

EFFECT OF DENSITY OF FUELS ON THE OPERATIONAL AND ECOLOGICAL  
CHARACTERISTICS OF MOTOR VEHICLES

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*Key words: density of fuel; operational and ecological characteristics of motor vehicles; oil refining; fuel additives*

[1].

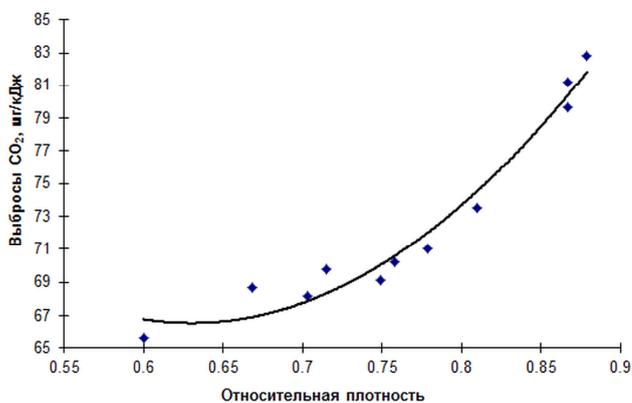
1

	300 900 , /	/ <sup>2</sup> ,
	47001	63,8
-	46333	65,5
-	46189	65,7
-	45953	66,5
-	45841	66,7
-	45691	67,2
3-	45645	67,3
-	45363	68,1
-	45225	68,3
- -1	45528	69,0
- -1	45087	69,7
	44723	70,3
	44361	70,8
	44293	70,0
	40909	82,7
	41300	81,1
	41707	79,6
	41972	78,0

1  
300 ,  
900 , [2].  
23 % ,

(63,8 – 70,8 / ),  
C<sub>6</sub> – 10 – 82,7–78,0 / .

( . 1).



. 1.

2

( 2).

0,2 %)

[3]

$$Q = 49907 - 8552 \rho_4^{20} , / . \quad (1)$$

	/	, /
	21486	64,0
	31655	69,5
	34611	68,7
-	33677	70,7
- -	35838	69,7

[2]

$$\rho_4^{20} \rho_{15}^{15} \text{ c} \quad (2)$$

$$\rho_{15}^{15} \approx \rho_4^{20} + 0.0035 \quad [4]$$

$$Q = 49936,9 - 8552 \rho_{15}^{15}, \quad / \quad (2)$$

(3) [5]

$$= 74 + 15 \rho_{15}^{15}, \% \quad (3)$$

 $W_{CO_2}$ 

$$W_{CO_2} = 0,01 \cdot (74 + 15 \rho_{15}^{15}) \cdot \frac{44}{12} = 0,55 \cdot (4,93 + \rho_{15}^{15}), \quad / \quad (4)$$

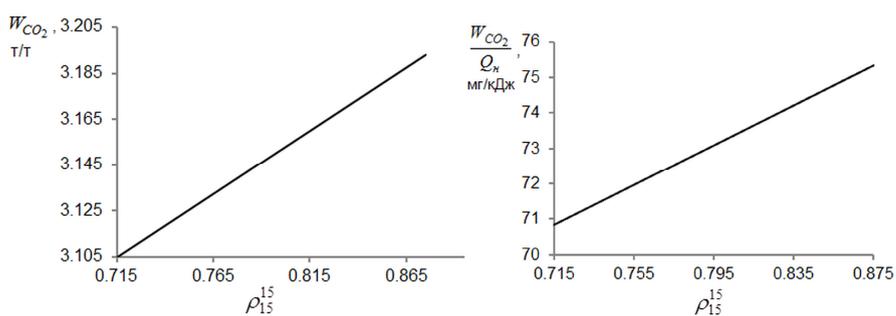
$$\frac{W_{CO_2}}{Q} = 64,31 \frac{4,93 + \rho_{15}^{15}}{5,83 - \rho_{15}^{15}}, \quad / \quad (5)$$

. 2 ( ), ( )

 $\frac{W_{CO_2}}{Q}$  $W_{CO_2}$ 

Q

).



