



$$200 - 300 \quad , \quad , \quad - 4 - 6 \quad ,$$

$$- 20 - 75 \quad , \quad , \quad ($$

$$), \quad ).$$

1.3.

1.4.

(N ) ,

1.5.

2.

3.

- :
- ( / );
- , /;
- , /;
- , .

4.

) V

$$, V = \sum \frac{V_i}{n}$$

„ ”.

) V

$$V = k \cdot V \tag{1}$$

$k = 1,7 \div 3$  (  $k = 2$  ) -

$$V = 4 \div 6 \quad / \quad V \quad V = 8 \quad / ,$$

$k = 1,3 \div 2$ .

$$1 \div 3 \quad / \quad V$$

$$V = (1,4 \div 1,6) \cdot V .$$

---


$$V > 8$$

$$V = 2,5 \cdot V$$

)

( 10 ),

V

$$V = V \cdot \left( \frac{h}{h_1} \right)^{\frac{1}{5}} \quad (2)$$

V - h;

V - h<sub>1</sub>.

- 10 - 70 .

5.

,

$$V^A = V \quad (3)$$

V<sup>A</sup>

$$N^A = N \quad (4)$$

$$Q = Q ;$$

$$N^A \ll N \quad Q \ll Q \quad (5)$$

---

$Q$  ( )  $Q$  ,

$$n = \frac{N}{N} \quad n = \frac{Q}{Q} \quad (6)$$

$n.$

6.  
6.1.

$$Q = 0,000481 \cdot D^2 \cdot \eta \cdot \eta \cdot \sum V_{pi}^3 \cdot \xi \cdot \tau_p \quad (7)$$

$D$  - ;  
 $\eta = 0,9 \div 0,92$  (0,9) - ;

$\eta = 0,92 \div 0,95$  (0,94) - ;

$V_{pi}^3$  - ;

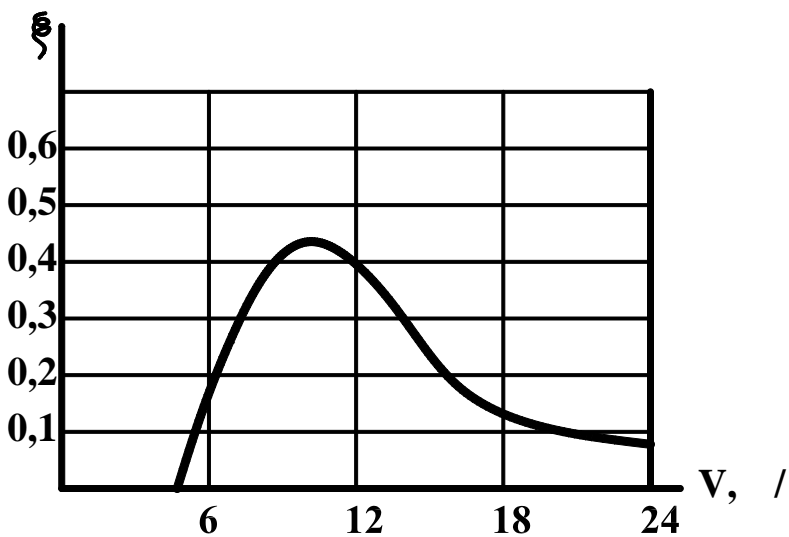
$\tau_p$  - , ( )

$V$  , ,

$V$

$\tau = \tau + \tau.$

$\xi$  - , .1



1.

2.

$N, V$

$$N = f(V)$$

$$E_{\Sigma} = N_{V_1} \cdot \tau_{V_1} + N_{V_2} \cdot \tau_{V_2} + \dots + N_V \cdot \tau_V$$

$$E_{\Sigma} = (N_{V_1} \cdot \tau_{V_1} + N_{V_2} \cdot \tau_{V_2} + \dots + N_V \cdot \tau_V) \cdot \dots$$

(8)

$N_{V_1}, N_{V_2}, N_V$  -

$V_1, V_2, V_p$ ;

$\tau_{V_1}, \tau_{V_2}$  -

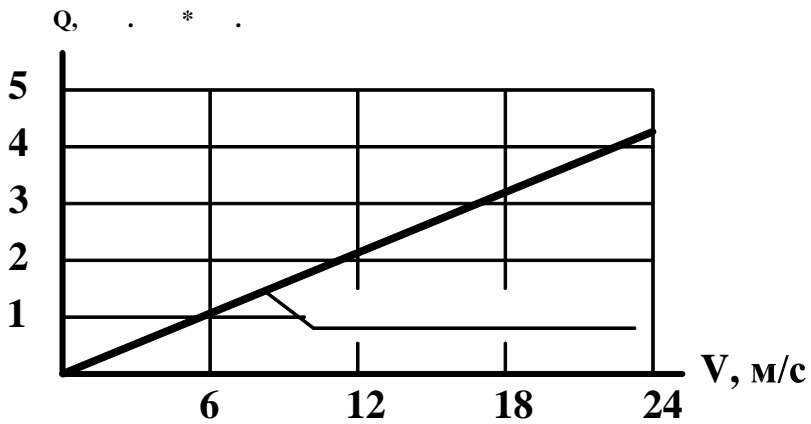
$V_1, V_2, V_p$ ;

$\tau_V$  -

;

$T$  -

7.



. 2.

8.

8.1.

( ) ;

— , , ( ) ;

— “ ” ;

— ;

— ;

— ;

— ;

— 100 ; 50 —

8.2.

— ( ) ( ) .

$N = k \cdot N$  (9)

$$k = 1,05 \div 1,1 -$$

$$N = N \cdot \eta \quad (10)$$

$$N - \quad ( \quad ) \quad ;$$

$$\eta = 0,98 -$$

$$Q = \eta \cdot Q \quad (11)$$

$$\eta - \quad ;$$

$$Q -$$

1. . . . . - 2 - , . . . . .  
 . . . . . - 1983.
2. . . . . " . . . . .  
 . . . . . : , 1987.
3. . . . .  
 - : , 1992.
4. . . . . - 500.  
 . . . . . 2.  
 , 1997.
5. . . . . 2000 - 2010 . / ,  
 " " - - , 2000.
6. . . . . 2 - " . . . . .  
 . 1983.
7. . . . . " . . . . .  
 . " . . . . .  
 . //
8. . - : , 2005. - 6. . 50-53.  
 . . . . .  
 . // . . . . .  
 ; . 37. - - :  
 , 2006. - . 506 - 509.