

A new fuel support with increased  
lubrication properties:

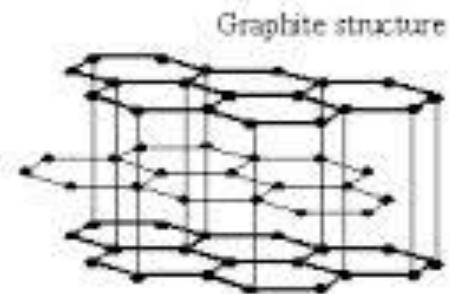
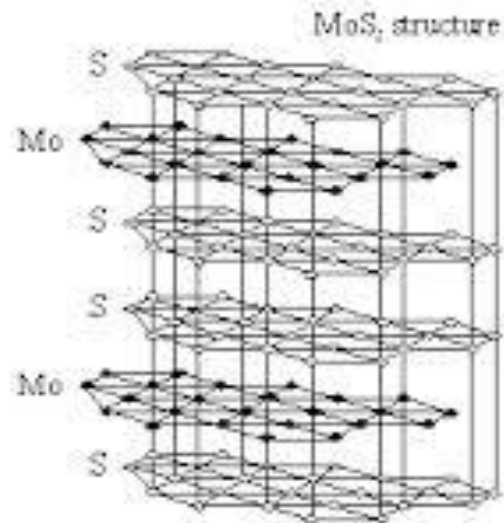
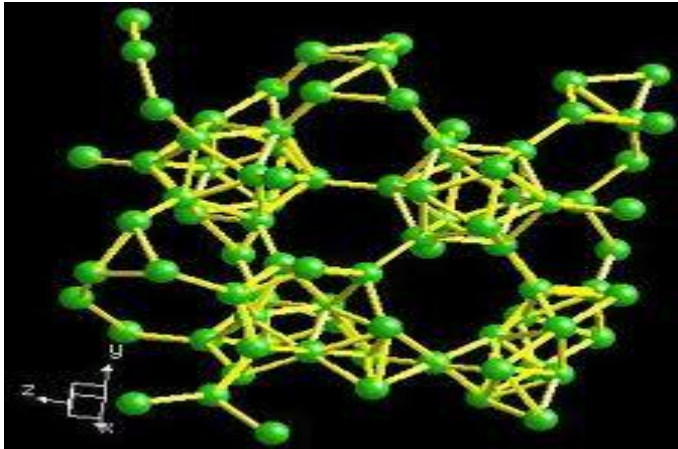
**OCTAMIX**

Prepared by :

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# Lubricants

- Lubricating compounds
- 1. Solid lubricants (Grafite, MoS<sub>2</sub>, Bor nitride)
- 2. Plasticized (creams ) lubricants (Sodium and lithium soap based )
- 3. Luquid lubricants (Raw oil based greases , synthetic greases, vegatable greases)
- 4. Gaseous lubricants



# What is lubricant?

- ⊕ Lubricants are the general name given to the special compounds which decrease the frictional forces between two materials with a very high friction coefficients. Based upon the application they are required to be resistant to temperature , corrosion and attrition)
- ⊕ They can be organic
- ⊕ and inorganic ( zincdialkylditiophosphate ,  $\text{BN}_3$  and long chain aromatic compounds )



# Tribology

- Tribology is the science investigating the lubricating properties of the compounds .
- Tribology investigates the film forming capacity of lubricants upon the surface , the resistance of the resulting film against the temperature ,the effect of the mechanical friction effects, the change of the surface shape with the lubrication, and the dissociation compounds and the conditions of the lubricants



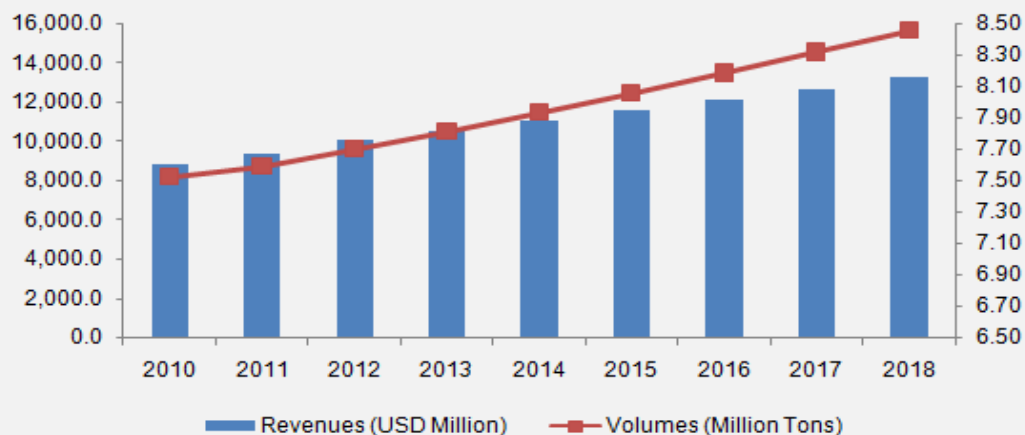
# The properties of lubricants

The organometallic compounds formed by the addition of boron, phosphorus, sulfur and nitrogen to the organic compounds of various metals are known to decrease the frictional heat between the respective surfaces and form a friction surface between them. The boron added compounds form a thin triboride film. The film formed must be equipped with the mechanical strength to resist the mechanical wear and excessive heat.

