



55808—
2013



2014

- 1 - « » -
- 2 . 371 « » -
- 3 22 2013 . No 1692-
- 4

1) — « 1.0—2012 (8).
» (» , ~
» () « ~
» « -
» ,
- ,
(gost.ru)

1	.....	1
2	.....	1
3	.....	2
4	.....	2
	.....	11
	.....	21
5	.....	35
6	.....	35
7	.....	36
( )	.....	37
( )	.....	39
( )	.....	$f_{M(c)u}$
()	f_{wicw} $B_{w(ou)}$	40
( )	.....	42
( )	.....	44
	.....	47

Федеральное агентство
по техническому регулированию
и метрологии

Федеральное агентство
по техническому регулированию
и метрологии

Федеральное агентство
по техническому регулированию
и метрологии

Nondestructive testing. Ultrasonic transducers. Test methods

—2015—07—01

1

S5725 (—). 0.16 30,0
(—) * .
(-) 4.3.4.8. 4.18
55725.

2

1050-88
15130-86
2780-73
4784-97
17622-72
21488-97
51232-98
55725-2013

« », « 1 »
().

3

3.1

-

•

-

3.2

3.3

3.4

3.5

(

3.6

500
(60 1 3) ;
0.1 / .

3.7

3.9

Kf_v

3.10

3.11

3.12

4

4.1

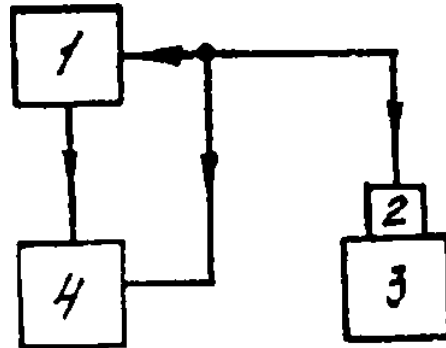
f?*)

$f_{maK(N)}$

U

4.1.1

1.



)—

:2—

;3—

:4—

1—

5.0 %.

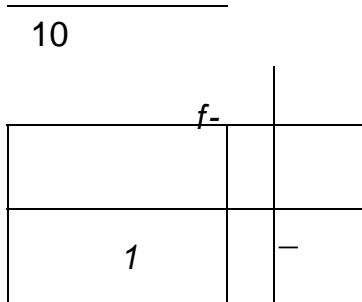
— 0.03-300 :

30.0 ;

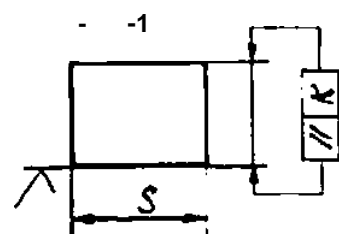
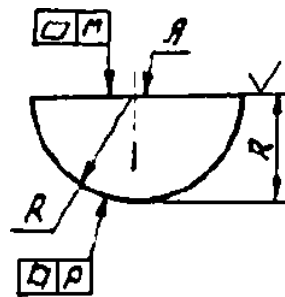
— 0.0-35.0 :

1

2. 3.



2



3

1—

-		-		-		-	-	{ -)L	-
-		R.	2789.	*		*	/	/	S.
0.16	-	75 *1. 125 ± 1	Rz 20.0	0.05	0.1	0.1	27101 100	250	200
1.0	17622								
1.0	-	2510.5. 50 ± 0.75	Ra 2.5	0.02	0.04	0.05	64201 100	90	70
14.0	16								
	4784								
0.6	45	25 ± 0.5. 50 ± 0.75. 75 1 1	Ra 0.63	0.02	0.04	0.05	59151 100	90	70
7.5	1050								
5.0	-	25 ± 0.5. 50 ± 0.75	Ra 0.32	0.01	0.02	0.05	59701 100	50	
30.0	15130								
21488.		—		16				16	
1.								-	

z , £ , / (z- R ,).

51232,

z ()

26266. v -):

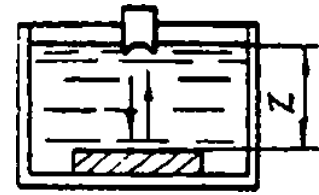
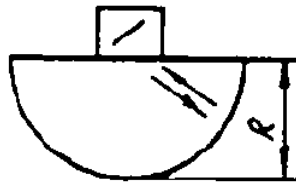
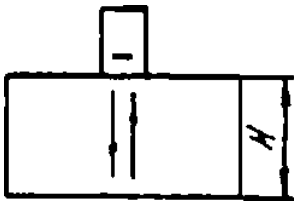
60 : - Ra 0.63 :

- 0,02 .

3.7.

4.1.2.

(. 1) 4-6,



4—

5—

6—

-5 , = 1. 2, 3.....
F.

(. 6)

F.

6)

() - ,

()

4.1.3

K''_{v1}

20lg

(D

U_m

()

4.1.4

4.1.3

(1)

= cij 'Z

/ .2-

W.

(1)

W/ - -201g V >

v—

4.1.5

l_3

$$f_3 = \frac{z}{2\tau} \quad (2)$$

f».

(2).

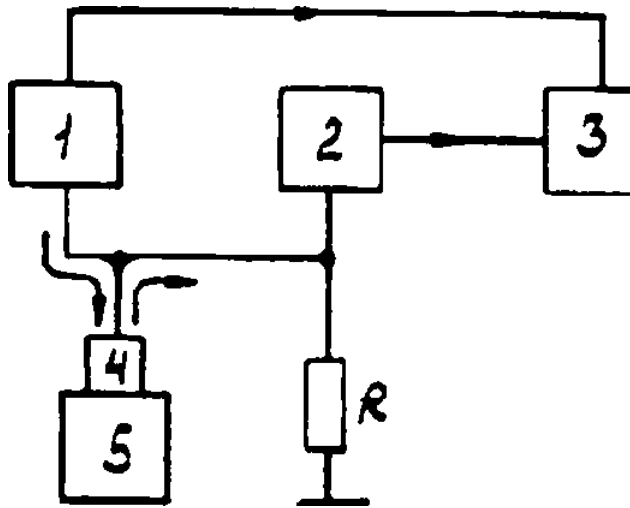
7,

4.2

^~|

4.2.1.

7.



5— .2— :3— ,4— (SO 11)

7

()

- 1000

2 — 15 :

< 1/2/ :

, = (1// - ^,) ± 0,1// * ,

f—

f_w

30,0

60

0 — 60

0.16 —

30 ;

± 0.5

1.0
0.5' 10³ — 1.0 8.

50

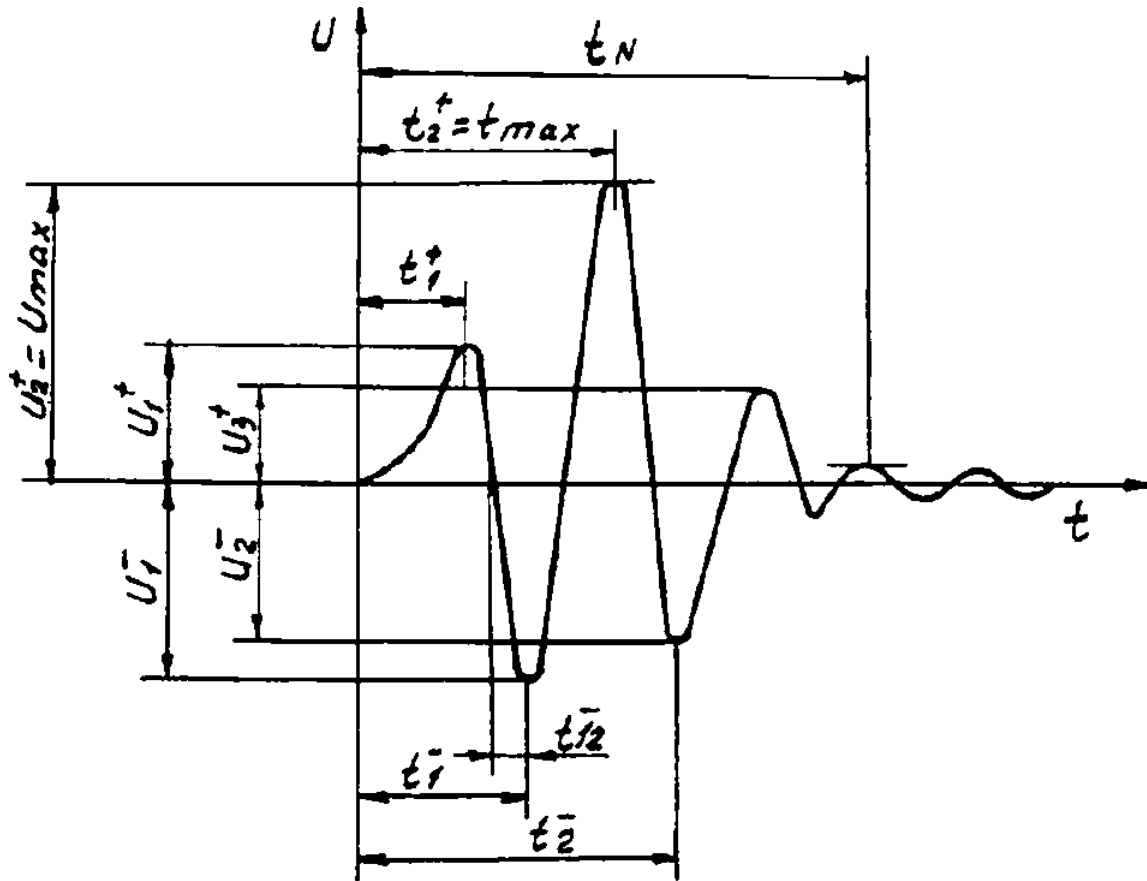
4.1.1.

