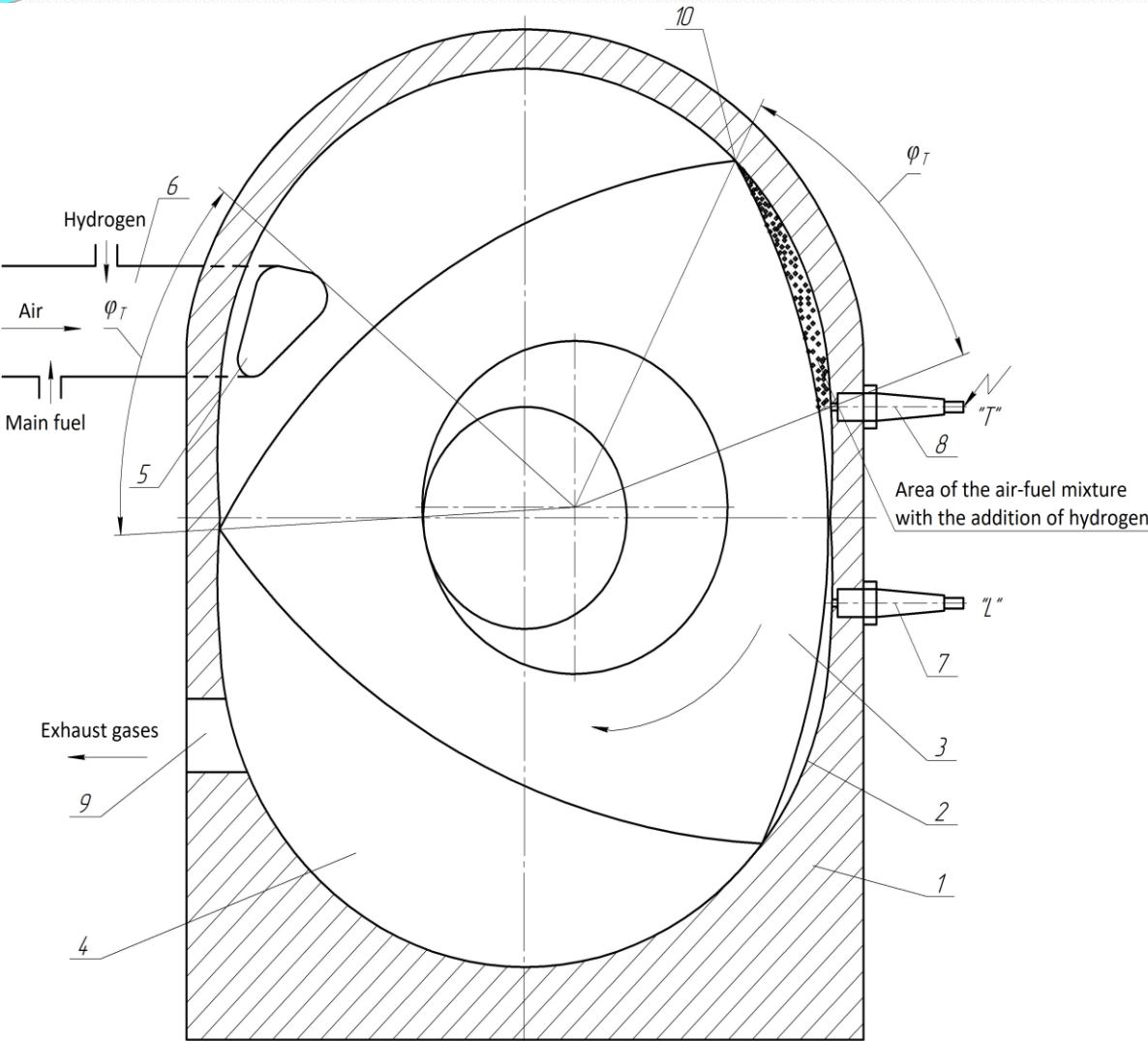


Use of phased supply of hydrogen additives for improvement the ecological characteristics of the Wankel rotary engine

E A Fedyanov, Y V Levin, E M Itkis and K V Prikhodkov

Volgograd State Technical University, Volgograd, Russia

The moment of the beginning of hydrogen supply during stratification of the air-fuel charge in the Wankel rotary engine.

