



Experimental Investigation of EGR Fluid Temperature Effect on Performance and Pollutants in S-I Engine

Y. Ajabshirchy Department of Farm Machinery, Faculty of Agriculture,
University of Tabriz, Tabriz, Iran

V. Pirouzpanah Mechanical Engineering Department Faculty of
Engineering University of Tabriz, Tabriz, Iran

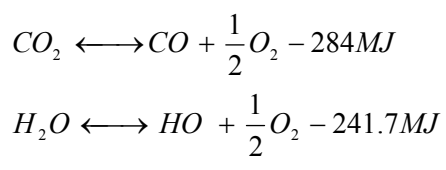
Abstract

Vehicles are one of the major source of the environment pollution, particularly the air. The safety of the human being and all other creatures would be in serious danger if the amount of pollutants in air are not controlled. Exhaust gas recirculation is one of the common methods of reducing nitrogen oxides pollutants. In this experimental research work, in order to reduce the amount of NO pollutant further, and for reducing its negative effects on engine performance, cold EGR was investigated in a 1725^{cc} spark ignited automotive engine of Iran Khodro. The engine equipped with the EGR circuit went under comprehensive test of performance and pollutant evaluation. The results of the experiments showed that the power and torque losses for the experiments in which cold EGR was used were less than that of hot EGR. Moreover the amount of NO pollutant were reduced further for the cold EGR experiments. The optimum amount and temperature of EGR under test condition were 8% and 430K respectively.

Key words: Cold EGR, NO_x reduction , Combustion in S-I engines

[]

UHC kg CO / kg CO kg
 UHC kg CO / kg CO NO_x / kg
 [] CO
 EGR CO)
 NO
 NO
) EGR []
 EGR NO ([]
 EGR
 H O CO N



S-I

[]

)

(

)

(

)

(

EGR

EGR

()

(EGR)

EGR

imep

NO

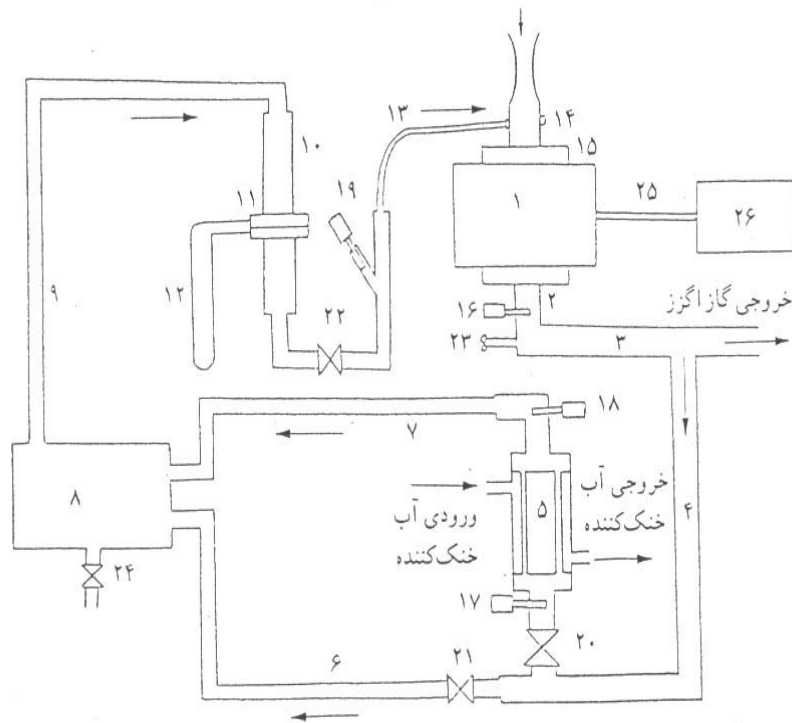
)

