



12.3.047—  
2012



12.3.047—2012

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Федеральное агентство  
по техническому регулированию  
и метрологии

Федеральное агентство  
по техническому регулированию  
и метрологии

Федеральное агентство  
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и метрологии



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 Z , 3; .1; 1. ~3.  

$$V_0(l^* 0.00366 ) \quad (-2)$$

$V_0$  / — , ~1; 22.413 3 1; .  
 61\* ; ^ -  
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$$^{100} \quad \text{'>+4. 4|} \quad ( )$$

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tea	2
	1.0
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,	0

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$$= \frac{Z}{1} \quad (-4)$$

$W_0$  — , \*1:  
 • 1 • ~1 ( , 1,01 \* 10 . '1 \* '1);  
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	> >	6
	0.100 000 0.050 000 0.010 000 0.003 000 0.001 000 0.000 001	1.29 1.38 1.53 1.63 1.70 2.04
	0.100 000 0.050 000 0.010 000 0.003 000 0.001 000 0.000 001	1.29 1.37 1.52 1.62 1.70 2.03
-	0.100 000 0.050 000 0.010 000 0.003 000 0.001 000 0.000 001	1.19 1.25 1.35 1.41 1.46 1.68
-	0.100 000 0.050 000 0.010 000 0.003 000 0.001 000 0.000 001	1.21 1.27 1.38 1.45 1.51 1.75

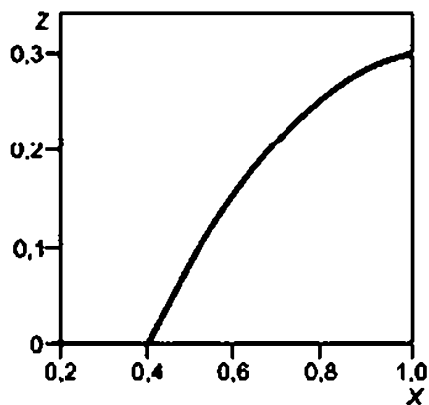


Рисунок А.1 — Зависимость коэффициента Z от X

$Q\{C>U\}$   
 $0( > ).$  0.05.  
 .24 Z  
 X , .1.  
 $X = \frac{\hat{\phantom{x}}}{1. >}$  ( .12)  
 \* = < ;  
 < — , 1.9.

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[4].

$$= 1 \quad (.13)$$

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m.

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$$I = ( * ) \quad (.14)$$

$V_f$

$$= 0.01 \quad (.15)$$

$V$

$$V_i = V_n \quad V_{2i} \quad (.16)$$

$V_{2v}$

$$V_u = qT \quad (.17)$$

$q$

.12. ;

$$3, = 0.01 \quad ( , L, * | ^ + \dots rIX \rangle ) \quad (.18)$$

$r_{1,2} \dots$

$L_{1,2}$  .27

rv m.

$$nw > \quad (.19)$$

$m_p$

$0^*$

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$$I = WF_m T. \quad (.20)$$

W—  
—

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\_2.9

W, • \*1 \*2,

.1.2.

W

$$W = 10^{-6} ijM \quad (.21)$$

1 .

q

*1	) * .				
	10	15	20	30	3S
0	1.0	1.0	1.0	1.0	1.0
0.1	3.0	2.6	2.4	1.8	1.6
0.2	4.6	3.6	3.5	2.4	2.3
0.5	6.6	5.7	5.4	3.6	3.2
1.0	10.0	8.7	7.7	5.6	4.6

.2.10

$$-0.024 \quad (.22)$$

\*1 ~;

$\frac{19,173 \cdot 10^3}{2}$

Lmc\*\* ( \* + +2732f ' )

o—

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(/(<).

1.1 « . ( .4). Z

$$Z = 0.5F, \tag{.24}$$

F—

F=1.

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21% ( .).

$$= \min \left\{ \begin{array}{l} m_{\text{aj}} \\ \frac{C_{\text{CT}} \cdot V_{\text{aa}}}{Z} \end{array} \right. \tag{.25}$$

m<sub>aj</sub> —

m<sub>ae</sub> —

V<sub>aa</sub>

$$/ = /TVu \tag{.26}$$

, = m<sub>TK</sub>

$$\tag{.27}$$

K<sub>aj</sub> —

= 0,9;

t<sub>v</sub> —  
. 4

$$" > > = * QT) \tag{.28}$$

q—

. 1.2 ( ), .

- = 0.5 —  
- = 1.0 —

350 :  
350 .

. 1.1 . 1.3.

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$$= 7 ( 1^4 ) \cdot \tag{.29}$$

0.6

0.7 —

0.9; ( ).

( 5% ) — 0.7;

/ | —

3.6  $m_i (i = 1; 2),$   $\textcircled{}$  ( . . . ).

$!^{**} , - < 1 - \textcircled{ } > \& ( = 1:2).$  ( .30)

3.7  $(i = 1; 2)$   $\sim$   $0, /3^*$   $(/? , 02 = 1).$   $/? , = 1.$   $= 0.$

$=$   $( = < 2 > .$  ( .31)

$G_{...} G^{\wedge} , -$   $F_{ij} ( ? )$   $( ? )$

3.8  $.4$

50% -	100
(	53
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, . . . )	12
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4  $( )$   $( )$  ,

$= , 2'$  ( .32)

2.1 2.2;

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2.2.  $Z = 1$  W,

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1.  $q$  ( /  $^2$  ) ( ) ( ) .  
 ( ) ( ) -  
 $Q^{\wedge}E, f=q.T$ . ( .1)  
 $E_f$  — ; /  $^2$ :  
 $F_q$  — ;  
 , .1.  
 .1 —

	/ ". d.					v/(m* )
	10	20	30	40	50	
( - )	220	180	150	130	120	0.08
	80	63	50	43	40	0,1
	60	47	35	28	25	0.06
	40	32	25	21	18	0,04

10 — 50 . 10 50 ( .  
 , ( /  $^2$  )  
 $140e^{0.12d*20} (1-0.12^*)$ . ( .2)  
 — — , 2.7. ( /  $^2$  )  
**0.4** \* —  
 '<>  
 — — . / . (  $^2^*$  );  
 $L$  — , . ^ : / (  $^2 \bullet$  ),  
 0.001 . , ( .4)  
 $Lq$  — . / .  
 — — . / (  $\bullet$  );  
 — — ;  
 — — .  
 ^  $E_f / ^*$  .





