditions given by Hydromoving system [REF.test 2011/2, CS]

comparison PM



<u>PM emissions</u> comparison between reference condition and new conditions given by Hydromoving system [REF.test 2012/6, MM]

TESTED VEHICLE Results

Model	Engine	Displacement (cm³)	Power
1.5 DCi K9K	diesel TC	1461	64 kW (86 Hp)

Nissan NV200

cat. ‘N1’ – Class 3

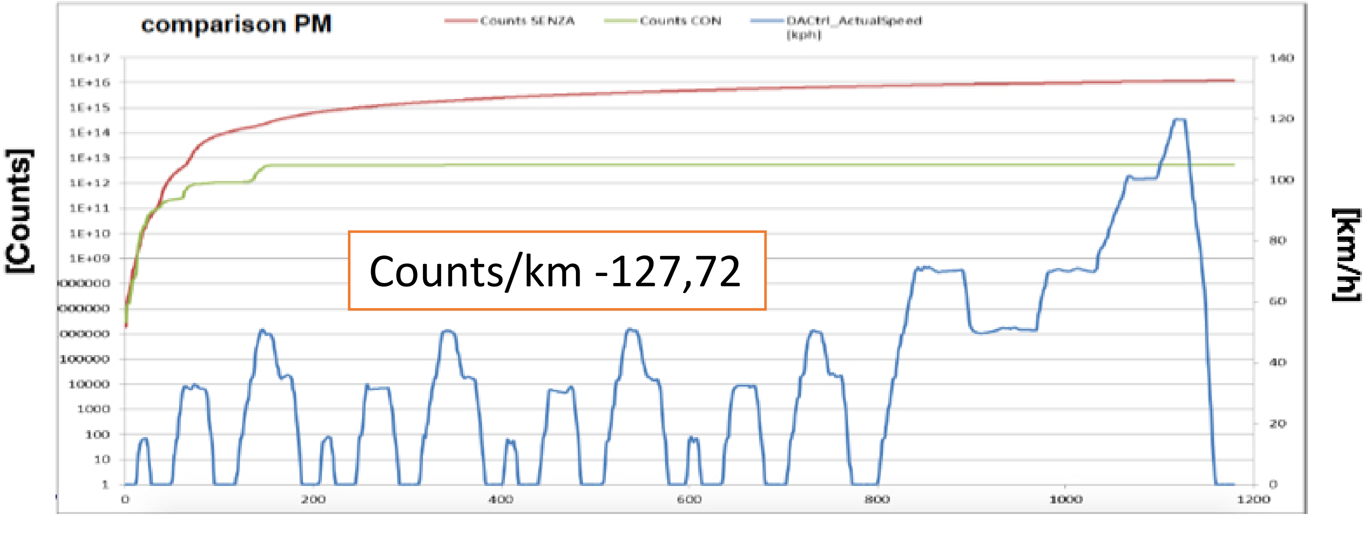
Diesel fed

TEST A FREDDO SCARTO IN % "SENZA dispositivo" vs "CON dispositivo"							
EMISSIONI	THC + NOx	THC	CO	CO2	NOX	Particolato PN	
UDC [g]	-16,28	-32,03	-8,13	5,05	-13,74	Counts	-127,80
EUDC [g]	0,15	-26,34	63,04	0,34	0,44	Counts	-758,17
UDC [g/km]	-15,58	-31,24	-7,48	5,62	-13,06	Counts/km	-126,44
EUDC [g/km]	0,28	-26,17	63,09	0,47	0,57	Counts/km	-757,02
NEDC [g/km]	**-5,10**	**-30,87**	**-6,75**	**2,60**	**-3,62**	**Counts/km**	**-127,72**