R

4.2.2

4.1.2.

$t_i \cdot U_{mix}$ (8)



8

$I_{?}$

4.2.3

[!,,

$U,$

(3)

U_{mu} -

$R_{,} : R_{,}$ -

$; V_{R^-}$

% - WiA -

4.2.4

"

4.2.3

(3)

$W.$

4.1.4.

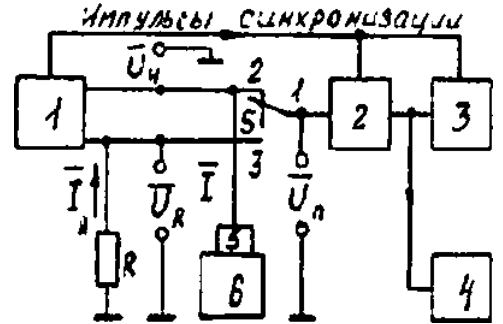
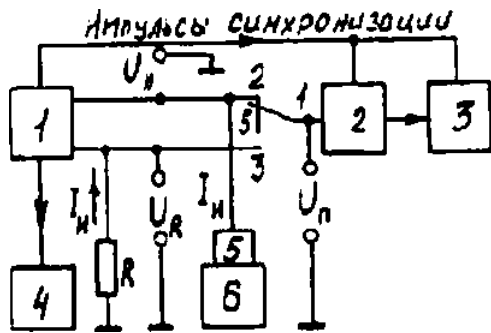
W. « — » (3)
4.1.4.

4.3 $f_w K_{vH}$ {<*>},

$f_{UH(UH)}$ $f_H f_B$

4.3.1

9 10.



1— .4— .5— :2— :3—
; —

1— :4— :2— :3—
:5— ; —

9

10

(. 9)

(. 10)

0.16 — 30.0
(5 — 15) I* (I-

5 1

70 .

0.1 — 30.0 .

2 .

20 Z», (.)

0 — 60

0.5 .

(. 10)

1 — 100 .

— 0.1 %.

0,16 — 30.0 :

(5-15) 1 . f — 6f 1 600 * :
80 . f_w

: 0,16 — 30.0 ;

3 — 70 .

4.1.1.

R

4.3.2

4.3.2.1

4.3.2.2

(— '), 4.1.2.
(. 9)

$$U_j - U^{*i-1.2/..,l*}, \quad (4)$$

' -

U^*_ξ -

$U'_H U\#$

f* ;
R f« ;
f i, .
1-2; - .

4.3.2.3

(10)

$$uv - U' - U_i - - * -1,2,- , \quad (5)$$

U'_u -

• -

4.3.2.4

no 4.3.2.2.4.3.2.3

4.3.2.5

()

$$(\Rightarrow 0 - KW * 20\ll , l . i -1,2 ,\ll \ll\ll)$$

4.3.2.2. 4.3.2.3. ;

R0 -

(1). 1 / .

KUU(UI) (>)

no 4.3.2.2. 4.3.2.3.

KUU(UI) ()

KUU(UI) fUU(UI)

fjJU(UI).

KUU(UI),

fOUU(UI)

$$\wedge =fSum^" fuum\bullet \quad (7)$$

(\$ -
 f_{UI}(UI),, K_{UI}(UI) (u>
 f_u(UI) 6 . fB. fH. .

BUU(UI).

°WW) "C/twn - / ©1

K(UI) (u> () , K(UU) (to),
 4.3.2.6 4.3.2.5

W,

(4), (5)

W « 4.1.4

$$y = a^2, 2,$$

(9)

$$* \dots 20UZ \}_3 / Z_s y.$$

()

Ce'j -

f i, / ; z - ,
 f i, ; Z3 -

(. 9.10)

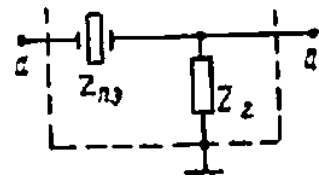
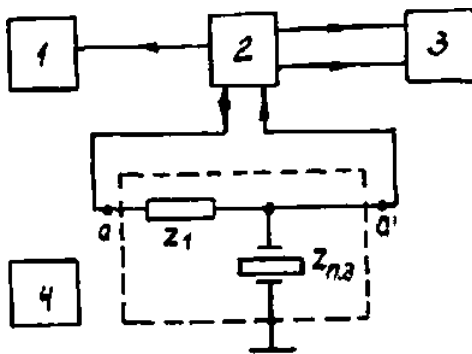
«l»

4.4

{&}> 2^3 , z f j H ^

4.4.1.

11.12.

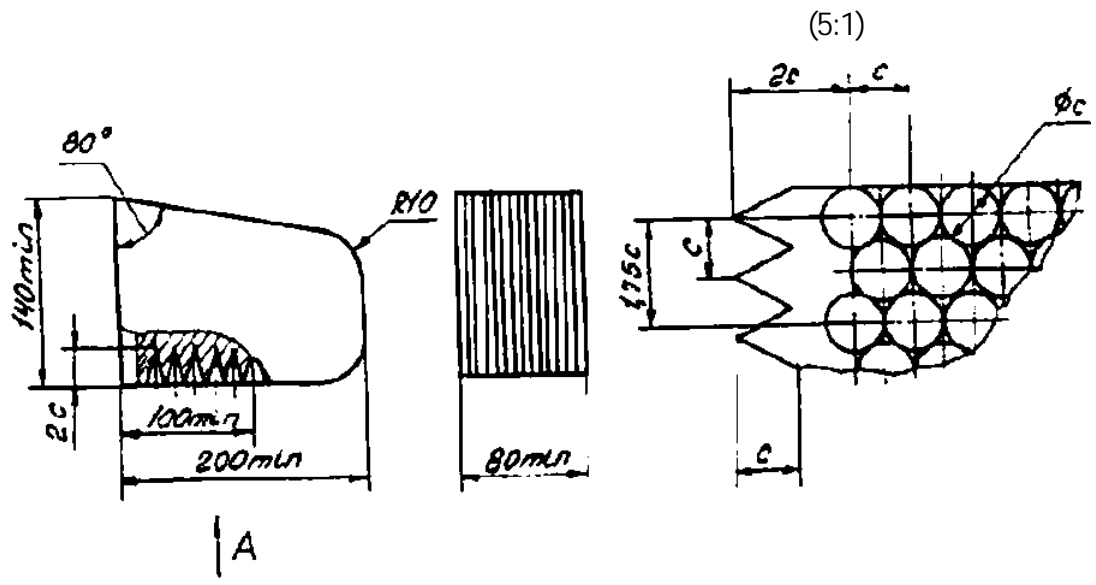


1- ; 2- ;
 3- ; 2- ;
 2-- . 4-

2 - ;
 2; -

()
 : 0,1 — 35,0 :
 — ± (0,4 + 0,1)
 20 Z_n () ;
 ()
 0,1- 25,0 / : ± 1%
 Z_i -
 |Z₂₁ > (10 - 20)2 -> (< >) •

13.