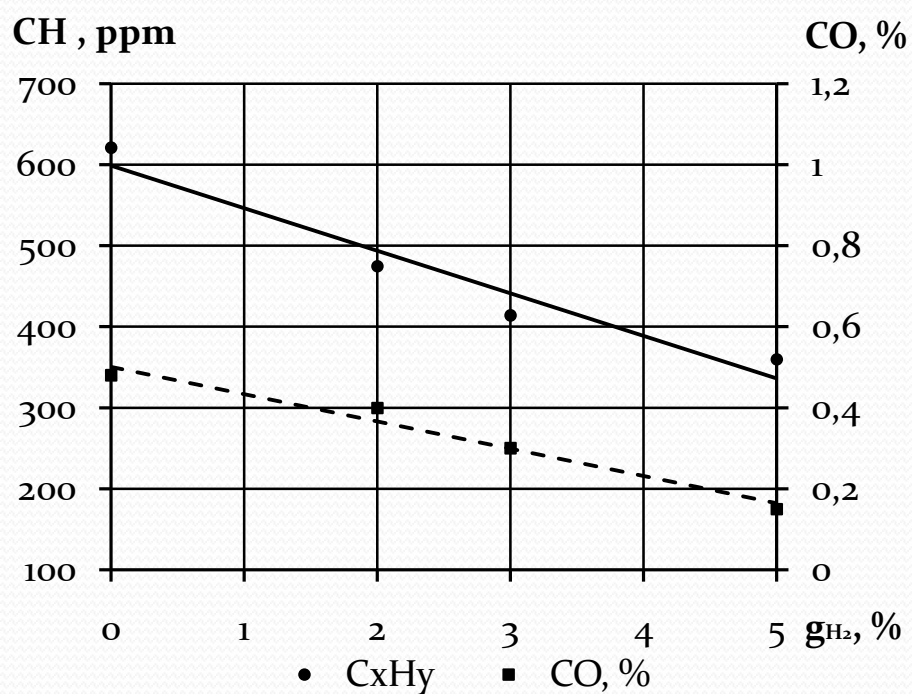


The Wankel rotary engine, designed according to Wankel's scheme, is more adaptable for running on hydrogen fuels than traditional reciprocating engines, possessing lower pre-ignition and backfire probability. Hydrogen additive to main air-fuel mixture helps to decrease incompleteness of combustion in the vicinity of rear rotor apex.

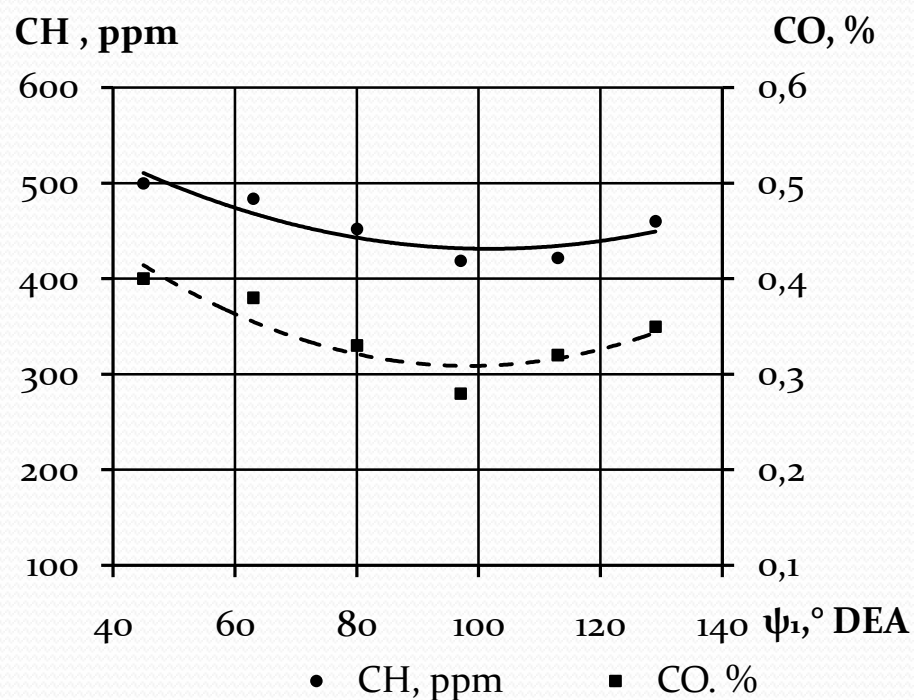
To reduce the quantity of gaseous hydrogen that provides the complete air-fuel burning it's preferable to consider the opportunity of stratification of the air-fuel mixture properties varying the value of hydrogen concentration in WRE combustion chamber volume, i.e. charge stratification.

- 1 - stator; 2 - epitrochoid surface; 3 - rotor; 4, 5, 6 - rotor tops; 7, 8, 9 - working chambers rotary engine; 10 - side inlet window; 11 - outlet window; 12 - leading spark plug "L"; 13 - top spark plug "T"

Using of small hydrogen additions to the main fuel enables to enhance the ecological characteristics of Wankel rotary engine. The addition of 2% hydrogen mass fraction to the main gasoline fuel for simultaneous injection decreases unburnt hydrocarbons emission in factor 1,2 and carbon oxides in 1.3. The phased injection of 2% hydrogen addition to the main fuel mass fraction further reduces the amount of unburnt hydrocarbons in exhaust gases by 16.2% and carbon monoxide by 30% comparing to simultaneous injection.



Relationship between the incomplete burning products quantities and the hydrogen addition for the urban driving cycle.



Relationship between the incomplete burning products quantities and the moment of supply of 2% hydrogen for the urban driving cycle