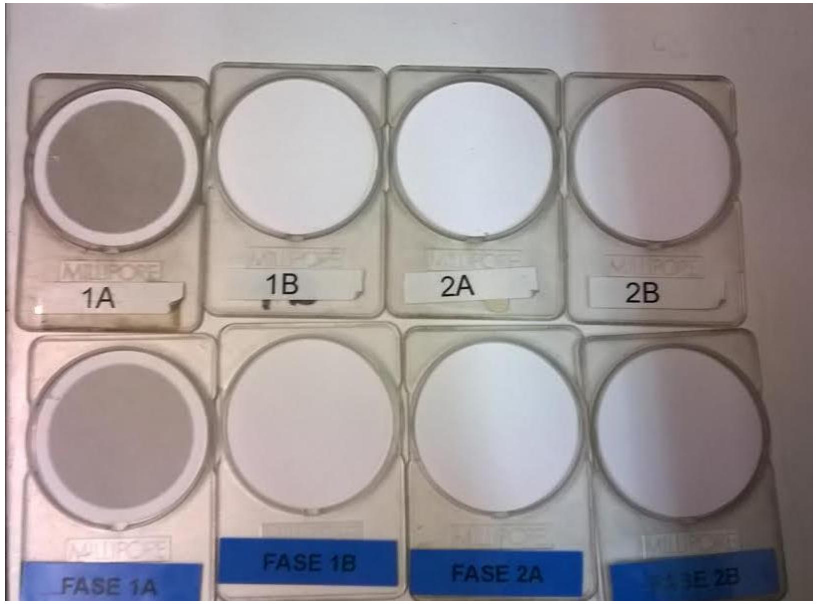
CONSUMI	MPG	l/100km	Km/l
UDC	-5,86	5,54	-5,86
EUDC	-0,47	0,47	-0,47
NEDC	**-2,64**	**2,57**	**-2,64**

European NEDC Cycle
VEHICLE UNDER CONDITIONING

Particulate Reduction



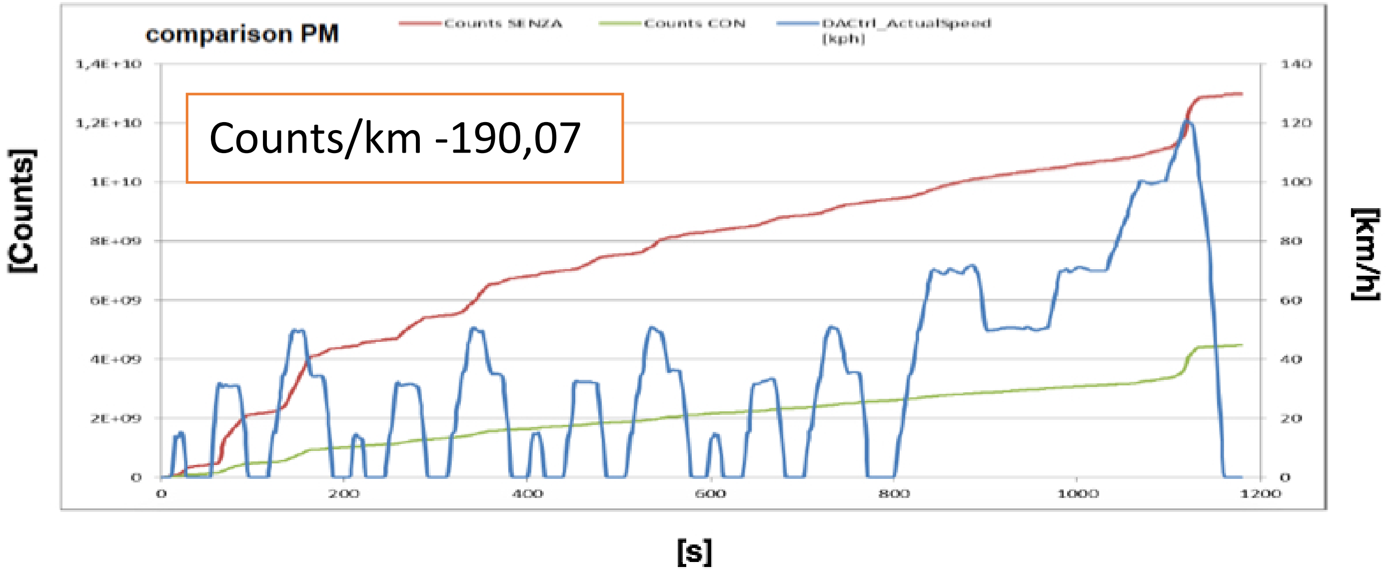
Comparison of PM emissions with and without system, cold NEDC cycle



Details:
EUDC **cold** test without HM system> Photo 1A (Blue)
EUDC **hot** test without HM system> Photo 1A (White)
EUDC test **cold** with HM system (perfectly white filter)> Photo 1B (Blue)
EUDC test **hot** with HM system (perfectly white filter)> Photo 1B (White)
The excellence of the device is clearly visible.