(

) EGR

EGR

(



EGR

EGR

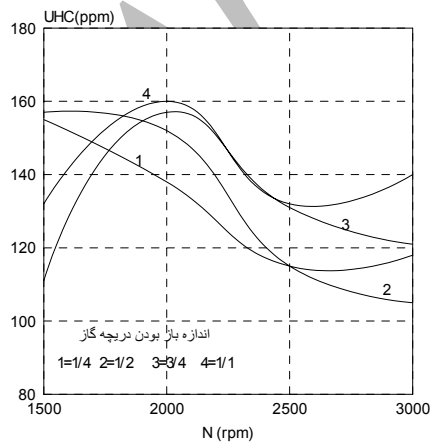
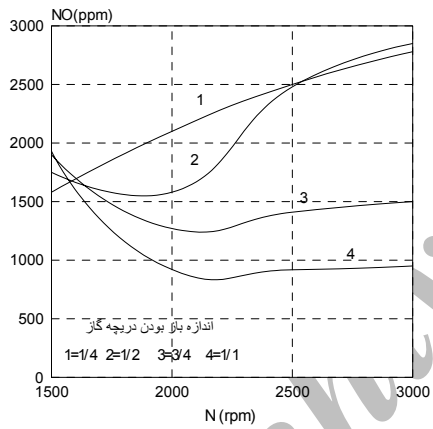
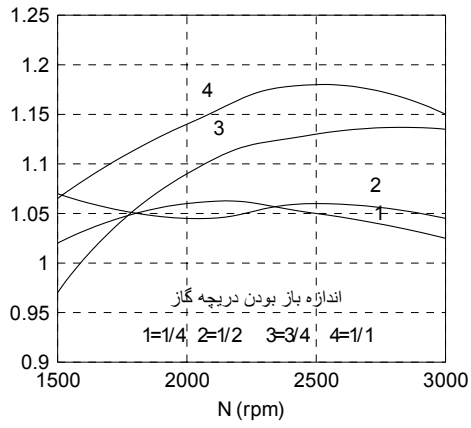
EGR

EGR

EGR

EGR

EGR



EGR

()

EGR

cc

EGR

()

)

NO

()

NO

(Part-load)

NO

[]

(.)

UHC

()

UHC

)

UHC

(.

UHC

()

() ()

EGR %

EGR

(Full-load)

rpm

EGR

()

()

EGR

EGR %

EGR

(EGR

%)

)

%

%

EGR

%

%

EGR

-

EGR

/

NO

rpm

UHC

() ()

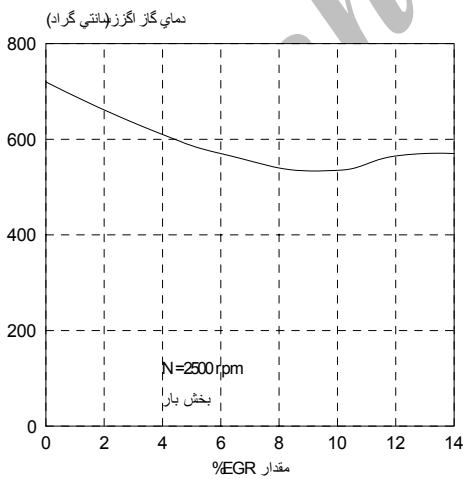
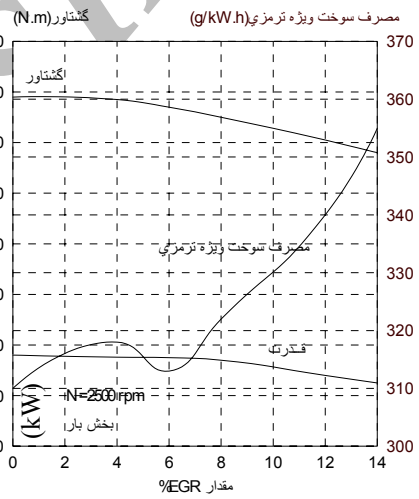
EGR