The most important boron compound used as a lubricant is the boron nitride (BN). The hexagonal structure of boron nitride forms a graphite like structure upon the electrode and decreases the friction coefficient. However BN is not soluble in grease just forms an emulsion. That is why it is used in finely grounded form. However the use of completely soluble compounds of boron will increase its lubrication capacity. That is why the synthesis and the use of completely dissolvable solutions is of great importance.

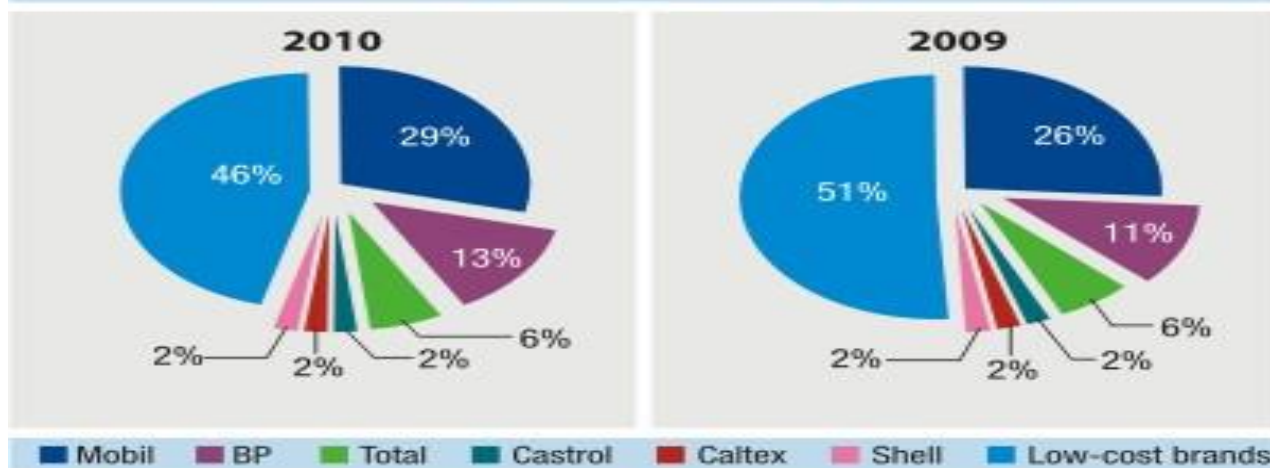
# Lubricant

**FIG. 1 NORTH AMERICA SYNTHETIC LUBRICANTS MARKET VOLUMES AND REVENUES, 2010 – 2018 (MILLION TONS) (USD MILLION)**

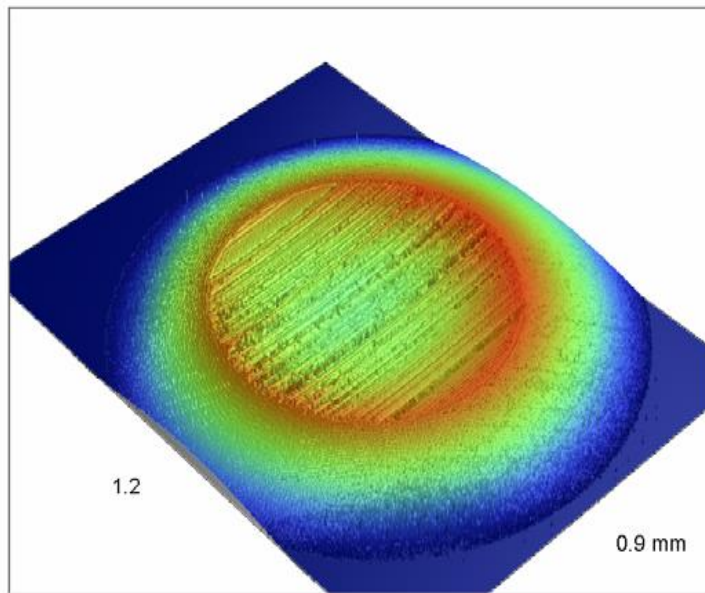


Source: ICIS, Source: ICIS, Fuchs, Lube Report Magazine, Base Oil Weekly Magazine, Petrosil Magazine, Primary Interviews, Transparency Market Research