, < 1

$$L = 42 d \left( \frac{m'}{\rho_a \cdot \sqrt{g \cdot d}} \right)^{0.61} \quad (.18)$$

0

$$= \frac{Jm^1 g - 7}{I^*} \quad (.19)$$

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(9.81 / 2).  
Ytan 6

$$\cos \theta = \begin{cases} 1, & . < 1 \\ u \cdot 0.5 & .21' \end{cases} \quad (.20)$$

$$* (-7 \cdot "4 \cdot (X - 0.5 \cdot d)l \quad (.21)$$

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		*
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		4.2
1- 20—30 2- 1f—20 —40 - 15		7.0
:		17.0
1- 3—5 2- 6—8 12—16		10,5
12%) 15	(	12.9
:		17.0

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$$\dots * \dots, ( \dots ) + \dots L_i \dots \quad ( .1 )$$

—  
\*—  
L<sub>g</sub>—  
—  
—  
X<sub>w</sub>—  
»—  
8—  
8

$$5 = 1 - \frac{-C_{p,g}(T_g - T_g)}{L_g} \quad ( .2 )$$

9—  
. 1.2

$$v_a = 0.6v_a (v_0 - \dots)$$

)  
)  
)

$$\dots a, x r^2 a_2 a_3 j_i R i^{-1} * 2 \dots \left( \frac{d_r}{d_i} \right) \cdot \pi h, \quad ( . )$$

$$\dots * ( \dots * * 2 (V - \dots) ) \quad ( .4 )$$

$$d r. ( \sim f t \dots ) \quad ( .5 )$$

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\*—  
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Ri —

$$\dots ( \dots = 0.7. \dots = 1.07. \dots = 0.3 \dots ) \dots$$

$$W = ( \dots \textcircled{4} * \dots / v_j )_{j=1}^n$$

h—  
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	1		>>>0.01
	2		>>0.01
	5		>0.01
D	5		*0.01
	3		<0.01
F	2		( )

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$$* = \frac{M_a + M_g}{\left(\frac{M_a}{\rho_a} + \frac{M_g}{\rho_g}\right) \cdot \left(\frac{T_a}{T}\right)} \quad ( )$$

$$\frac{f_{**} - f^*}{f^*} < \quad ( .7)$$

= / ? ( / )

$$= \left(\frac{M_a}{\rho_a} + \frac{M_g}{\rho_g}\right) \cdot \left(\frac{T_a}{T}\right) \cdot \left(\frac{1}{\pi r(t)^2}\right) \quad ( .8)$$

.1.3

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( , . z)

$$(\dots) = (2t)^{x/a^2} \int \exp\left[-\frac{(** \sim *)}{2^2} \cdot \frac{*}{\dots} \cdot \exp\left(-\frac{z^2}{2\sigma_z^2}\right)\right] \quad ( .9)$$

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\* = 0 # - /2.14. - /1/2.14:

> 2 \* 2\_0 \* 2( , - 0); 2 = < /\_0 \* 2( - 0);

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$$\left( \frac{\varepsilon}{\dots} < 2 \right)^* \dots \left| \frac{ft^{(2)} - X}{\dots} \right| \left| \frac{V}{\dots} \right| \left| \frac{2^2}{\dots} \right| \quad ( . >$$

Q-m- ^ —

a<sub>rr</sub> a<sub>jj</sub>  
Gy. Gg —

a<sub>yr</sub> .1.3.

1  $q( / 2)$  .1.  
 2 350 / 2.  
 $F_Q$

$$F = \frac{\mathbf{E} \ll \text{---}}{4( + )} \quad (.1)$$

—  
 $O_s$  —  
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$$= 6.48 \cdot 10^{-4} \quad (.2)$$

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$$l = 0.852 \quad (. )$$

$$= \exp \{-7.0 \cdot 10^4 J r^2 - \} \quad (.4)$$

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1- 2- 3-	1.2 - 10» 2.2 - 10* 3.2 10»
— $q$ — $q f,$ $t_s$ —	. / 2; ) = $Q t_t$ . / 2; ..

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$\xi = \dots, \bullet \xi, \bullet \xi^* \dots$  , > , (-1)

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	1.03	1
	0.62	0.66
	0.44	0.82
	0.41	1
	0.30	1
	2.73	1
	0.25	
2		0.42
	1.07	0.84
	0.77	0.70
	0.77    :	
	0.7	0.45
	0.62	0.61
	0.32	0.69
	1	0.79

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seujecio		
	1	0.12
	0.56	1
	0.51	1
	1	1
	1	1
	1	0.53
	0.77	0.23
	1	0.24
	0.80	0.34
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	1.14	0.42
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$$\frac{R}{\left(\frac{E}{P_0}\right)^{1/3}} \quad (.4)$$

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):

$$\ln(PJ) = -1.124 - 1.66 \ln(\dots) + 0.260 \ln(PJ)^2 \quad (.5)$$

$$\ln(1) = ^{.4217} - 0.898 \ln(R_t) - 0.0096 \ln(\dots)^2 \quad (E.6)$$

.5. E.6  
R\_t

R\_M 0.2. , R\_t 02. 18.