. 2.

$$(a) W_{CO_2} = f(\rho_{15}^{15}); \quad (b) \frac{W_{CO_2}}{Q} = f(\rho_{15}^{15})$$

[6–10],



$$\Delta T = \frac{Q}{\sum m_i c_i} = \frac{613n - 103x}{(287n - 53,5x) \cdot 10^{-3}} = 2135 \frac{n - 0,168x}{n - 0,186x}, \quad (6)$$

$m_i$  —

[11] [12],

(900 ),

$$2 + 2 = 2 + 566, \quad (7)$$

$$N_2 + O_2 = 2NO - 181 / . \quad (8)$$



$$\frac{900}{632} \approx 10^{33} [2],$$

$$\left( \frac{2750}{632} \approx 10^{3,9}, \right) [13]$$

[14, 15],

[16, 17],

$$0,05 - 0,38 [18].$$

h,

$$DHh : D^2H/4=4H/D, \quad D = 90 \div 100 \quad h = 0,05 \div 0,38$$

$$0,2 \div 1,7 \%,$$

( ) .

[19] 90 % 182 138<sup>0</sup>  
22 %.

—  $\alpha = 1$  ( ,  $\alpha < 1$  .

( ) .

[20].

80 % ; — , , .

( ) . : , .

(  $\alpha$  )

[21]. ,

( $\alpha$ ) 26,0–28,6 ,

( 3, [22]).

3

( $\alpha$ ) (ppm)

	1,15	2,0	2,5
	28,6	429	335
	1,1	33	54
-1	1,0	32	31
	1,0	24	17

— ( $\alpha$ ) .

( $\alpha < 1$ ) [23],

[24] : : : = 8.2 : 6.6 : 4.5 : 1.0.

[25] ( : ) ;  
 < < — <  
 ( )

$$+ 2 = 2, \tag{10}$$

$$+ 2 = + 2, \tag{11}$$

$$+ 2 = 2. \tag{12}$$

[25]. 1,6 : ( , -  
 ) [H<sub>2</sub>O] : [CO<sub>2</sub>] , -  
 , , -  
 ( ) ; ( - -  
 ) . ( -  
 ) ; ( )  
 ( (10)-(12)) —  
 (10)-(12)

[26].

330–360° [27].

« », , -  
 , -  
 , 10 [20, 28].

[8, 9, 12, 29–32]

~ 6,5 <sup>2/</sup> 20<sup>0</sup>

(13), [3]:

$$= 0,85 + 0,1 - 0,2 \quad (13)$$

.%

50 % [3].

30

[33],

— 82°( 5- 6).

1,5 [7].

150–160 °C.  
150–60 °C

C:H,

[34].

[6, 12, 29–32, 35, 36].

1. EEA (European Environmental Agency), Air quality in Europe, EEA Report, 5/2014.
2. . . . ., 1985. – 464 .
3. . . . . / . . . . ., 1966. – 776 .
4. . . . ., 1989. – 9-10.
5. . . . ., 1979. – 568 .
6. . . . . – Deutschland: Saarbrücken, 2012. – 206 .
7. Magaril E. The solution to strategic problems in the oil refining industry as a factor for the sustainable development of automobile transport // WIT Transactions on Ecology and The Environment. – 2014. – Vol. 190(2). – pp. 821-832.
8. . . . ., 2008. – 160 .
9. . . . ., 2010. – 160 .
10. . . . ., 2000. – 171 .
11. . . . ., 1970. – 228-241.
12. Magaril E. The influence of carbonization elimination on the environmental safety and efficiency of vehicle operation // International Journal of Sustainable Development and Planning. – 2013. – Vol. 8(2). – pp.231-245.
13. . . . ., 1974. – 110-114.
14. . . . ., 1970. – 53-122.
15. . . . ., 1987. – 18-20.
16. . . . ., 2008. – 72-75.
17. . . . ., 2008. – 40-43.
18. . . . ., 1979. – 222 .
19. Pawlak Z. Tribochemistry of lubricating oils. – Amsterdam: Elsevier, 2003. – 382 p.
20. . . . ., 1996. – 338-339.
21. Ravindra K., Sokhi R. & Van Grieken R. Atmospheric polycyclic aromatic hydrocarbons: source attribution, emission factors and regulation // Atmos Environ. – 2008. – Vol.42 (13). – pp. 2895-2921.
22. . . . ., 1996. – 81-82.
23. . . . ., 1972. – 40-45.