Nissan NV200 gasoline Tdci Without DPF/FAP

Particulate Reduction



Comparison of PM emissions with and without system, hot NEDC cycle

Excellent Test of the efficiency of the HM system.
Perfectly White with HM system in operation.
Perfectly Black without the HM system
The HM system makes the EURO 6 Standard obsolete

<u>Nissan NV200 gasoline Tdci</u>
<u>Without DPF/FAP</u>

EMISSIONS

Nissan NV200

IMPORTANT IMPROVEMENTS:

STRONG REDUCTION OF NOx and PM

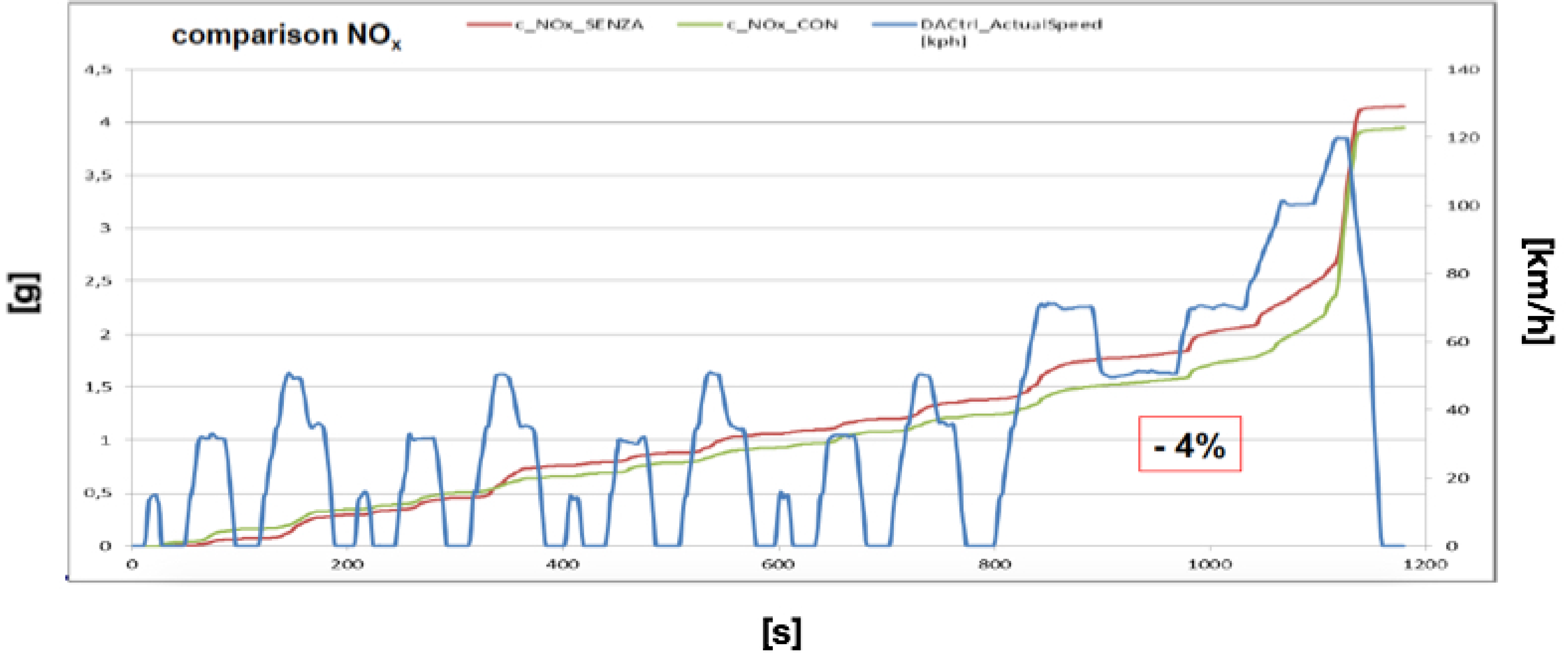
uconditioned vehicle (HOT)

EMISSIONI	NOX	Particolato PN	
UDC [g]	-12,29	Counts	-263,29
EUDC [g]	-22,31	Counts	-88,51
UDC [g/km]	-13,27	Counts/km	-266,46
EUDC [g/km]	-22,61	Counts/km	-88,97
NEDC [g/km]	**-19,17**	**Counts/km**	**-190,07**

conditioned vehicle

EMISSIONI	NOX	Particolato PN	
UDC [g]	-13,74	Counts	-127,80
EUDC [g]	0,44	Counts	-758,17
UDC [g/km]	-13,06	Counts/km	-126,44
EUDC [g/km]	0,57	Counts/km	-757,02
NEDC [g/km]	**-3,62**	**Counts/km**	**-127,72**