$$= \dots \quad (.7)$$

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R\_t ( 1 ) / ) :

$$\dots \quad (.9)$$

$$\dot{W} = W \cdot (1 - 0.4 W) \quad \frac{0.06001}{*R?} \quad \frac{0.0025}{*R?} \quad (.10)$$



$$W = \frac{u}{C_0} \cdot \left( \frac{\sigma - 1}{\sigma} \right). \quad (.11)$$

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$R_x$   
 $f_{D1}$

$R_{\rho}^* = 0.34;$

,  $R_A < 1.$

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$$= 7^* \frac{m_j^{33}}{3} \frac{m^{\circ} J^*}{\dots} \quad (2)$$

$$= 123 \frac{\#}{\dots} \quad (3)$$

$$/ \dots \quad (4)$$

$$(- \dots) \quad (5)$$

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$$= A - igP_{, vJ} - \dots + 273.15: \quad (6)$$

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.1  $W, \wedge 2 - )$   

$$W = 1 < * I J m \dots \quad ( .1)$$

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	1  * )				
	10	15	20	30	35
0	1.0	1.0	1.0	1.0	1.0
0.1	3.0	2.6	2.4	1.	1.6
0.2	4.6	3.8	3,5	2.4	2.3
0.5	6.6	5.7	5.4	3.6	3.2
1.0	10.0	0.7	7.7	5.6	4.6

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$$<5=1- \quad ( .2)$$

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 6 < 0.35 -

$W, w( 2 \bullet )$

$( , - , )^{\circ} - \dots 1 \quad 0,035 - \text{TM} ( - , ) \quad ( . )$

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 »' — , ;  $7_0 \cdot 2/$ .



.1.11 1 t :

$$H_p = \frac{\rho}{\rho g} \quad (.5)$$

.1.11.2 / 5.

$$6 = \ln \pm (.1) \quad (.)$$

.1.11.3 .1 .15 .1

$$\begin{aligned} a \\ th \cdot a \\ = c/»nr \end{aligned} < .7)$$

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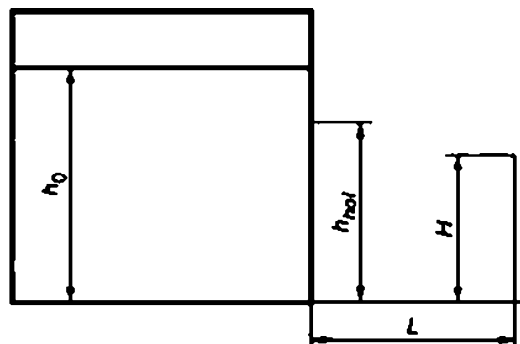
0.000	0.000	0,990	0,993	3,107	1,901	14,999	3,408
0.071	0.106	1,000	1,000	3,418	1,987	16,573	3,506
0.170	0.241	1,045	1,030	3,762	2,075	18,313	3,605
0.268	0.361	1,081	1,053	4,144	2,164	20,236	3,705
0.362	0.467	1,185	1,117	4,568	2,255	22,362	3,804
0.454	0.560	1,255	1,158	5,037	2,347	24,711	3,903
0.540	0.642	1,337	1,205	5,557	2,440	27,308	4,003
0.622	0.714	1/33	1,256	6,132	2,534	30,178	4,102
0.697	0.777	1,543	1,313	6,769	2,628	33,351	4,219
0.765	0.831	1,668	1,374	7,473	2,725	36,857	4,302
0.853	0.877	1,610	1,439	8,253	2,821	40,732	4,401
0.876	0.915	1,971	1,509	9,115	2,918	45,014	4,501
0.921	0.946	2,151	1,581	10,068	3,015	54,978	4,701
0.955	0.970	2,352	1,657	11,121	3,113	67,148	4,901
0.980	0.960	2,575	1,736	12,287	3,211	74,210	5,000
0.986	0.986	2,62	1,817	13,575	3,309		

.1.11.4 f. 3,

< .8>

.1.12 ( $r > l$ )

2.  
\_2.1



.1—

.2.2

.2.3

$$G(\omega) \quad t(\omega)$$

$$G(\omega) = G_0 \frac{1 - \omega^2}{Ar} \quad (.9)$$

$G_0$ —

$$= \{ \quad (.10)$$

—  
—  
//—  
—  
—  
 $h_0$ —

.2.4

$$h(\omega) \quad t$$

$$(\omega) = 0 \quad \frac{-0.5 \pm \sqrt{0.25 - \#}}{2} \quad (.11)$$

-2.5

$$(\omega > 0)$$

< (.2)

—  
L—

.2.6

$$(\omega)$$

$$= J_6(f) \text{rt} = G_0 \cdot \frac{2.7}{2} / \mathcal{E}^* \quad (.13)$$

—

$$(\omega)$$

.2.7

$\omega_{df}$

$$\omega_{df} = \frac{\pm Jb^1 - 4}{2} \quad (.14)$$

$$**9v \quad \frac{1}{2} \mathcal{E}^* \quad (.15)$$

$$\omega_{df} = \frac{\mathcal{E}^*}{Ar} / 2 \quad (.16)$$

$$= /1_0 - \mathcal{E} - J \quad (.17)$$

.28

$\phi_0(l)$

( ),

$z^2$

<K.t8)

.1

.2

.4

(.1)

$h_a$

$l$

(9,81 /  $l^2$ ).