13

45.

16 .

1.

4.3.1.

4.4.2

Z%₃

16 .

2% 9

11.

14.

15.



14 15

Z_3 2 ()

$Z, \bullet Z,$ $Z'_7 \bullet$ (w)

$Z_{n3}(u)$ $Z_n ()$

$Z_{n3}(u)$ $Z_{n3}(w)$

$Z_{n3}(u)$ $Z_{n3}(\infty)$

$Z_n ()$ $Z_3 (u>)$ $Z_n (u>)$

Z_3 2 %.

$2JW. 3$

12, $20Z_{n3}(w)$ $Z_{n3}(w)(10 - 20). 8$

$fZ_2 I$ $Y_{n-3}(w)$

$Y_{n-3}(w) = 1/Z_{n3}(u>)$

4.5 *

$fomuoy$ $fou(w)$

B_{eUrtW}

4.5.1 $f_w(u>)$

$Zna ()$ 4.3, 4.4. () 4.3

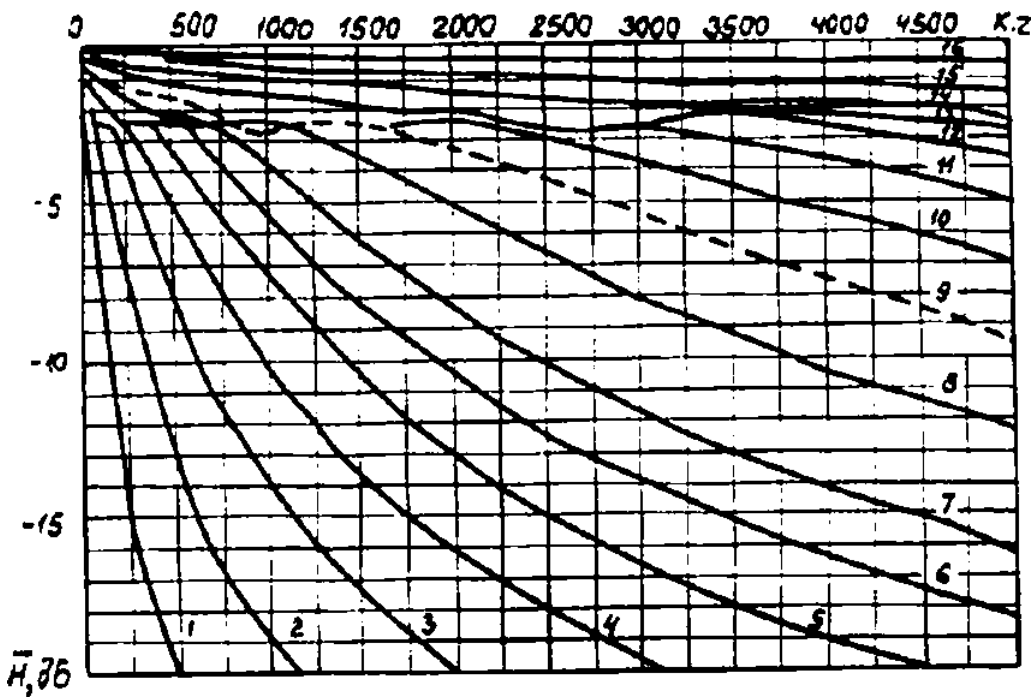
$K_{uv} ()$ 1.

4.5.2 (>). (), :

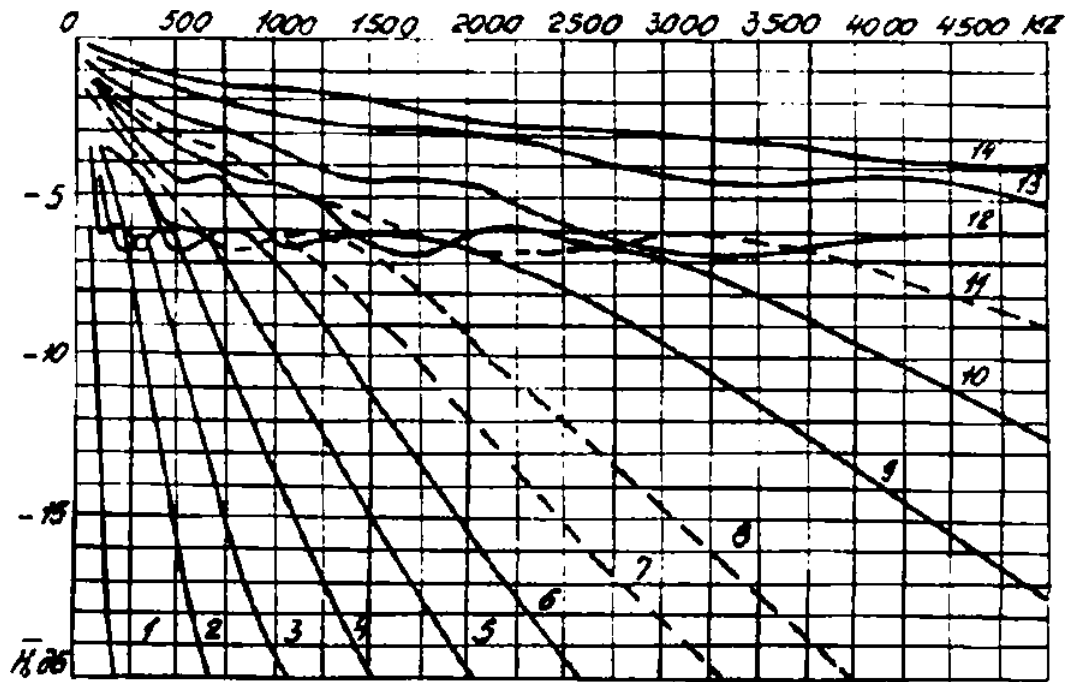
$$K_{uv}(\omega) = \frac{1}{2} K_{vv}(\omega) - 10 \lg \left[HZ_{\beta, \beta}^H(\omega) (K_{uv}^0)^2 \right]; \tag{11}$$

$$K_{uv}(\omega) = \frac{1}{2} K_{vv}(\omega) - 10 \lg \left[HZ_{\beta, \beta}^H(\omega) (K_{uv}^0)^{-2} \right]; \tag{12}$$

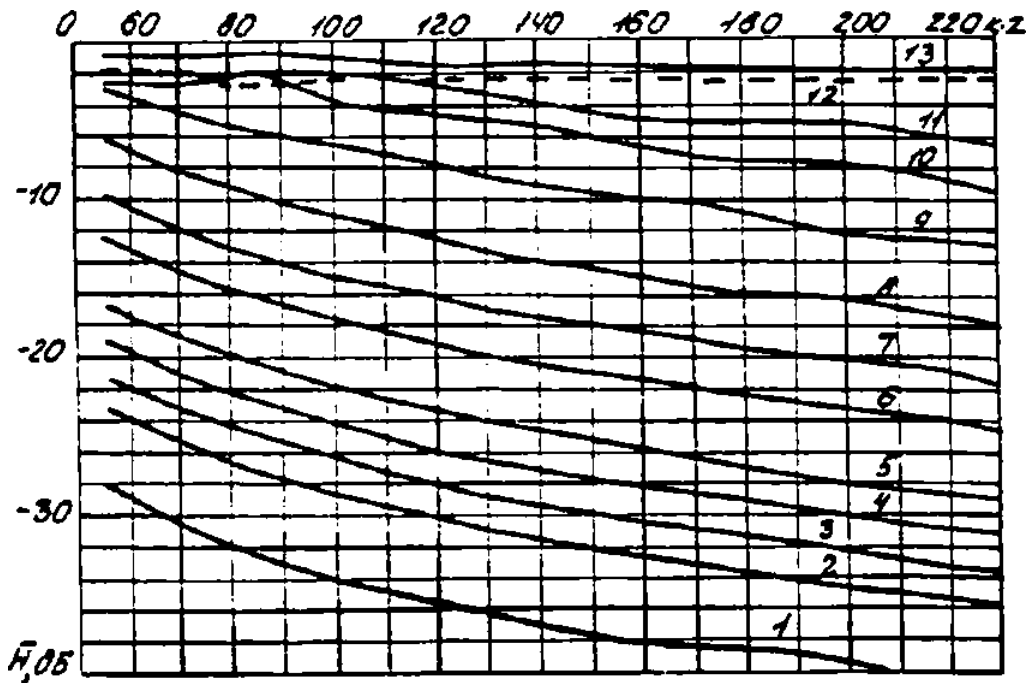
$Z\%_3 \sim$; $\wedge = 1 /$;
 ($\textcircled{R} -1 /$); -
 \ [& - 4
 1. , l=1, 2. 3 $I(,*,$,
 : " $\text{£}l,, - U\% \sim$ -
 / ; ^- /- .
 : ;*- fc-ro . .
 « ' = ,, • $10' /3^\circ$ \textcircled{C} « = 2 S/pv. S-
 . 2; - , / 3; v-
 . / . 16 . 45. 16 - 20 , ,
 - 2}f'afv.£z " Tjtf'zfv')
 - : - () , ; - , -
 , ,
 16 -20.