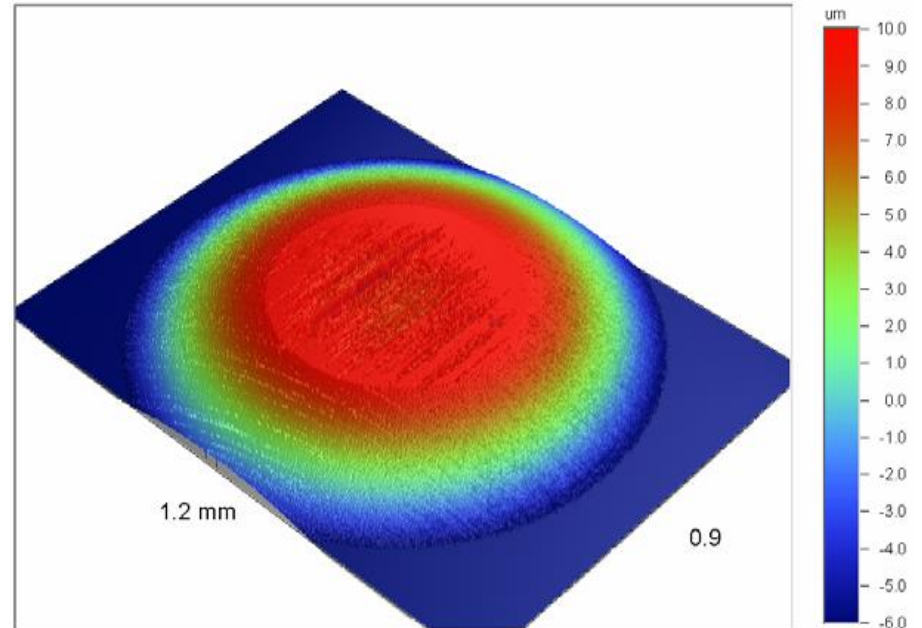
## LUBRICANT SALES: MARKET SHARE



# Lubricant effect



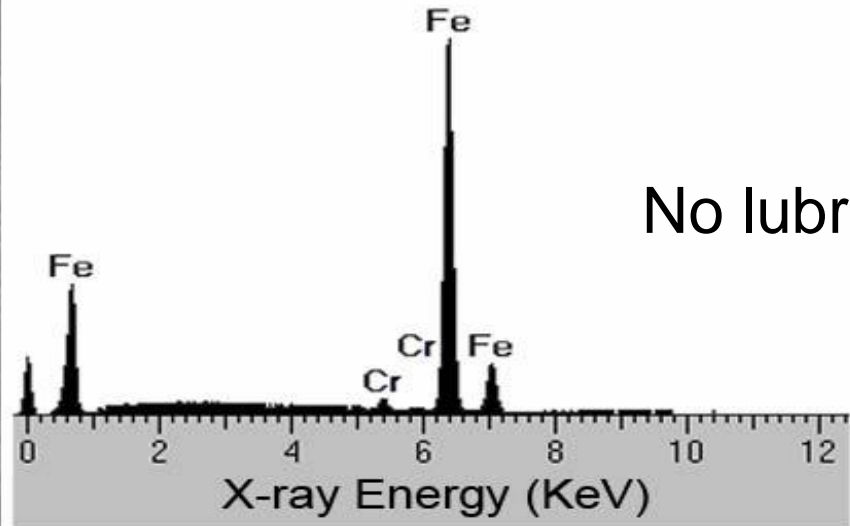
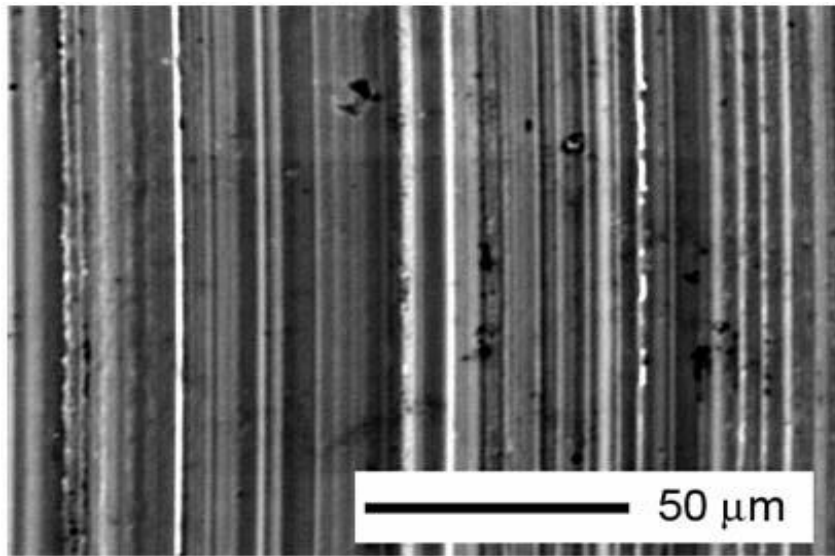
no lubricant