(.2)

$$\frac{\partial h}{\partial x} \Big|_{\cdot} = 0;$$

(.20)

<.21)

$$\frac{\partial h}{\partial x} \Big|_{\cdot-6} = 0;$$

<.22)

$u_L$

$h$

$l > e$ .

0.

$h \epsilon a$

<.23)

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7.

$*(\wedge / -) <$

-100-5

$\bullet R$

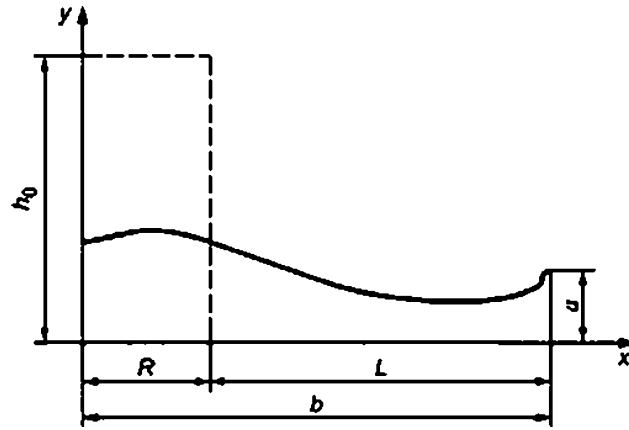
<.24)

$h_N$

6

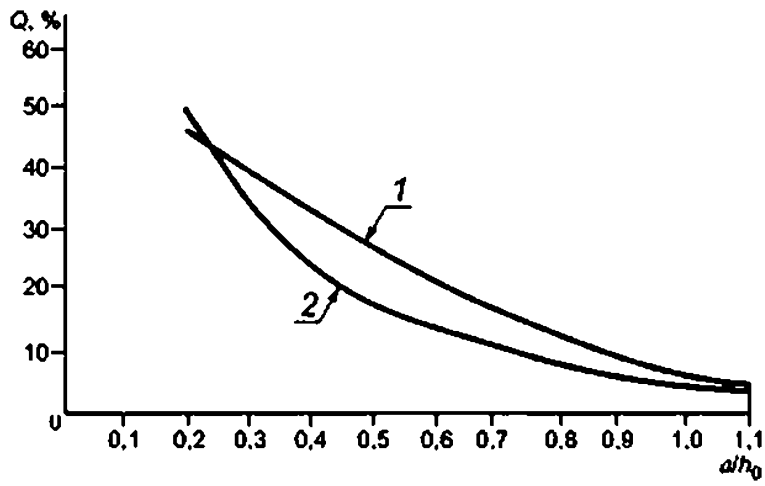
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$a/h_0$



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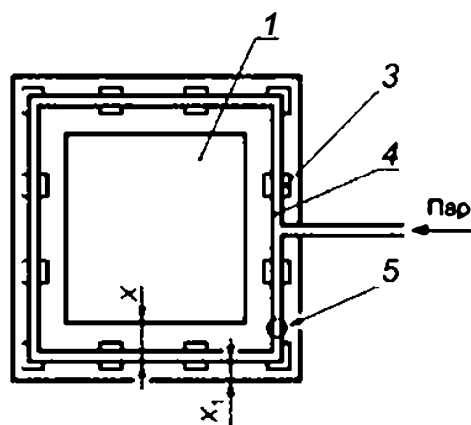
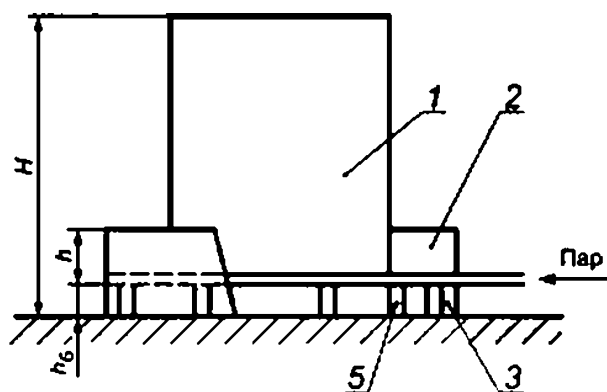
/ ^:

1— : 2—



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1— ; 2— ; 3— ; 4— ; 6—  
 h— ; X,— ; X—

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( ^ ) / (L^A) ( ) (cf)

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0.4 0.6

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(.) (W<sub>0</sub>); (.)  
 (W)<sup>0</sup>( ) /J :  
 ( ) ;  
 (/?);  
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2.1.1

X .

$$X * 0.25$$

(.1)

2.1.2

(.2)

2.1.3

${}_0W_0$  / ( <sup>2</sup>< )

$$2 \cdot \frac{K}{K-1} \left[ \left( \frac{P_2}{P_1} \right)^{\frac{2}{K}} - \left( \frac{P_2}{P_1} \right)^{\frac{K+1}{K}} \right]$$

(. )

fa—

tV<sub>0</sub>—

l—

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2.1.4

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$$= 1.3.$$

$$= 1.135).$$

d<sub>0</sub>

$$\left( \frac{P_2}{P_1} \right)^{\frac{15}{5}} \left( \frac{P_2}{P_1} \right)^{\frac{15}{5}}$$

(.4)

W<sub>a</sub>—

, / 3;  
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0^.

$$\frac{1}{0.667}$$

(.5)

2.1.5

l.