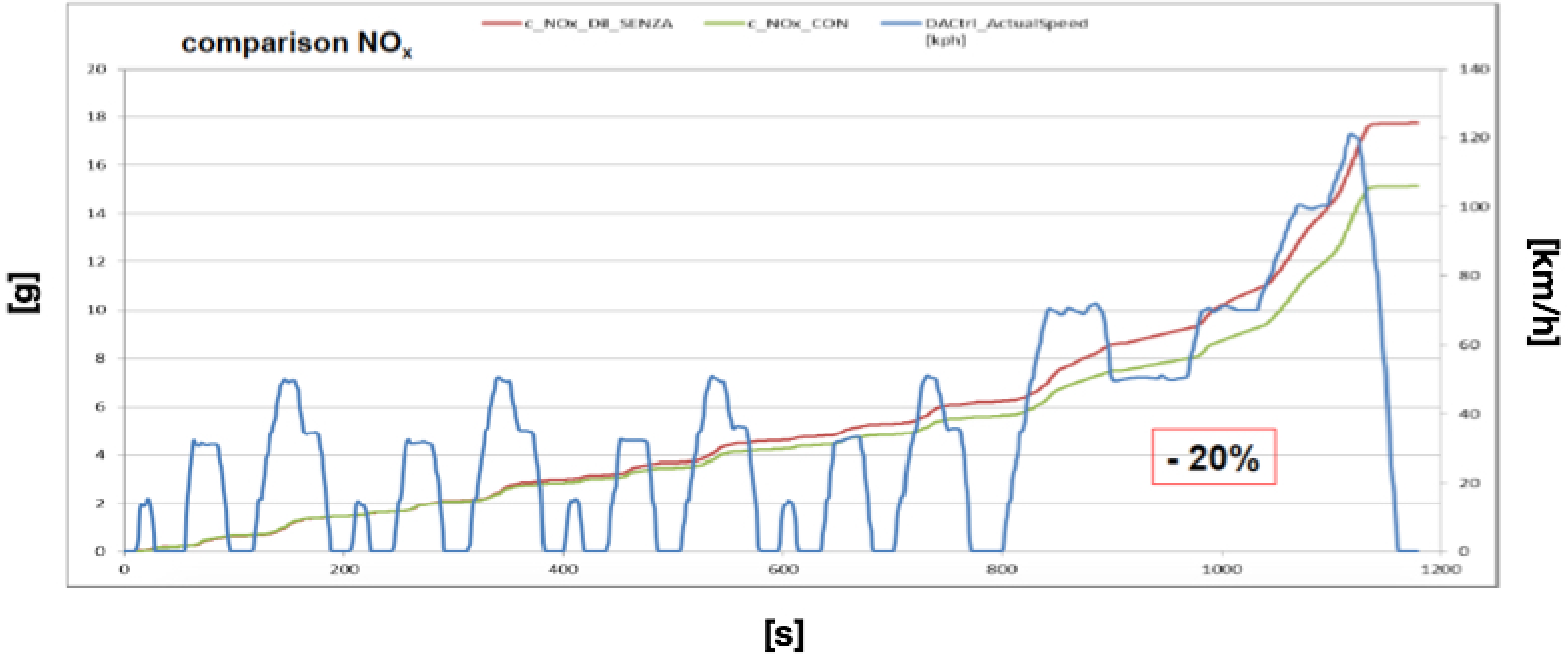
No_x Reduction



Nissan NV200

Comparison of NOx emissions with and without system, **cold** NEDC cycle

No_x Reduction



<u>Nissan NV200</u>

Comparison of NOx emissions with and without system, **hot** NEDC cycle

TESTED VEHICLE   Results

Model	Engine	Displacement (cm³)	Power
1.5 DCi K9K	diesel TC	1461	64 kW (86 Hp)