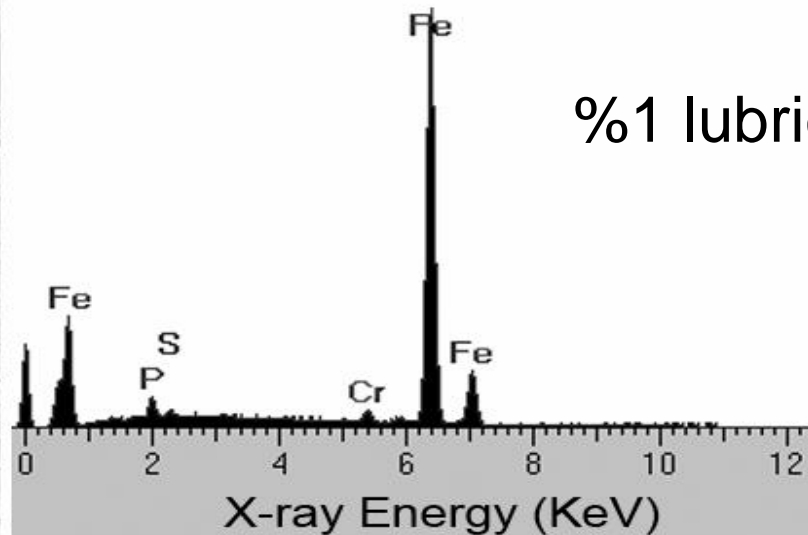
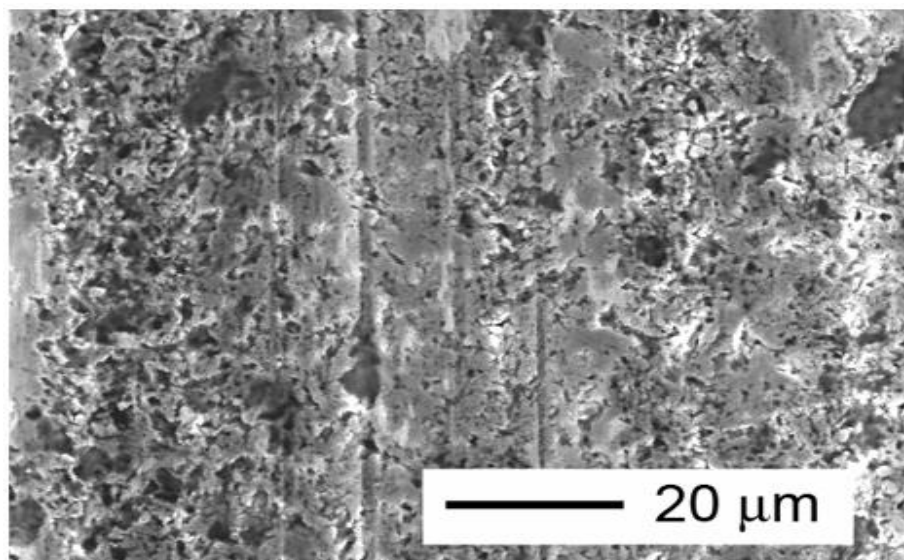
%1 lubricant