1 — 10; 2 — • 15; 3 — « 20; 4 — * 25; 5 — • 30; — 35; 7 — • 40; — • 80; 9 — 60; 10 — • 70;
 11 — * 80; 12 — 90; 13 — » 100; 14 - • 150; 15 — * 160 — 400; 17 — - 500 — 1600

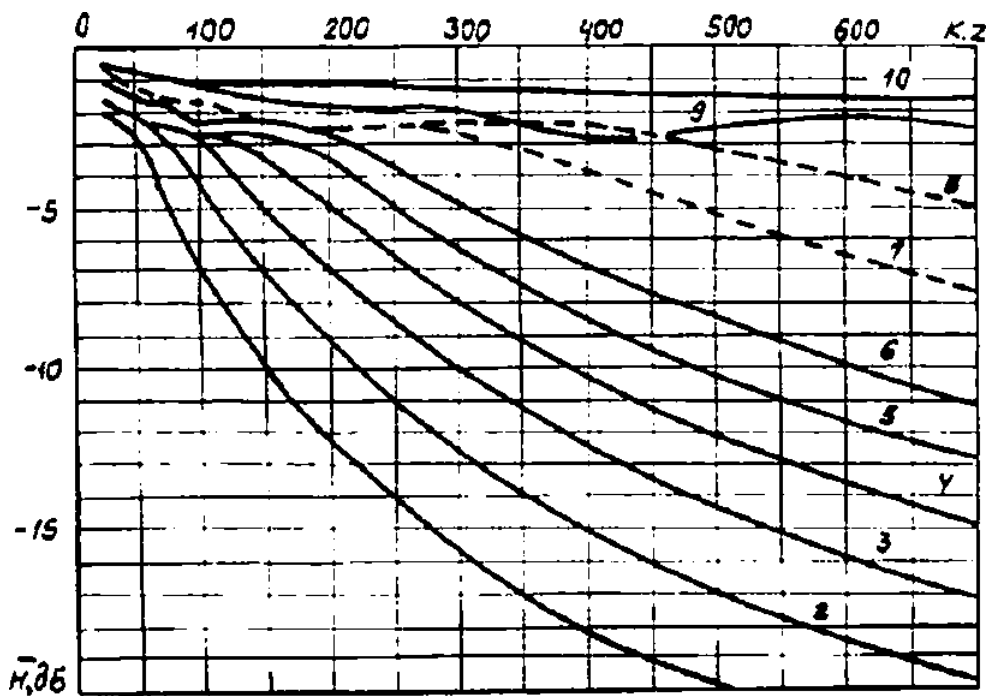


1 — «10; 2 — •15; 3 — •25.4 — 30: 5 — 33:6 - *40:
 7 - »46; - »60; - »60;10 - •70; 11 - »80;12 - -100; 13 - * ISO: 14 - »200 - 400
 17 —



1 — 20'2 — »2.5; 3 — •3.0; 4 — »3.6; 5 — •4.0; 6 — »5.0; 7 — »6.0; 8 — »7.5; 9 — 10.0; 10 —
 »12.5; 11 — 15.0; 12 — *20.0; 13 — »35

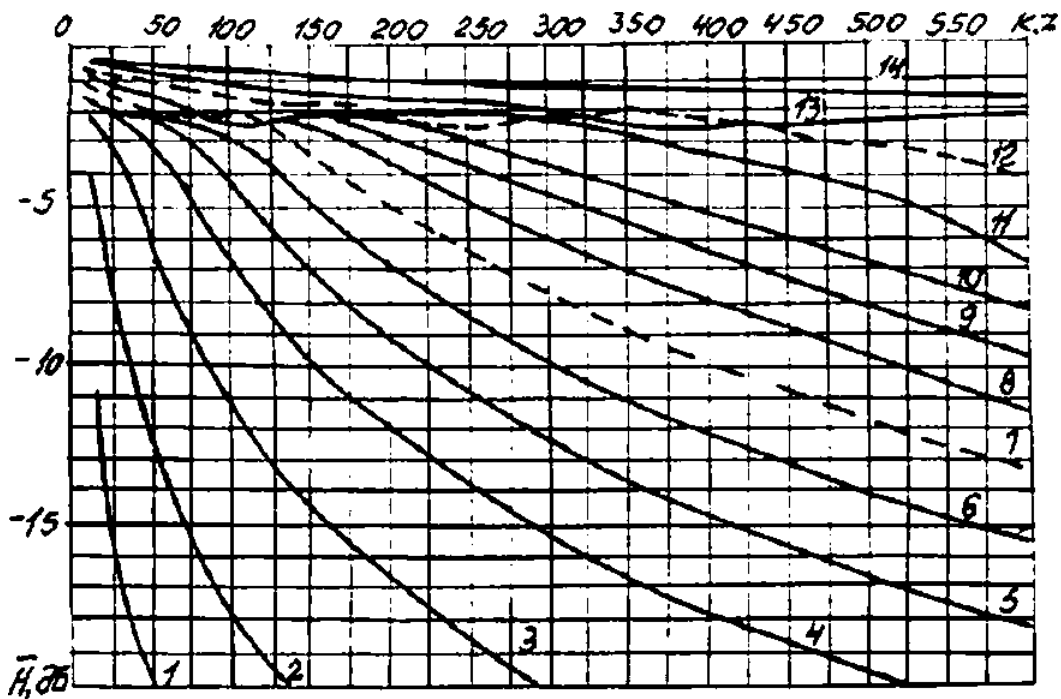
18 —



1 — *10; 2 — 12; 3 — *14; 4 — «16; 5 — »18; — 20; 7 — 2S; 3 — •30; 9 — »40;
10 — »00—205

19 —

16



1 — 2.0; 2 — »5.0; 3 — »7.5; 4 — »10.0; 5 — »12.0; 5 — »14.0; 7 — »1.0; — 15.0,
9 — »20.0; 10 — »22.0; 5 — 11 — «25.0; 12 — »30.0; 13 — 40.0; 14 — •50.0 — 120.0

20 —

45

4.5.3

$$K_{eww}(\cdot), \quad 4.5.2. \quad f_{ou(uc>} \\ A, \quad - \\ = feV\{Ve\} \sim feW.V^*Y$$

$J^*(w(w) 'j< > (\bar{VT})$
 f_{outuoy}

$1 \quad)(\quad)$

$(\quad),$

3

$$- \quad * \textcircled{*} \quad WWO! \bar{\varepsilon} - < *A.VrV \quad (15)$$

$(\quad) \quad K^*Xu>), K_{(Ucf}(\quad).$

4.5.4
 $f_{ou}(w$

4.5.1 - 4.5.3.

$I_{w(wi^-}$

$f_{ou}tuoy$

4.6

4.6.1

4.9.4.11

1.

—4.1.