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(. )

h—

2.1.6

$$- 1,$$

(.7)



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1

10 <sup>s</sup>	%							
	3	4	S	7	6	9	10	
$W_e = 6 /$								
4	—	—	1.84	2.10	2.30	2.54	2.75	2.90
6	—	1.95	2.25	2.57	2.82	3.10	3.34	3.60
	—	2.20	2.52	2.90	3.20	3.50	3.80	4.00
10	2.10	2.50	2.85	3.16	3.60	4.00	4.30	4.60
12	2.20	2.65	3.08	3.40	3.85	4.20	4.60	4.90
15	2.42	2.90	3.86	3.82	4.25	4.60	5.00	5.35

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20 : 20	0.1 0.2

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2	0.80	0.30

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$$/20.9 \frac{X(. -}{\quad} \quad ( -2)$$

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$$\kappa_m = \frac{\rho_m}{\rho_i}$$

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S<sub>Ut</sub>— , / ;

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$X - (« ») ( 1 , /0.867 \quad 6 \frac{\pi_0 - \pi_m}{\pi_0 - 2} ) . ( .4)$

“ 2 3 — , .1.

		1*			
		9.	*		•*
0.25	10 <sup>3</sup> / ° 7	0.15	4	1.0	0.0
	200 <sup>3</sup> , 1 < *, £ 2:	0.00	0	2.0	0.0
		0.00	0	8.0	0.0
	200 \ 2 £ £ *:	0.00	0	.	1.2
		0.00	0	2.0	6.0



.1

			•	*4
0.04: t<*m<2:	10 <sup>3</sup> ;	0667		
	(	0.00 0.15	0 4	0.0 0.0

11  
200<sup>3</sup> . . . . . ( 200<sup>3</sup> . . . . . )

10<sup>3</sup> 2.5 5 10<sup>3</sup> 200<sup>3</sup> ( °667) . . . . .

.4.2 . . . . . 5:1 . . . . .

.4. . . . . ! 200<sup>3</sup> . . . . . 2; . . . . .

.4.4 ( . . . . . ) 8. FV<sup>0667</sup> . . . . . 0.025 0.25. . . . .

2 ( .4.5 10 10<sup>3</sup> 2.5 5). . . . . ( . . . . . )

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2 0.8. \* , > 2 ( - \* ) — 8 2. . . . .

.4.6 . . . . .

4 ( . . . . . FtV<sup>0667</sup> 0.015 0.035. 10 15<sup>3</sup> . . . . . )

<2. . . . .

.4.7 0.2 . . . . . 0.1 . . . . .

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.4.8

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 $10^{-3}$  ~ 15

\*=4.

4—6.

.4.9

\*=

= 0.61.

0.4 1 (

.4.10

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$$(\pi_m - 1) - \left(\frac{\lambda}{\mu F}\right)^2 \quad (.5)$$

$10^{-3}$

F

1 OUMyUHMUIOO

Hd Ip^UHIU IUldMdHn.

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X-

1.75

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/^5.

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12.1.044.

.1 .2

W ( .)

$S_{Uf}$

$$S_{v_i} = S_{v_o} \cdot \left(\frac{p}{p_o}\right)^n \cdot \left(\frac{T}{T_o}\right)^m \quad (.6)$$

£ —

7<sub>0</sub>

0.04 1.00 293 500  
 3.1 0.6  
 = -0.5 = 2.0  
 5.2 ;  $y_t$

$$\frac{1}{4\sqrt{r_{\text{ш}}}} \cdot T_t$$

$$= \dots / \dots$$

$$= \dots / \dots \quad (.7)$$

$M_t$  ; —

$$\dots^{-1} \dots \quad (.8)$$

.2 — ft. ^ ^ TM  
 298.15

	„	9.355	8.71	1.25	7,44	2200	0.31
		3.964	9.23	1.25	7,90	2240	0.32
-	^14	2.126	9.38	1.25	.	2250	0.29
-	7 16	1.842	9,40	1.25	8.05	2250	0.30
	3	4.907	9,28	1.25	7,96	2240	0.32
	3	4.386	9.34	1.24	.00	2220	0.30
		2.679	9.30	1.25	7,99	2320	0.36

.2

: 2. 20. ?, N<sub>2</sub>. . . . N. . . . 4. HCN. O<sub>2</sub>O<sub>3</sub>. . NO. NO<sub>2</sub>. NH<sub>3</sub>. HNO<sub>3</sub>. 19

$$\wedge = 4.8445/J \quad 1' \quad (.9)$$

/J—

.6 .81 12.1.044.

.6.1

10 .

$$F = \frac{CF_t}{\text{max}} \quad ( )$$

F— ( ; ) ; 2;

F<sub>s</sub>— ; 2;

12.3.047—2012

4.

1(

	05
1	0,26
2	0,30
	0,51

4—

$K_{yt}$

tea	1
0 < $K_{yt}$ £ 20	1
20 < $K_{yt}$ £ 30	2
30 < $K_{yt}$	3

6.2

4.0 / 2.

10

$$F = aV^b - (9A7K_{yt}f(0.01 P_m, , , f.)) \quad (.11)$$

$$\begin{aligned} &= 0,000571 \exp(0,0197 P^* J); \\ &= 0,978 \exp(-0,001037 J); \\ &= -0,687 \exp(0,00223 P_{\text{ш}}); \end{aligned}$$

$$K_{yt} = \frac{1}{V}$$

(.11)

$$UD < 5;$$

$$1 < V < 1000;$$

$$< \text{ш} < 200;$$

$$5 < \text{ш} < 60;$$

$$* > 5;$$

$$\sim \text{ш} > 5$$

$$95 < \text{ш} < 120.$$

LD—

12.0 / 2.

6.3



$$q_p / 2$$

$$-^* > 0^*$$

$$^* = (6s - ) ; \bullet$$

< 5 >

S—

Q« 2 «. 2.2

$$q_K \cdot \dots \frac{V^{0M7}}{q_A < q^{\wedge}}$$

( ):

7

$$4 \cdot - = 22 \text{ «}^* \text{''}$$

< .6)

$$0,15 \quad \text{£ 1.22} \quad 8\% \quad -1000^* \quad 5\%$$

$$r_{mp} = 940e^{*M \ll - JM \cdot JO^*}$$

< .7)

/—

( ) ,

$$^* \sim 6285Ajh$$

( .8)

$$\gg \ll = 32-8.1, \ll \ll \gg^*$$

( .9)

( " \mathcal{N}

/ —

( .8).