NO

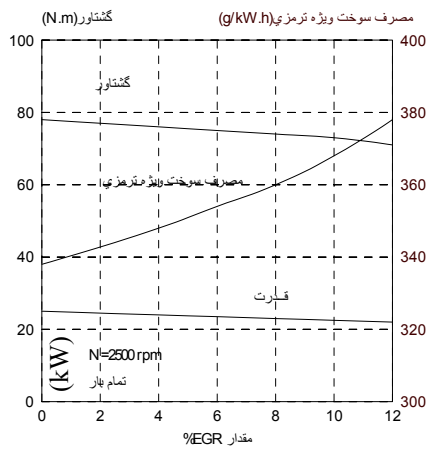
EGR

UHC

[]



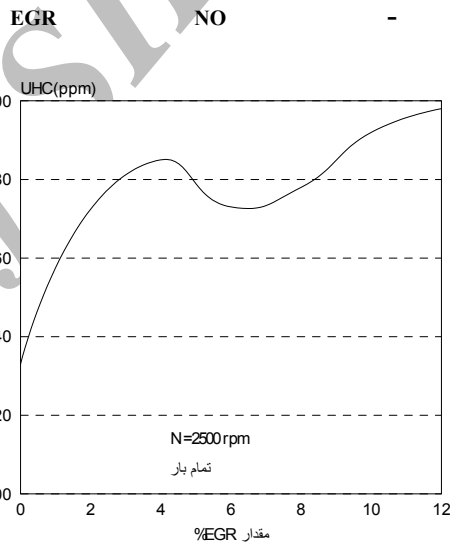
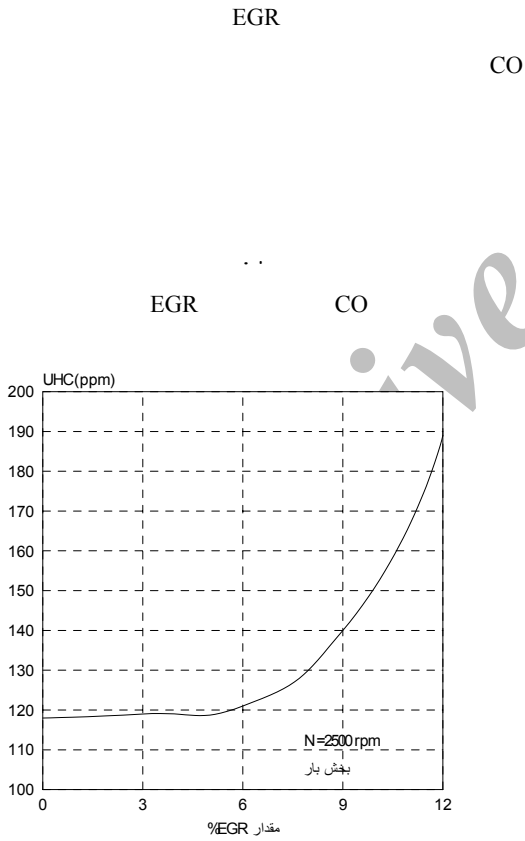
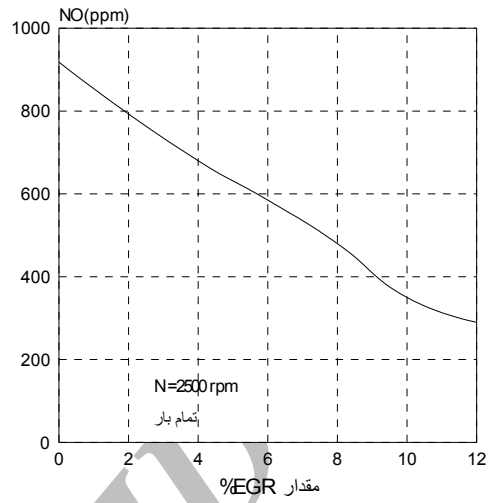
EGR