4.6.2

”

21

21

(16)

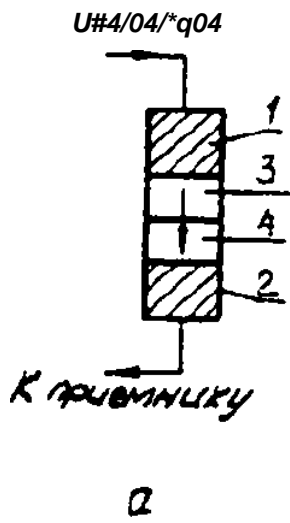
, -

f-ro

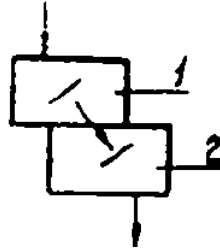
, ; 1 -

r-

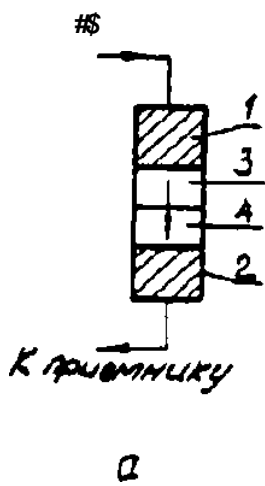
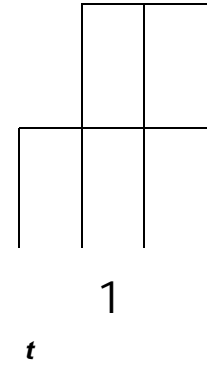
- : ,/. 1.2, 3.



От генератора



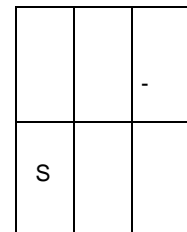
w#e?Qmcpa



Qm #pQmQa



- "T
* # *



£ flpytMHUXy

1— ;2— ;3— ;4—

21

4.6.3

-
-
-

4.1.2.

)

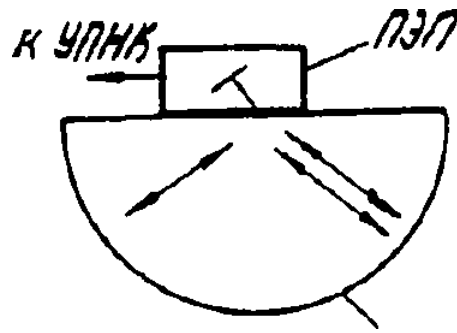
22.

-

-

,

4.1.2.



НҚРҮҚ

22

— — — — —

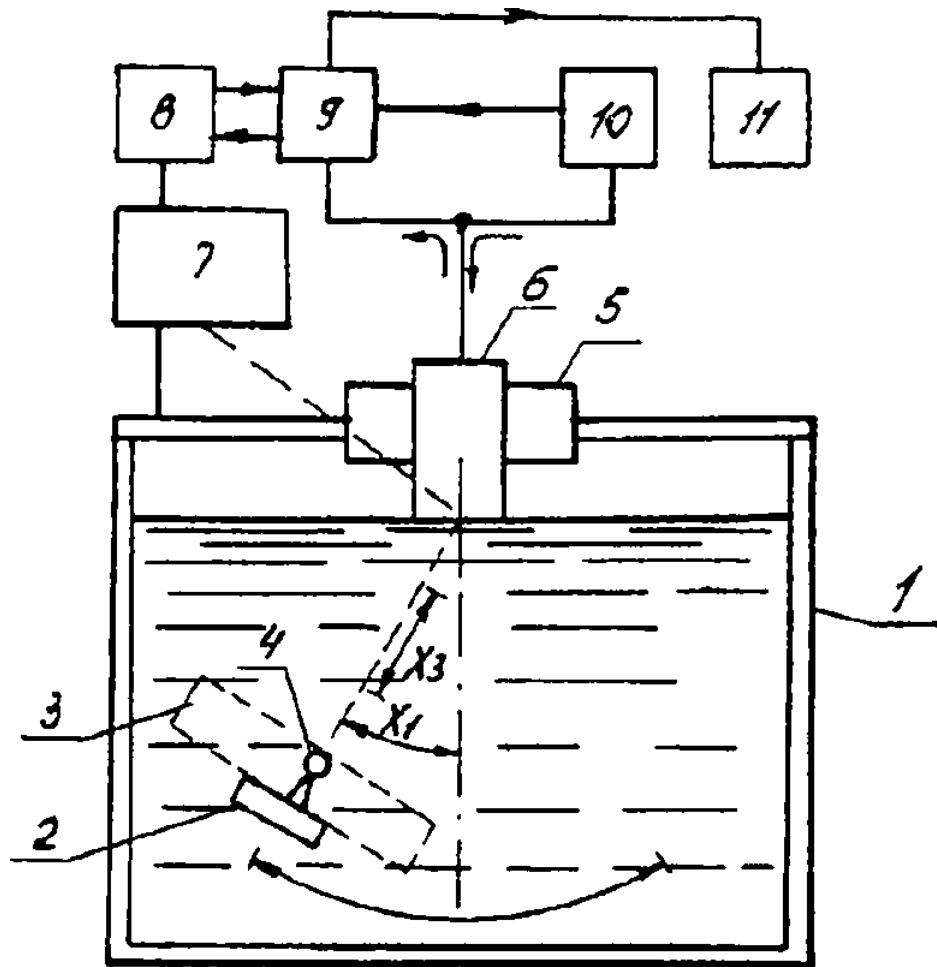
^, .

= -)- <17)

, (2) — () -

4.7 (' ,

4.7.1 , 23.



5— ; 6— ; 2— ; 7— ; 3— ; 4— ; 8— ; 9—

23

30 30* 0 250 ()
 360° 12'; -0.5 ; -30'. X,
) 100 — 20 Ra
 0.63 . 0,01 . 2. 5, 10 .
 7350 60 .
 fuu,» 1
 1 8
 0 80

(6±0.1)

(2 — 15) .

400 — 2000 *fw* . -

600/^^ .
4.1.1. 4.3.1.

1.5 %.

2.7.2

6-2 *f* 10.0 :
-5 10,0 > *f* > 1,0 ;
-10 /S 1.0 .
/-

f_w . -

32/)1₆
2)

6
20 .,

L - (0.6
L - (1.3
- 2*nf/v*: - *a?f/v*:
: *v*-

O.S L&. 0.02

100 .

L (0.6 + 32/) ,
L 3

23. -

X,

0*.

fwa) . -

X,

6

180®

1(2'

20 .
4.7.3

^ < {)

=== (18)

m - */ ; ; -

6 . ; } ' } - *

*aUX**)

(18),

()

6 .

3 ()

() $I_{1(2)}$

4.8

$\wedge(\wedge$

$0^\wedge,$

$I,$

$I,$

f *

4.8.1

25, 26

24.

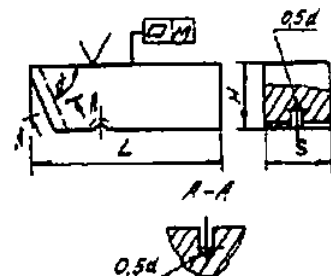
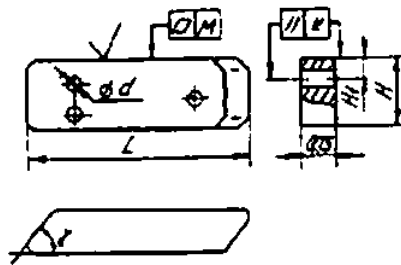
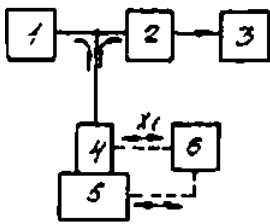
2.

2.

Adj 1U2Z.