# SEM EDS Analysis



No lubricant



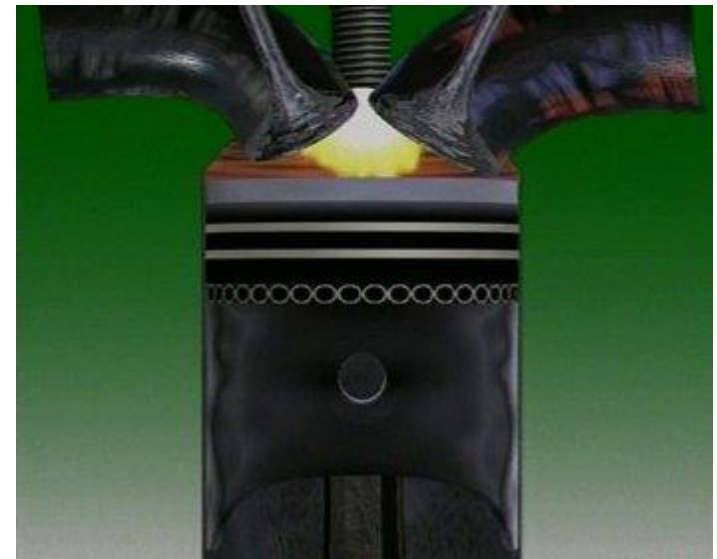
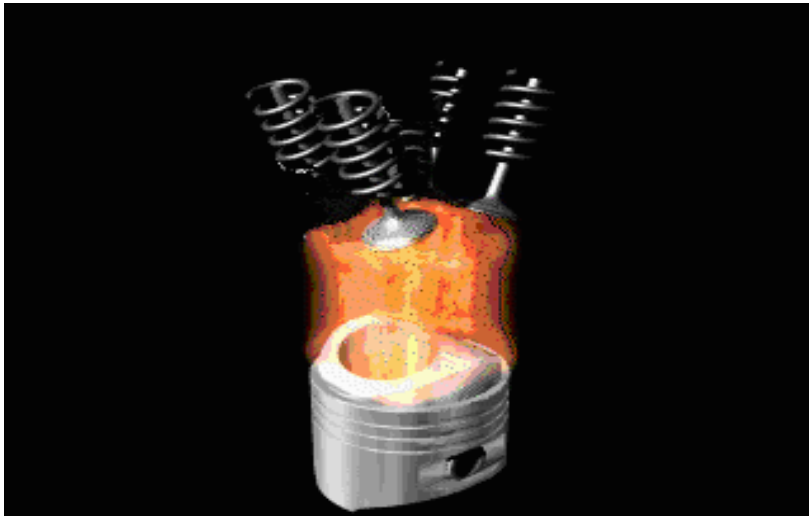
%1 lubricant



# Can the fuels also act as lubricants?

Fuels(diesel or gasoline)don't have the lubricant property but the addition of some supporting material may have them equipped with this feature .

The lubrication property give the fuel a better combustion, better heat resistance, higher energy density and formation of a film by the combustion products.



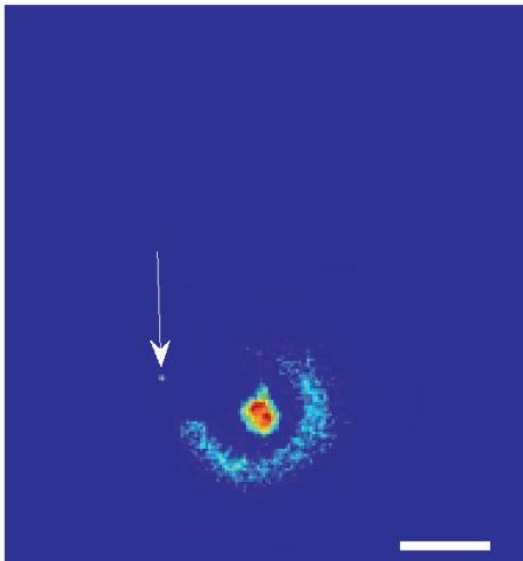
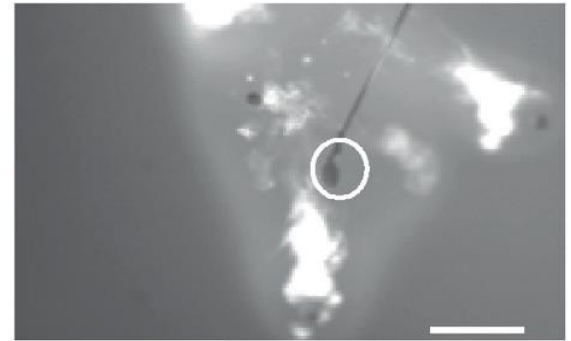
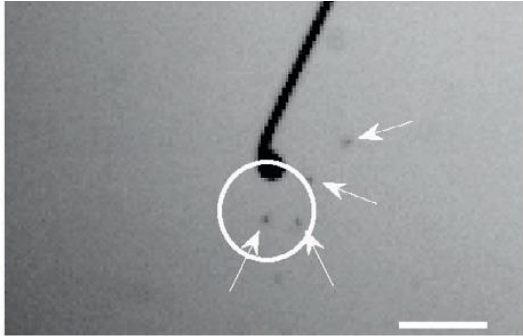
# What is the advantage of adding a lubricant to the fuel ?

- What if a compound which burns well, kinetically triggers the combustion reaction and promotes the combustion process , minimizes the resulting radiation, decreases the friction effect of the combustion product , forms a film on the surface which decreases the heat conduction
- IS SYNTHESISED ?