Nissan NV200

cat. ‘N1’ – Class 3
Euro 5 Standards
without particulate filter

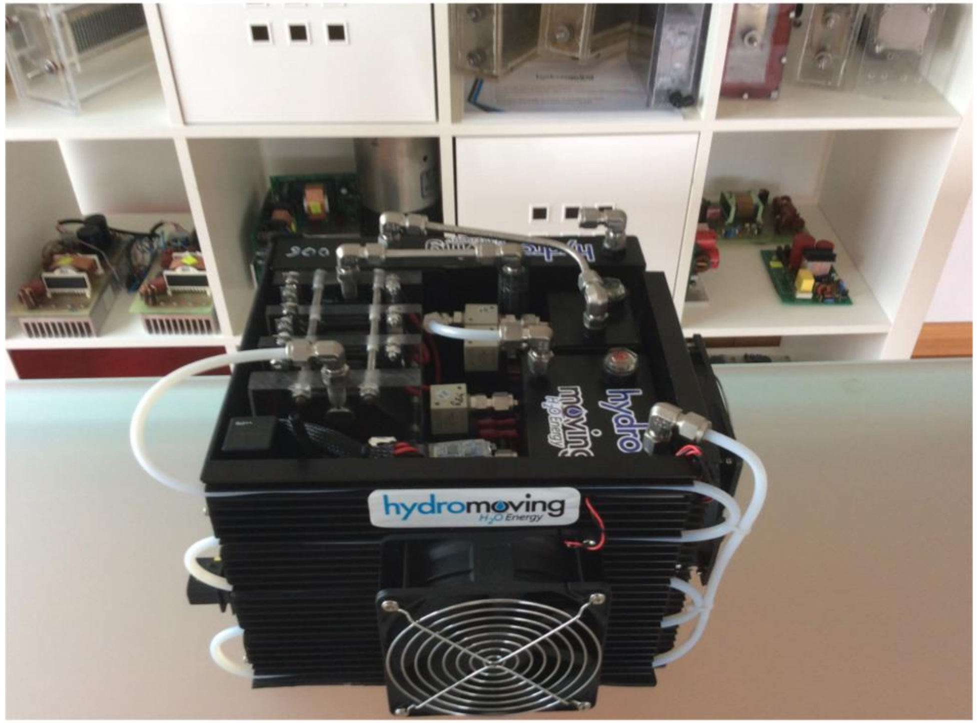
Diesel fed

TEST A CALDO SCARTO IN % "SENZA dispositivo" vs "CON dispositivo"							
EMISSIONI	THC + NOx	THC	CO	CO2	NOX	Particolato PN	
UDC [g]	-11,85	29,37	-527,07	2,42	-12,29	Counts	-263,29
EUDC [g]	-22,09	35,90	86,17	-2,67	-22,31	Counts	-88,51
UDC [g/km]	-12,83	28,75	-532,54	1,57	-13,27	Counts/km	-266,46
EUDC [g/km]	-22,40	35,74	86,14	-2,92	-22,61	Counts/km	-88,97
NEDC [g/km]	**-5,10**	**31,49**	**-285,11**	**-1,16**	**-19,17**	**Counts/km**	**-190,07**

CONSUMI	MPG	l/100km	Km/l
UDC	-1,59	1,56	-1,59
EUDC	2,83	-2,92	2,83
NEDC	**1,14**	**-1,15**	**1,14**

European NEDC Cycle
‘HOT TEST’
VEHICLE NOT CONDITIONED

Hydromoving Technology HM-System Pro



Special features:

1) Ph control of the Basic solution
2) Electronic control of pressure (**0,3 Bar**)
   and overpressure (**0,5 Bar**)
3) Electronic control engine Stop/Run
4) Electronic control of gas leaks, System Off

Features :

1) Very small dimensions **28 * 18 * 20 cm.**
2) Weight **8 kg.**
3) Energy consumption certified **40 W / hour.**
4) Energy efficiency **98 %**
5) Production of hydrogen / oxygen mixture on demand per minute **0.3 / 4.5 liters** electronically controlled by the **throttle pedal / engine load / Map / Maf / injection time** of the internal combustion engine.
6) Engine parameters control through **Can-Bus.**
7) **Bluetooth** system operation parameters control.
8) Increasing the overall efficiency of the engine from **0.21 to 0.25.**
9) Drastic reduction of all the polluting elements produced by the internal combustion engine such as **Pm (10-2.5), HC, NOx, SOx, CO, (- 90%) CO2 (-16/22%).**
10) Increased motor power **(+ 1.5 Hp**) and torque (**16/20 Nm**).
11) Annual cost **50 € (50,000 km).**
12) Maintenance every year Cost **€ 50.**