(\wedge)

R ,).



t—
2—
3— : 4—
S—
6—

24

25

26

2—

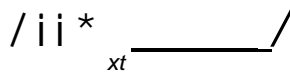
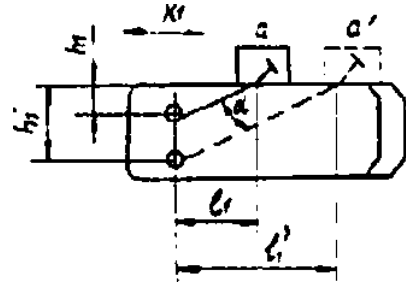
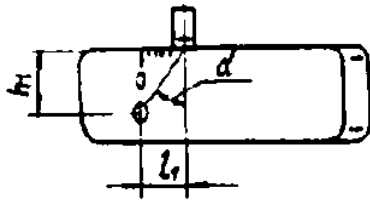
*)DH		- d.	-	-	*) X	*) ©	-	- L.	- S.	- ©
0.16- 1.0	- 17622	10.0+ 0.022	Rz 20,0	0.05	0.1	0.1	2710 1100	350	160	130
0.6- 7.5	45 1050	5.010. 012	Ra 0.63	0.02	0.04	0.05	5915 1100	350	160	130
1.0- 5.0	- 1 4784	5.0+ 0.012	Ra 2.5	0.02	0.04	0.05	6420 1100	350	160	130
5.0- 30.0	- 16 4784	2.0+ 0.01	Ra 0.63	0.02	0.04	0.05	6420 1100	350	160	130
21486.		—		16		2.	16			

26,
(
25
 $\pm \arctg (a/2L)$
X, ± 0.25 :
X, (± 0.5 aff).
1
4.7.1.
4.8.2
(. 2).
27- : 27 - 29.
28.29-

28.

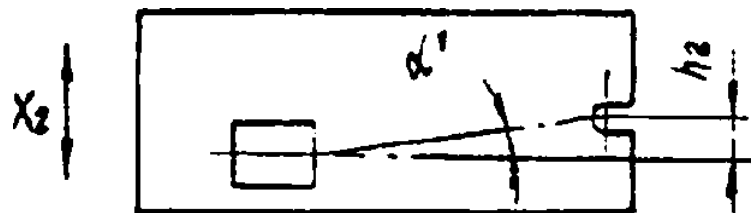
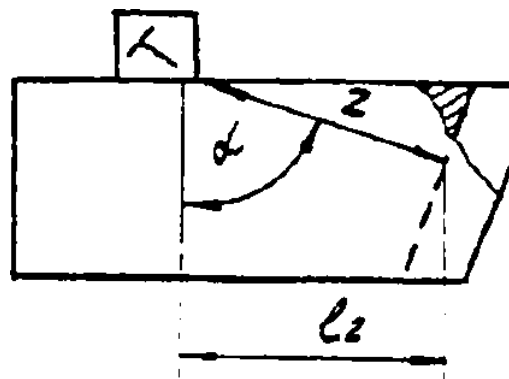
29 -

31\$,



27

28



29

4.8.3
4.8.3.1

*

23

11₃, $l, (), l$ 27 - 29. $l,)$

$$- \arctg \frac{h_1}{h_1} \quad (19)$$

$$- \arctg L \quad (20)$$

11, hi. 12 ,h2 •

27.29. l :

$$- \arctg \frac{''}{*-V} \quad (21)$$

$$\underline{Afr - *1.} \quad (22)$$

$l, hi (l, l?)$ — 28.

(') 0 ' -
 - (') 19 - 21. / -
 ; l- .
 /
 4.8.3.2 $X, ()$ 27 - 29. -

4.8.3.3 $@_2$ 4.8.3.1. -
 90® , q .

4.8.3.4 $X, ()$ -
 () $X, (^$ @)- $l, (1)$.
 $l, (l_2)$ / .
 ln () 3 .

4.8.3.5 $X, ()$,
 - (') / -

$\varepsilon \cdot (\varepsilon')$ /.

1

27.

(19)

2

(fuvoj S 1.25)

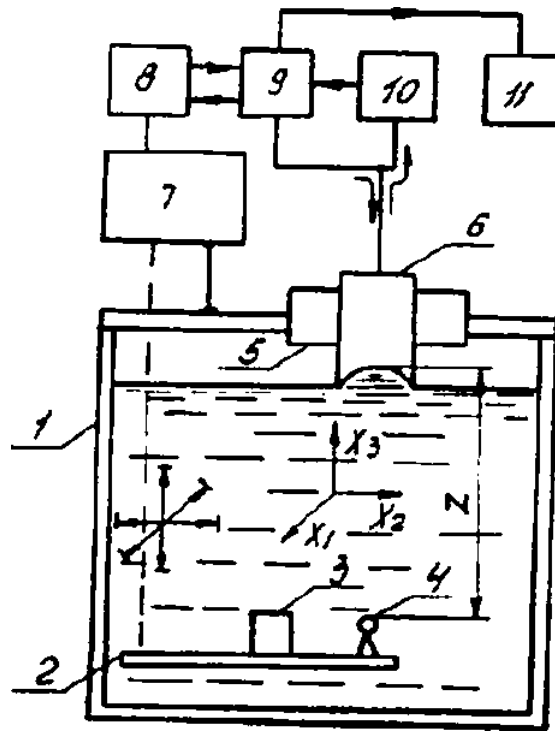
4.9

F

2

4.9.1

30.



4—)— .2— ;3—
 — ;5— ; — ;7—
 ;9— . — .11—

30

$X_i \cdot X_f$ - X_1 2. 3
 0 80.0 . - 0 250 .
 0.25 .
 1.0; 2.0:5.0 .

()

4.7.

X₁.

1.5 %.

4.9.2

$d_i \geq 1$ $f_{i,j} > 10.0$;
 $d_i \geq 2$ $10.0 \leq f_{i,j} < 1.0$;
 $d_i \geq 5$ $f_{i,j} < 1.0$.

$$\begin{aligned}
 & \dots a_{2F} \{ F \dots \\
 & \dots X_i \dots X_i^* \dots \\
 & \dots X_i = \dots X_i^* \dots \\
 & \dots X_i = \dots X_i^* \dots \\
 & \dots X_i = \dots X_i^* \dots \\
 & \dots X_i = \dots X_i^* \dots
 \end{aligned}
 \tag{23}$$

$l = 1, 2, 3$; $l = 1, 2, 3$

6

1

0.5

4.10.

4.10.1

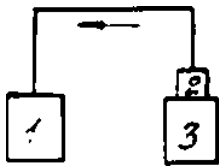
$D(z)$

(2),

31.

32.

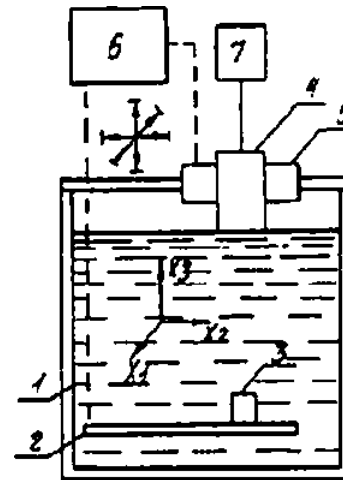
) $X_i \dots 25 \dots 400 \dots$
 $\pm 1 \dots$
 $3.7, 3.9 \dots 1.$



1 — ; 2 —
3 — ()

31

4.10.2
4.10.2.1



4 — ; 2 —
5 — . 3 — ;
6 — ; 7 —

32

31

4.10.2.2.

4.10.2.3

4.10.2.4

4. 5

4.10.2.2

), 4.1.2. (R. L.) D(2).
 (R. L.) (2)
 $\epsilon > (2)$ 33 (2) (2)

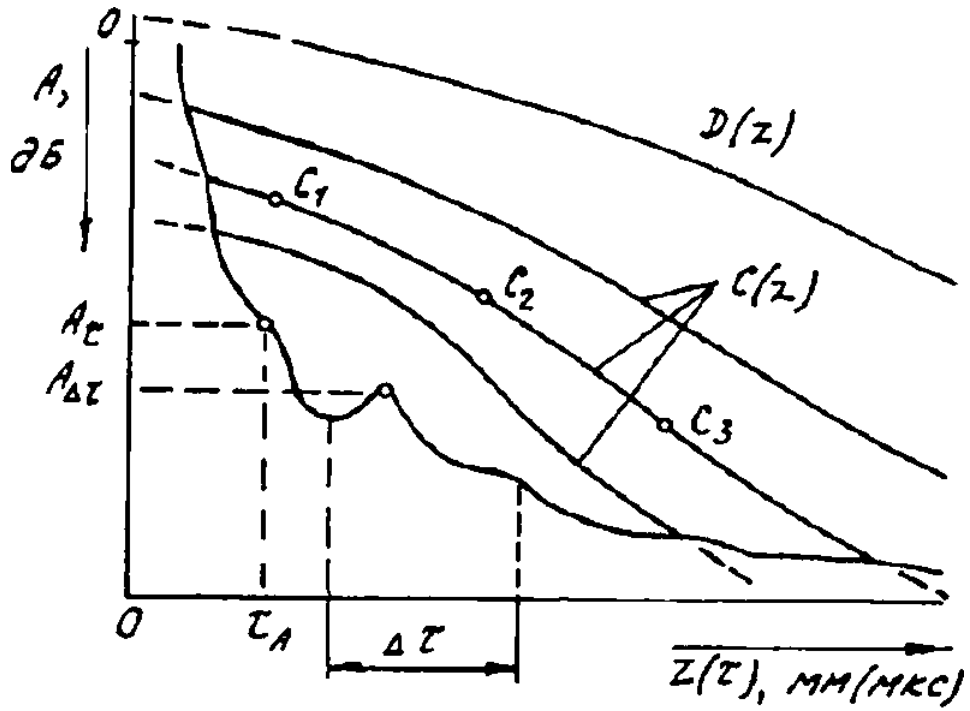


Рисунок 33

4.10.2.5 $D(2)$ 32 (.)