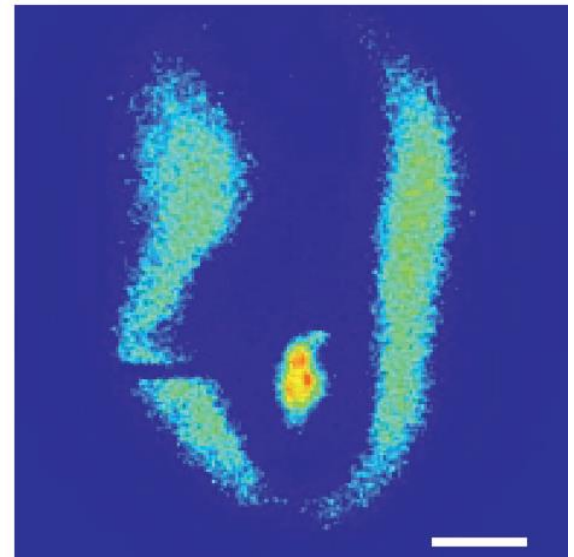


# Experimental results

## a) Combustion



1070 ms 2.0mm



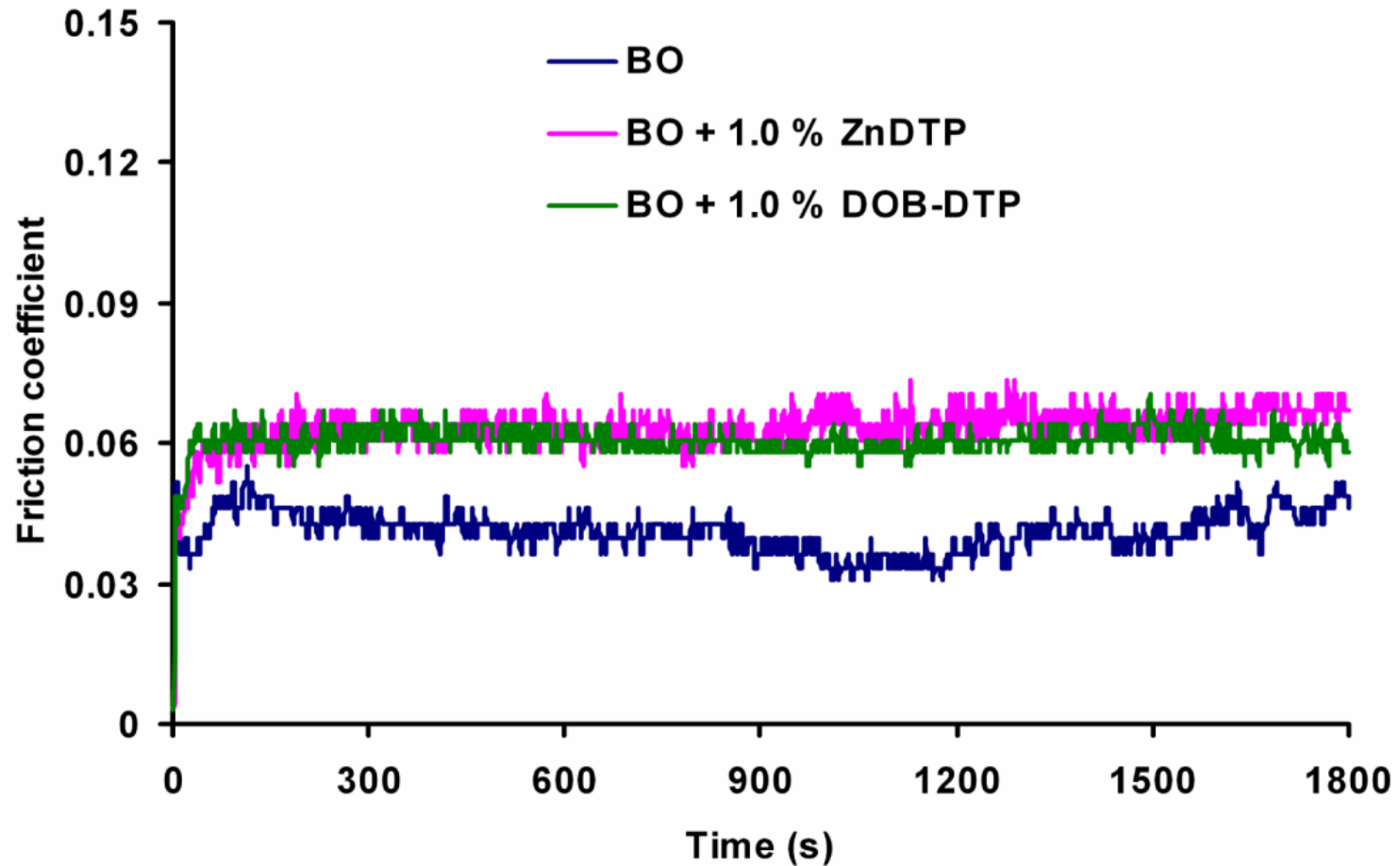
1060 ms 2.0mm

# What are the factors which promotes the combustion?

- Boron is a highly calorific fuel
- Hydrogen is a fuel which gives rapid combustion reaction
- Boron and hydrogen can be prepared in form soluble in the fuel
- This changes the kinetics of the combustion process and the better combustion promotes power