\*

$$\frac{-\dots}{\bullet IM4} = 115. (*-I \quad \vee' \quad /$$

( .10)

.23

$$TW_{man} > ^\circ$$

$$W: - \text{''} *130 \ll ? .$$

( .11)

$$8.5\% \quad \sim 980^* \quad \wedge \quad 5\%$$

$$T_{(MI)} 915e^s$$

( .12)

trm.

=

( .13)

10%

”

$$* \frac{1}{1} \cdot 1043 \left[ \frac{1}{1} \right]^{695} - e.es \left| \frac{1}{1} \right|, \quad (.14)$$

7^—  
 $T_{Wn} = \dots$   
 .24

»- "1,8α\* 44\_ ( 15)

0.155 /, < 0.8

10 %

= 250 17S < M,, - 1250^ ( .16)

0.8 < / £ 1.22  
 3.5 % 850 \* .

< « . = 35 - . ^ .0λ\*\* ( .17)

= 1.1

- Av<sub>f</sub> = 233  $\left( \frac{f}{t_{max}} \right)^{5,45}$  ( .18)

$T_{Wc} = \dots$   
 " —  
 .25

< > « „\* . / 2:  
 ) :

« " „.. = 357 < } 0,74. ( .19)

= (0.26 < j; s - . .10- < J^ 5 ↓ < λ\*\* [ ]: ( .20)

) :

0.8 > t<sub>n</sub> > 0,15

q<sub>w</sub> = 43 - 751. + 50\* ( .21)

1.22 2 /, 2 0.8

« - \*, = 15 / \*:  
 ( ) 0.8 > ^ > 0,15

q<sub>s</sub> = 65 - 1381.4 971\* ( .22)

1.22 2 / 2 0.8

\*, = 17.3 / 2;

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:

$$26-5.14? \quad ( .23)$$

( )

$$26-7^4? \quad ( \quad 2 \quad 4 \quad )$$

$$-S- = 37 ( \quad ) \quad ( .25)$$

.26

$$= 965 - 209 \quad 229.21 = + 10(4 - 30). \quad ( .26)$$

.31

V.  
ft;  
ft;  
ft;

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q

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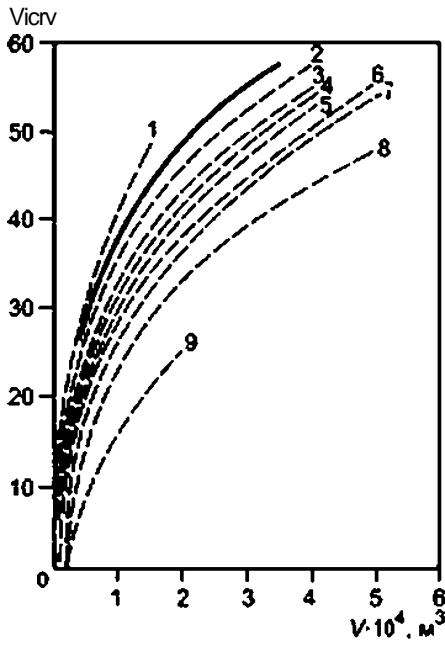
$$\left( \frac{(-) \cdot 0}{"} \right) = \left( \frac{f}{hcn} \right)^2 \quad ( .27)$$

250\* .

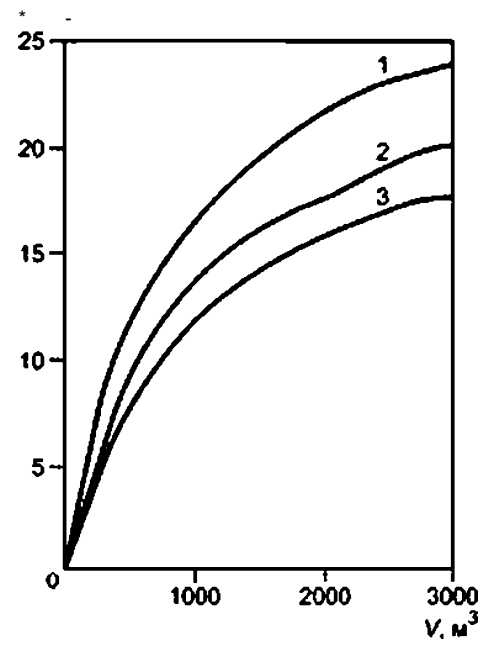


.1

( )



.1 —  
( ) V.



.2 —  
( ) V

1 — = 3 ; 2 — = , 3 — -12

$q=68-70 / ^2$  ;  
 $=4,8$  ;  
 $=6.6$  ;  
 1 — = 2.4—14 /  $^2$  ; 2 —  $q=67-119 / ^2$  ;  
 3 —  $q = 60 - 66 / ^2$  ; —  $q = 60 / ^2$  ;  
 5—9=82—156 /  $^2$  ; 6—9= 140-160  $^2$  ;  
 7 —  $Q = 200 / ^2$  ; 8 — 9 = 210— 250 /  $^2$  ;  
 9—9 = 500—550 /  $^2$

.1.1

\*\* ( ) ( , .