X_2

4.10.2.6 (2).

4.10.2.5

4.10.2.7 4.1 .2.5

X_2

$D(z)$.

4.10.2.8

8

4.11

$A(z) [()]$,

7 ,

4.11.1

. 31.

3.7.3.9

1.

— 4.1.

4.11.2

4.11.2.1

4.10.2.1 .

4.11.1,
4.1.2.

4.11.2.2.

1/2

()

$z(())$.
33

$A(z) [()]$.

1/2

1/2

4.11.2.3

* (. 33),

4.11.2.2

4.11.2.4

4 (. 33)

4.11.2.2

&
4.11.3

34.

500 —

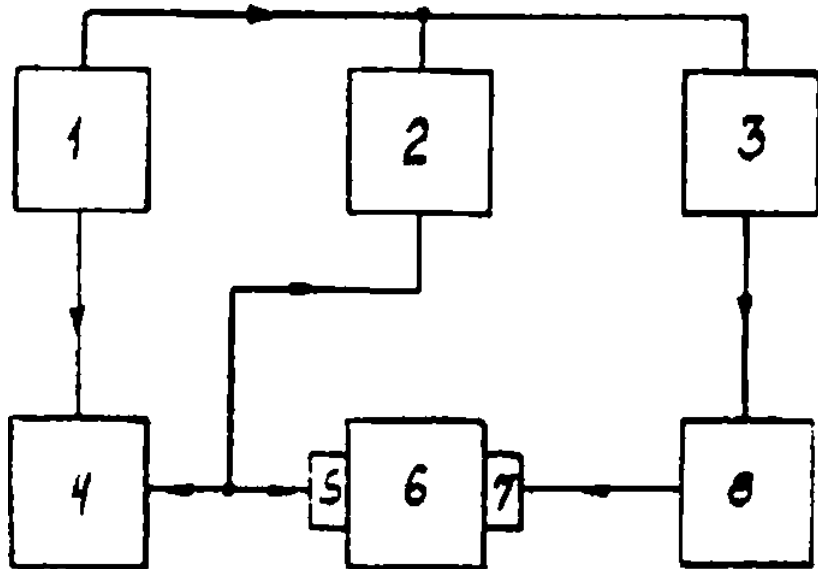
1.0-20.0 :

0.4-100.0 ;
10.03 :

10.0-20-103 .

0.1-

fUU. 8 — , 8 *
 4 . 3.7. 3.9 1. — 4.1. *
 *
 *



1.3 — :2— :4.8— :5—) :

34

4.11.4
 4.11.4.1

4.10.2.1 .
 34. -

4.11.4.2

8

3.

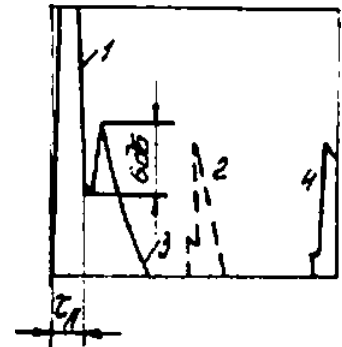
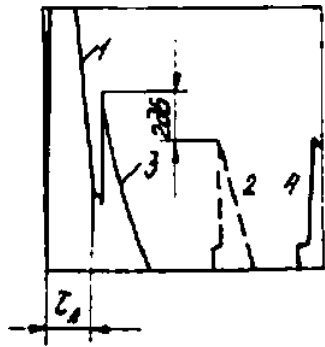
7.

1

3

± 2

(. 35). , « » ,
 ± 2 . « » ,
 6 (.).



2 —
3 —
4 —

2 —
3 —
4 —

35

36

35

3,

4

4.

4.11.4.3

($A(z)$),
4<-
^.

4.11.4.4

4.11.4.5

4.10. 4.11.

4.10.4.11

4.12

4.12.1

1.

32.

» ()

10 Z_{10}

Z_{10}

Z_{10}

— 4.1.

3.7. 3.9

1.

4.12.2

4.1.2,

— 4.10.2.5. 8

4.12.3 () **.-) ()
 () ()
 () ()
 4.12.4 () ()

$$A_t - 201g \overline{U_a} \quad (24)$$

И/ () -
 ;
 () -

4.13

4.13.1

1. — 32. 3.7. 3.9.

4.13.2

— 4.1 .1.

4.1

4.13.3

4.12. ^7» - ^{ > -0}' (25)

«(f). — /)Kh l). (26)

6^,(^()l), £ -)

4.14

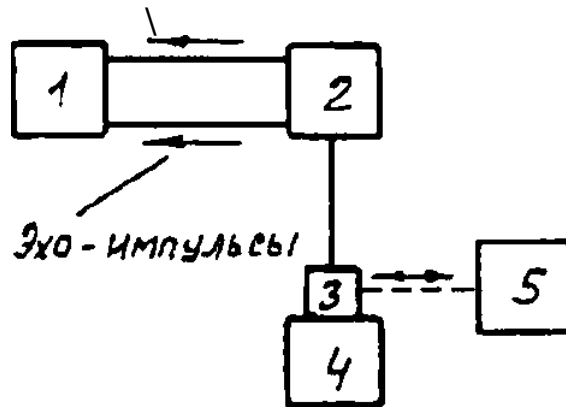
4.14.1.

37. -
 ; — 0.1 — 5.0 ; 0.5 — 50,0 ;

— ± \ N - — 10⁴ / ;

3.7. 3.9.

4.14.2.



1— ; 2— ; 3— ;
4— ; 5— ;
37

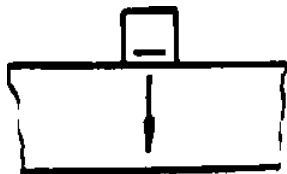
37.

38. 39.

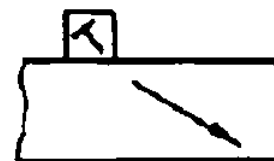
38 -

39 -

38. 39



38



39

() 30.

$$K_{\text{теf}} = \dots \quad (27)$$

1 j1 ^ — 2; / — ;
); / | - (-
 , / = 1, 2, 3,

$$^3 = - (w)^2. \quad (28)$$

; / = 1. 2. 3..... ; -
 **

4.15

4.15.1

50 * 50 *

3.7. 3.9, 4.8.
 4.15.2

4.1.4.8. 4.12.

U^~\ 4.1.4.8 4.12,

() , () U^

(2015) * ,

3

4.16

4

12997.

5.

4.17

), ()

27.410.

4.18

4.18.1

12.1.001 [1].

4.19

12997. 5.

4.20

1

()

1 - 39.

2

4

3

4

$f_{u,v}$

1.25

4.1 - 4.4.4.7

2 z/v. i -

5

3

6

()

7

8.

5

5.1

*

$$\delta_k = \pm \sqrt{\delta_{2k}^2 + \delta_{*k}^2} \quad (29)$$

* -

5.2

6

6.1

55808—2013

6.2

, , -

7

7.1

-

-

.

, -

7.2

,

,

-

[1].