# Experimental results

## b) Friction



# OCTAMiX

- **OCTAMiX**, a fuel support material containing organobor-octyldithiofosfat derivatives. It can homogeneously distributed in the fuel injection system and participate in the combustion process when added to the fuel. It has both the friction decreasing effect and forming an active oxide film upon the surface.
- **OCTAMiX**, is easy to use and the compound was tested for prolonged times in international laboratories to verify its friction inhibition effect.
- **OCTAMiX** has been designed separately for the gasoline and diesel engines according to the number of carbon atoms in gasoline and diesel to give the maximum efficiency.



# OCTAMix

- Promotes the octane number of the fuel
- Improves the combustion and decreases the bad emissions
- Improves the motor power by %15-20
- Decreases the fuel consumption
- Prolongs the greasing period and protects the engine
- Decreases the noise of the engine and promotes the pleasant driving.

# OCTAMİX

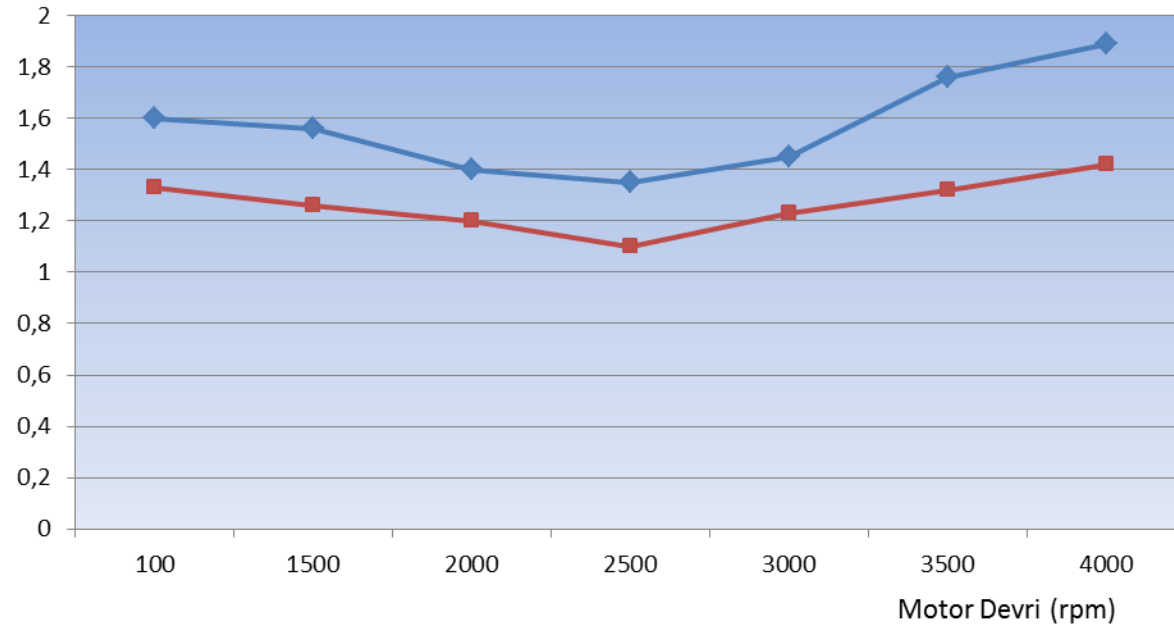
## (uygulama)

ÜRÜN	MOTOR SEÇENEĞİ	MOTOR HACMİ	KULLANIM ORANI
OCTAMİX ,D1	DİZEL	1300-2000 CC	0.33L/ DEPO
OCTAMİX,D2	DİZEL	2000-3000 CC	0,66L/ DEPO
OCTAMİX,D3	DİZEL	3000-5000 CC	1L/ DEPO
OCTAMİX ,D4	DİZEL	12 000 CC	1L/ 100 L YAKIT
OCTAMİX,D5	DİZEL	18 000 CC	2 L/ 100 I YAKIT
OCTAMİX,D6	DİZEL	25 000 CC-	3 L/ 100 L YAKIT
OCTAMİX ,B1	BENZİN	1300-2000 CC	0.33L/ DEPO
OCTAMİX,B2	BENZİN	2000-3000 CC	0,66L/ DEPO
OCTAMİX,B3	BENZİN	3000-5000 CC	1L/ DEPO
OCTAMİX ,B4	BENZİN	12 000 CC	1L/ 100 L YAKIT
OCTAMİX,B5	BENZİN	18 000 CC	2 L/ 100 I YAKIT
OCTAMİX,B6	BENZİN	25 000 CC-	3 L/ 100 L YAKIT