Hydromoving Artificial Intelligence

- **The first intelligent hydrogen / oxygen mixture generation system**.
  These are the special features of the update on the electronic control unit of the whole HM Compact Pro Artificial Intelligence system:
  A) ModBus remote communication control Gps for the control and modification of all the parameters implemented on the new electronic board:
  B) Electronic control of the Ph of the solution (percentage control of the conductivity), alarm signal for a solution that has deteriorated.
  C) Check the number of cells installed, and activate the most suitable number of cells.
  D) Control of the functionality of each cell
  E) Control of all sensors, Pressure Main Tank, BB and Rail Injectors, Pump recirculation, Compressor pump Rail, Solenoid Valves Protection Vl1 / Vl2 / Vl3, Relay protection Electronic card power supply, Manifold pressure control.
  F) Injector connection check.
  G) CanBus Card Connection Check.
  H) Control Bluetooth card connection.
  I) Cooling fan operation check
  L) Checking the battery voltage.
  M) Checking control of gas leaks, System go in Standby
  N) Crash protection, System go off.
  O) Double electronic system pressure control (0,3 Bar) Mt and Injectors rail.
  After checking all the functions of the connected actuators and sensors devices, check if the car has the instrument panel switched on and go in Standby mode.
  When the car's engine starts , the electronic control unit starts producing the hydrogen / oxygen mixture, waits for the injectors pressure to conform to the engine revolutions and start the injection of the Hydrogen /Oxygen mixture. .
  It checks the signals of the Map / Maf / Engine load , Engine injection time , Throttle position and calibrates the opening time of the Hydrogen / Oxygen mixture injectors.
  Most Important :
  Depending on the amount of Hydrogen / Oxygen mixture required by the engine, the electronic control unit intelligently decides the activation of the number of cells(1 to 4) more suited to the engine request, in this mode it saves even more energy by reducing the current absorption .
  The Hydromoving Compact Pro Artificial Intelligence System, can inject the Hydrogen / Oxygen mixture, on internal combustion engines with turbo pressure in the manifold up to 3.5 Bar.

Special Features

1) Very small size 25 * 25 * 20 cm.
   2) Weight 9 kg.
   3) Energy consumption certified 36/40 W / hour.
   4) Energy efficiency 98 %

2) 5) Production of hydrogen / oxygen mixture on demand (from 0,3 to 4,5 ltr/min.) electronically controlled by the throttle pedal / engine load / Map / Maf / injection time of the
   internal combustion engine.
   6) Engine parameters control through Can-Bus.
   7) Bluetooth system operation parameters control.
   8) Increasing the overall efficiency of the engine from 0.21 to 0.25.
   9) Drastic reduction of all the polluting elements produced by
   the internal combustion engine such as Pm (10-2.5), HC, NOx, SOx,
   CO, (- 90%) CO2 (-16/22%).
   10) Increased motor power (+ 1.5 Hp) and torque (16/20 Nm).

VW Golf 1.400 cc petrol fitting

The new systems can also be installed inside the engine compartment

Engine van volume in which fit the hydromoving system

Engine van of Golf 1.4 Sportsvan in original configuration

hydromoving system first fitting on engine van (piping and wiring in progress)

hydromoving system preliminary integration into the engine compartment

VW Golf 1.4 fitting

improved heat exchange system for system cooling

piping details

test configuration system to measure the heat to be managed by the system

Complete system ready for calibration, measurements, oprtimizations

THANKS FOR SHARING

I am proud to inform you that on February 16th 2018 and March 16th 2018 we have graduated two engineers from the University of Bologna (Energy Engineering)

The company Hydromoving srl has as its objective **the sale of the license to use all over the world, or the sale of patents and technology** to anyone interested, including the results of the R & D (Wltp/Rde) updated to the date of purchase.

Of course all subsequent updates will be performed under the supervision of Lorenzo Errico, who will be available for a further year of activity at the buyer.

We hope that the documentation may be interesting for you.

For any info or proposal on the HM device.

Tks

Lorenzo Errico

Chairman & CEO Hydromoving srl - Italy

Contacts :

Mobile - **+ 39-331-2404681** (WA available)

Mail **info@hydromoving.com**

lorenzo.errico@gmail.com