.1 P2

$$\left( \frac{n_{sp} Q_{H_A}^p U_{cp}^2}{(n_i Q_{H_i}^p U_{cp_i}^2)} \right)^{0.333} \quad (P.1)$$

= 1.2 / 2 . ; —

, ^ 2 • ):

OE = 13.6 / . Q<sup>p</sup><sub>Ht</sub> —

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U<sub>w</sub> - 9.9 10\*2 / . —

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$$F \xi_r ( / / )^2. \quad ( 2)$$

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(R2)

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$$n = HW^{\wedge} \quad ( 4)$$

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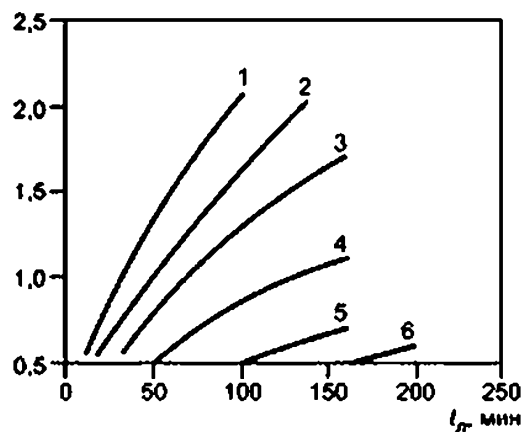
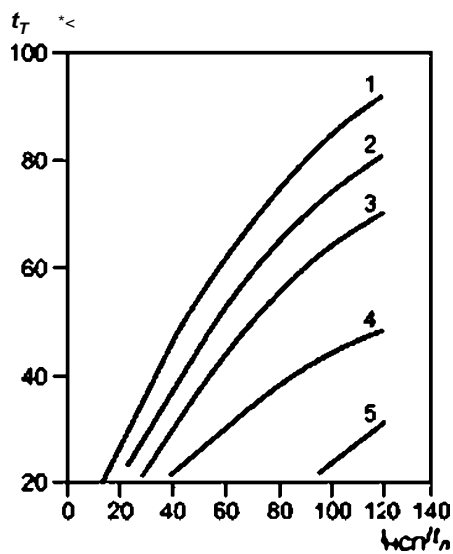
\*1

"-o/

n<sub>j</sub>

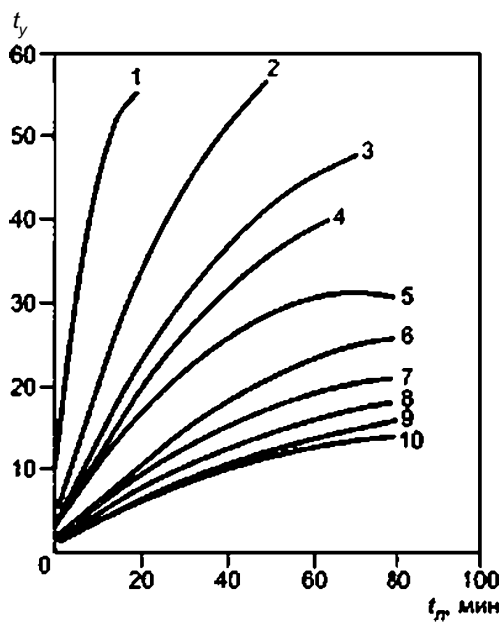
(R6)

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 f, (k. ). ( .5) ( .6)  
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 ( .4). ( . )



1  
 1 01 1 »  
 /  
 ( knl )  
 1 — HI-JF=1.2; 2—H-JF11.5; 3—HI JF=1.8;  
 4 — HIJP -2.2. 5 — HIJF=2.4

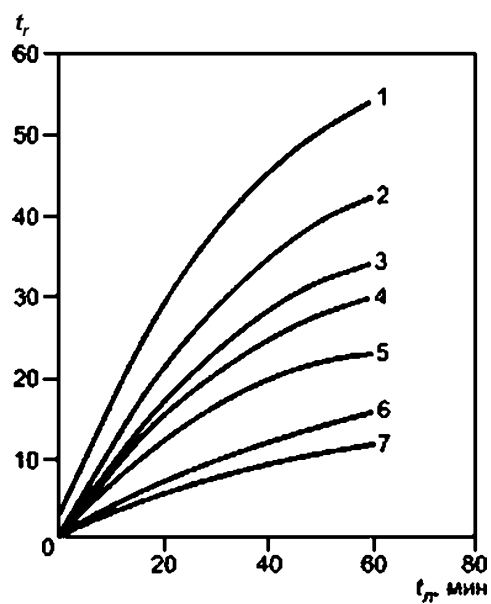
P.4 —  
 /  
 101 \* 101 1 1  
 1—HjF=1.2; 2— ^=1.5; 3 — hJF=1A;  
 4—hJf = 2.2; 5—HjF=2.4; —hJf - 3.6



5 —

$t_n$

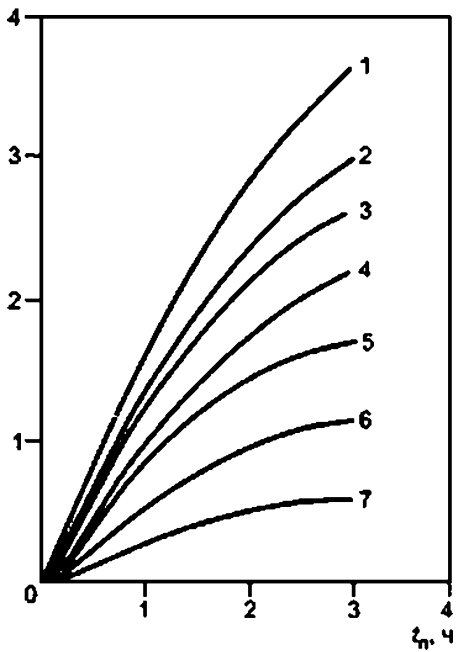
- 1 —  $HJF = 12:2$  —  $hJF = 2.0:3$  —  $H-Jf = 2.4$ ;
- 4 —  $H-Jf = 2.85:5$  —  $H-Jf = 3.2$ ; 6 —  $H-Jf = 4.0$ ;
- 7 —  $H-jF = 4.4:8$  —  $HjF = 5.2:9$  —  $hJf = 5.6$ ;
- 10 —  $hJf = 6.0$