# Octamix

## Yakıt Tüketimi

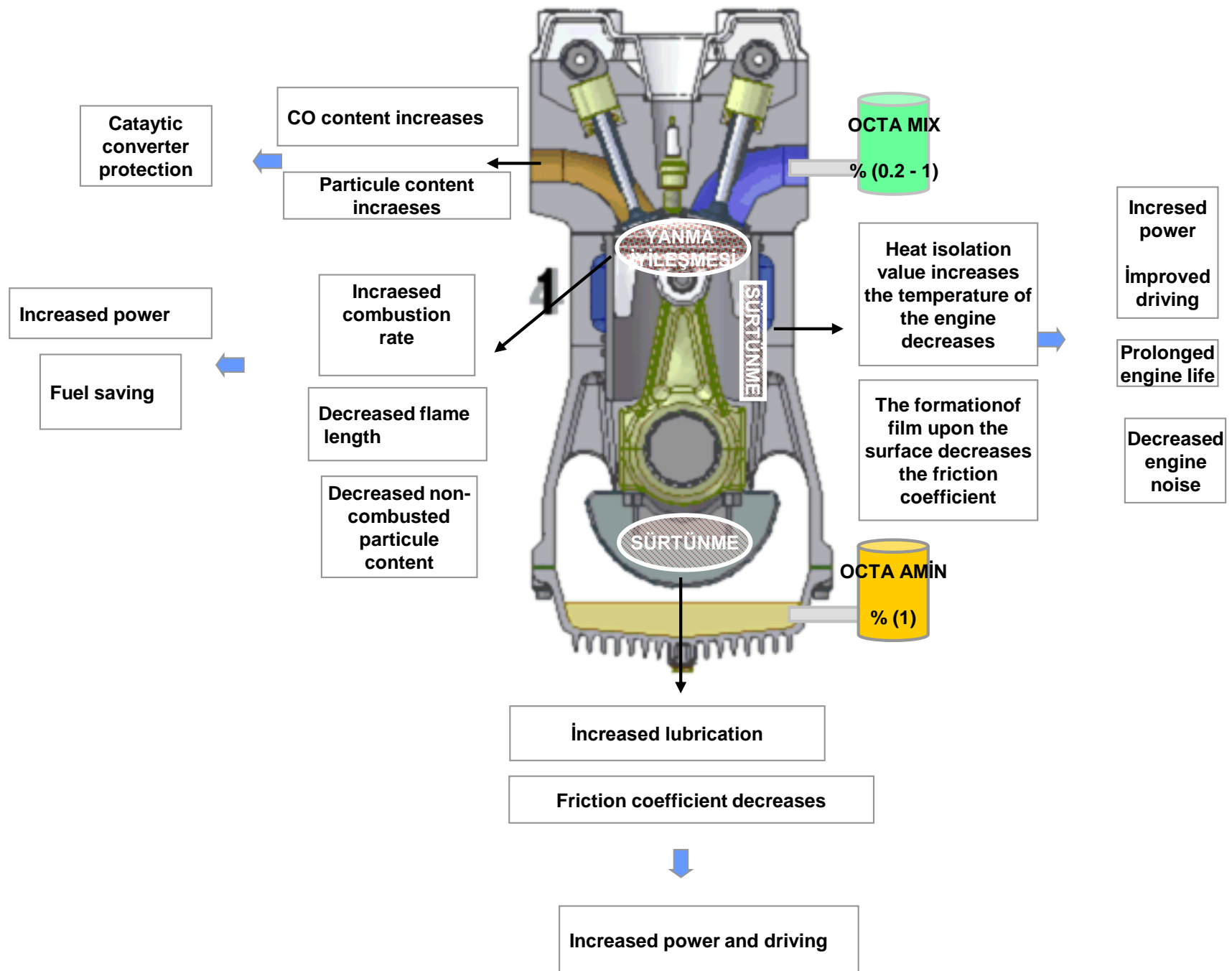
Spesifik tüketim(kg/ g-kWh)



The application of Octamix to 1600 cc motor

# Applications

- This process can be applied to all internal combustion gasoline and diesel engines (such as trucks , minibuses , buses, ships , tank and energy plants)
- Jet and turbine engines( planes, helicopters , submarines)
- There is %15 -30 saving in fuel and %20-35 increase in power



# Acknowledgments

- We are deeply thankful to Emre Ltd.Şti. for their devotion they showed throughout the study