EGR

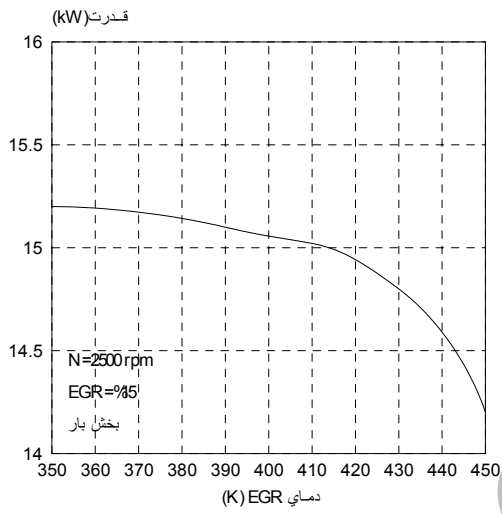
EGR

() UHC ()
 EGR rpm
 UHC EGR
 CO
 CO EGR
 []

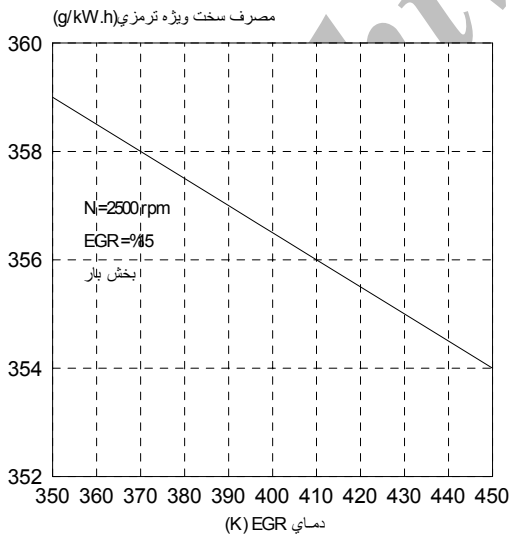


EGR
 EGR
 ()
 NO EGR
 () NO ()
 EGR
 EGR
 () NO ()
 EGR

()
 EGR
 K K EGR
 % /



EGR



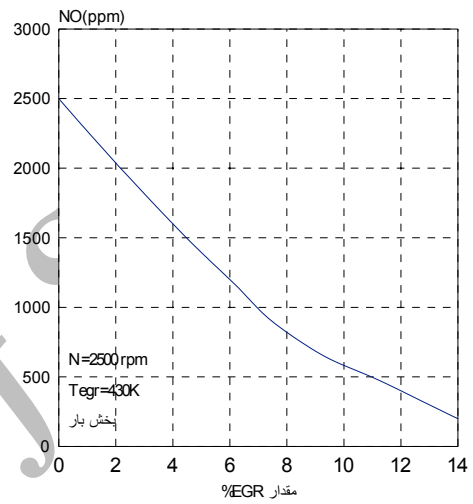
EGR

EGR

UHC

K

NO EGR %
 NO %
 []
 ppm NO
 K



EGR

NO

-

(PM)

EGR

()