P.6 —

$t_n$

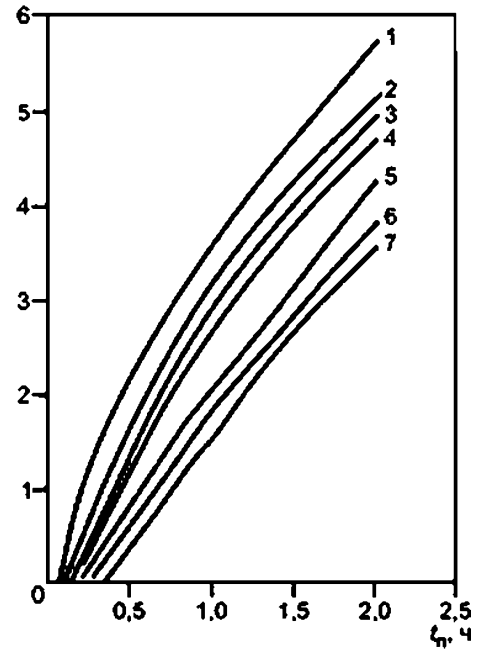
- 1 —  $HJf = 0.5$ ; 2 —  $HJf = 0.6$ ;
- 3 —  $H-JF = 0.7$ ; 4 —  $H-jF = 0.8$ ;
- 5 —  $H-JF = 1.0:8$  —  $H-Jf = 1.5$ ;
- 7 —  $H^A F = 2.0$ ;



0.7 —

/

1 —  $\sim 0,25$  ° 2 —  $= 0,20$  \* °;  
 3 —  $\tau = 0,1$  ° 5: 4 —  $\tau = 0,15$  ° 01:  
 5 —  $\tau = 0,12$  ° 5: 6 —  $\tau = 0,08$  °;  
 7 —  $\tau = 0,04$  ° 5.



0.8 —

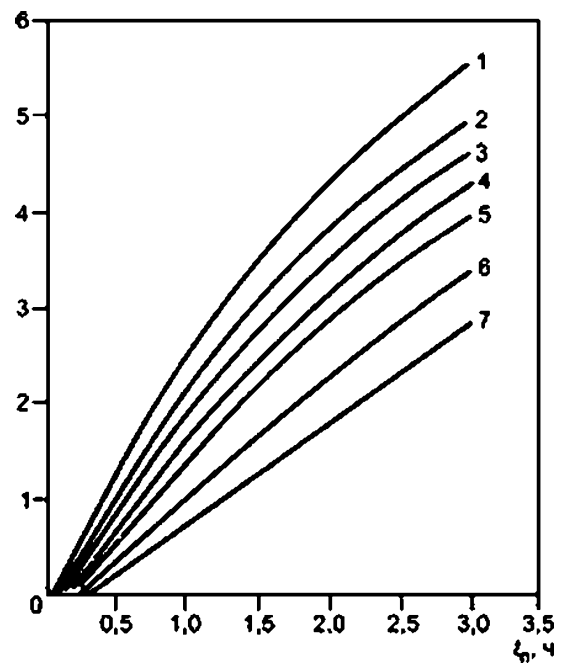
$t^*$

1 —  $\tau = 0,25$  ° 5: 2 —  $\tau = 0,20$  ° 5:  
 3 —  $\tau = 0,18$  ° 5: 4 —  $\tau = 0,15$  ° 5:  
 5 —  $\tau = 0,12$  ° \*; —  $\tau = 0,08$  °  
 7 —  $\tau = 0,04$  ° \*.

0.9 —

$l_n$

1 —  $\tau = 0,25$  ° 2 —  $\tau = 0,20$  ° 3 —  $\tau = 0,18$  ° 5;  
 4 —  $\tau = 0,15$  ° 5: 5 —  $\tau = 0,12$  ° 5: —  $\tau = 0,08$  ° 5;  
 7 —  $\tau = 0,04$  ° 5.



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.1.2

\*\*1

P.1.

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$$*P_0S(1-P_4)(1-P_{no}J$$

<R7>

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	2.65 1.89 0,60 0.60 1.53 1.89 1,53 2.24

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R\*.

		0		0	
10	-5	3.7	10	10°	2.3
Z5		4.1	2^		2.8
0.6		4.4	0.6		3.2
0.3		4.5	0.3		3.5
10	10 <sup>-4</sup>	3.1	10	10 <sup>12</sup>	1.3
2.5		3.5	2.5		2.0
0.6		3.8	0.6		2.5
0.3		4.0	0.3		2.6

.13

$$o = 0,527 \quad (0.36 \ 0). \quad ( .8)$$

R4  
S.

$$o = 5 \quad ID^{*6 \ 2/} \quad . \quad = 0.95 \quad = 0$$

4—

S.	*	,	,	,	,
1000	1.36			0.99	0.58
2500	1.52			1.14	0,75
5000	1.69			1,26	0,87
7500	1.79			1.31	0.94
10000	1.84			1.42	0.99
20000	2.03			1.47	1.10

.14

(

$Kq$

$$* = *$$

(R9)

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- [1] 22 2008 . 123- 3 « -  
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- [2] « » 21 1994 . 69-
- [3] . . .2012 .
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06.02.2014.

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« . \*23995 . . . . 4.

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