K

EGR %

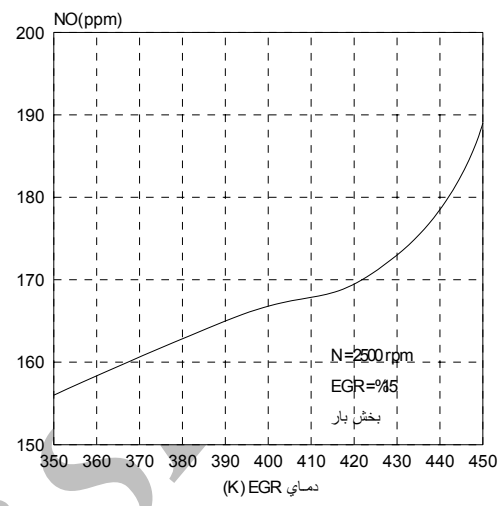
%

K

EGR

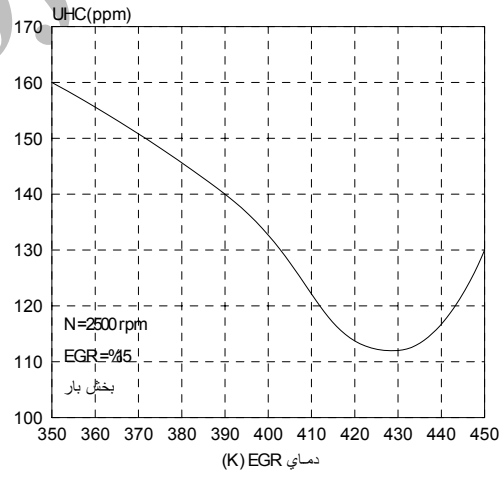
EGR

EGR
EGR
cc
%
K
bsfc (gr/kW.h)
EGR
MBT
N(rpm)
NO_x
T_{egr}(K)
UHC
λ



EGR NO -

() ()
cc
/ (mm)
/ (mm)
(cm)
/
rpm



EGR

Go Power

DA-316

EGR

S-I

TE-90

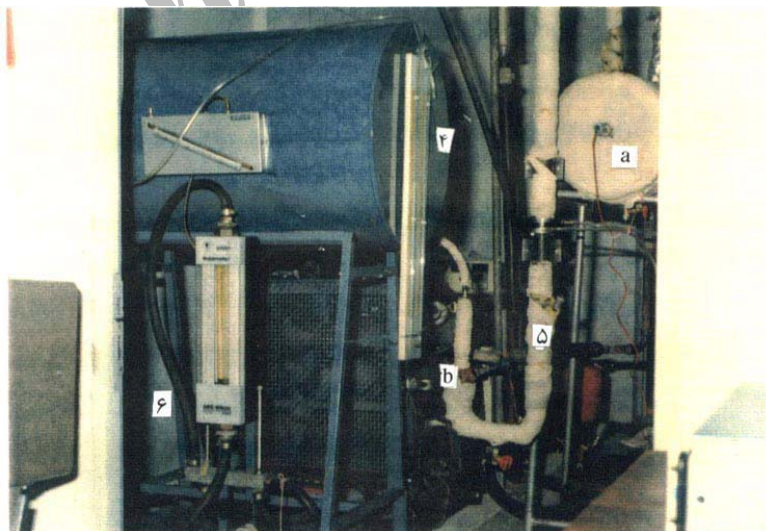
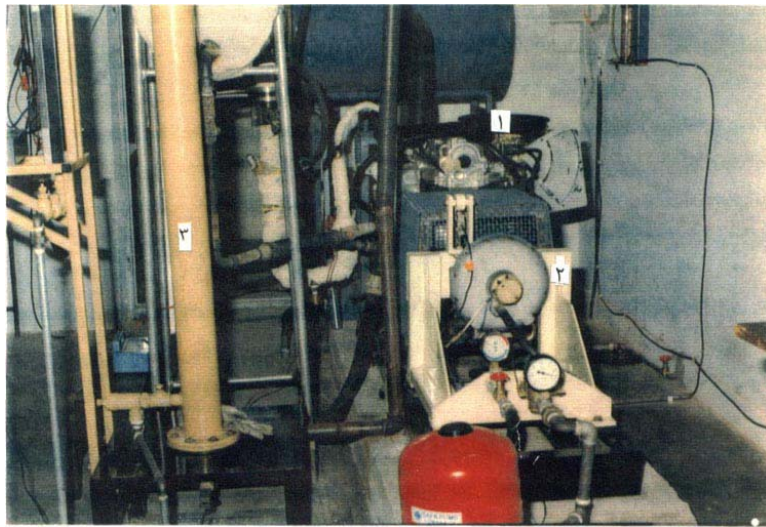
EGR

EGR -

NO

EGR

VM-4000	Signal	-	-
	NO NO		
	.CLD		EGR -
P8333	Cussons	-	-
.FID NDIR	UHC CO		-



- (b a) EGR -

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