7.3

,

,

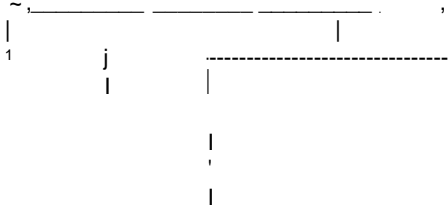
-

12.1.003.

()

,

XXXXXX



;- , - , -
 ; - , -
 ; - , *

« » « »

1 2

1 ?.

45:

N.

/

XXX

X XXX

, -
;
; -
; U-
; - ; -
,

45

/

5

50 75

:

. -50/75, -5

50 :

-50

5

100

;

-100. -5

()

1		1-20.				
2	-	43-63.				
3		5-78, 5-72.				
4		4-154. 4-158.				
5		>U-48, XI-54.				
6	CK4-5S.					
7	-50-2.					
8		-13	25-06.2538-84.			
9		-306.				
10		2-16	25-7761.005.	2-12	25-7761.001.	2-17
11	25-7761.034.	14782.	21397.			
12					-180.	
13				-180.		
14		-1	25-7761.002.			
15		-1	25-7761.012.			
16		-1	25-7761.0040.			
17				-11	25-7761.023.	
18		4-40	13.	6-0-	7-0-	.
19		23667.				

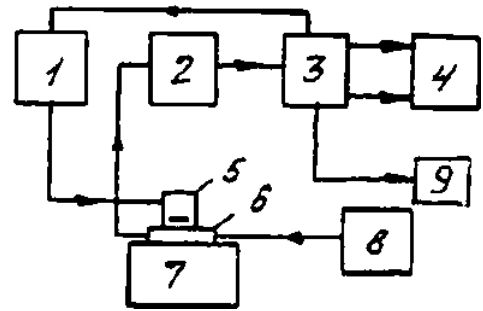
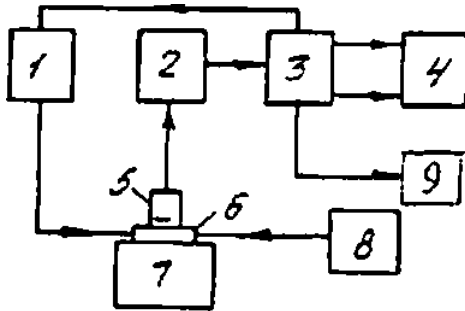
()

& fua(au)

fuo<am>
B_{Uo(QU)}

.1

40 : fua* ^ .- Uo. , 40 .



S

(— 4— :2— (40). (406): 3— :
:S— :7— :

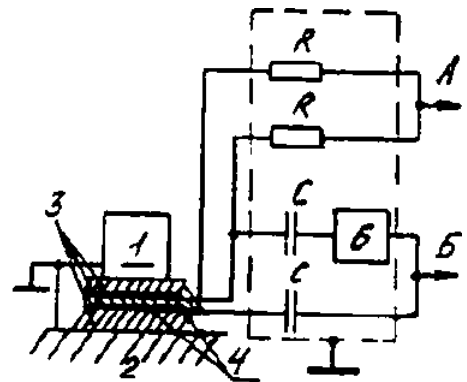
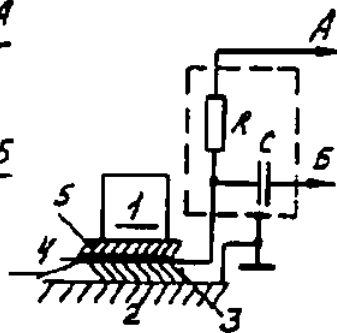
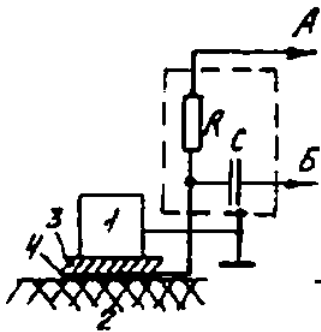
8— :9—

40

5 — 30 ; 0.16 — 6.0 — 10 — 100 . 0.1 Z_{ad} (Z_a»- 400.
50 ;) ; ()

1 .

41.



f— :2— :3—
10—1S . — 22 .4— :—

-0.25—1 . — S—1.2 :5- 4— 5
73-400 -0.1

41 —

0 500

4.4.1.

.2

.2.1.

41

41

41

-

£ -

-

41

(8 , , ,) .

-

-

-

3—5

.2.2

-

.2.3

-

20

.2.4

100 — 500

-

.2.5

(40

40

).

-

»
f i-atcvi- (uofavr © »

-

()

.1

()

()

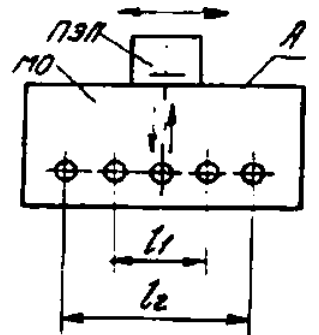
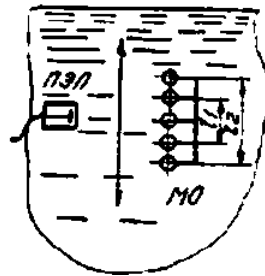
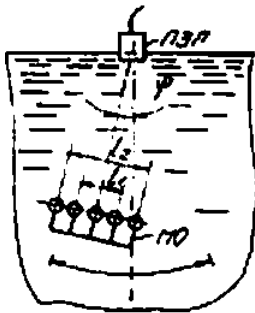
()

45.

(42 - 44).

(46).

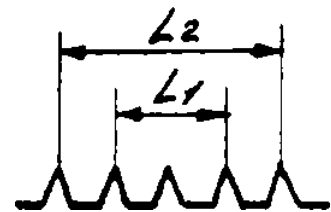
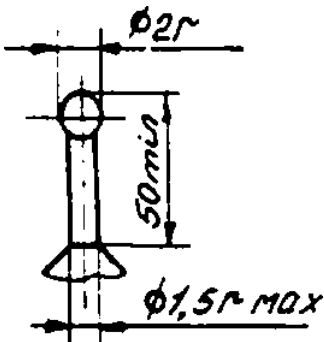
2



42

43

44



1.2.3.....

(30)

L, —

; < —

S_m

$S =_1(J^{\wedge}L.M$

$AL, -$

—

.

$L,$

;

$AL,$

-

.

()

.1

.1

.1

*		130%
	± 7 %	110%
%	± 7 %	110%
hr	± 10 %	115%
	15 %	110%
up	± 7 %	110%
£		130%
f *	± 6 %	110%
t,	± 6 %	110%
(	16 %	115%
up	15 %	110%
K&v		130%
f_{uu}'		
1,25	14 %	110%
1,25	$\pm 4 \text{ } bf_w / fov. \%$ $(£J_w / t_U vi 0.5)$	110%
*	$\pm [2^{\wedge} + (5 * 0.5 a_{ii} r X A - /,) - /, * J. \%$	120%
	$\pm [+ 0 \pm 0,5 a, z) 10 / - '] \%$	120%
		130%
»		
1.25	4 %	110%
1,25	$14 \text{ } bf_w / f_w \%$ (Abu / &u S 0.5)	110%

. 1

	$\pm 2,5 + < 5 \cdot 0,5$, /,-)- "].	$\pm 20\%$
	$\pm | + (1 \pm 0,5) - 10 ; 1] \%$	$\pm 20\%$
" 7? () " . j	$\pm 6\%$	$\pm 10\%$
VefrU)	$\pm 10\%$	$\pm 15\%$
fUoteU)	$\pm 8\%$	$\pm 10\%$
f U* < eU)	$\pm 10\%$	$\pm 15\%$
o\ a"	$\pm (0.03 + 35/aY_{,n})^*$, f,, 2 1	$\pm 1.5\%$
	$\pm 3.5 \%$. 1 2 1 . > 1	$\pm 5\%$
a:		
60*	$\pm 45^*$	\pm
60*	$\pm 1.0^*$	$\pm 3^*$
'	$\pm 1 \cdot 30$	$\pm 2^*$
$B_{is} 4; Q30^* > 15$	± 3	± 5
e_3	15	± 10
/	± 0.5	± 1
tnp	$\pm 10\%$	$\pm 15\%$
F	$\pm (0.25 + 0.02)$.	$\pm (0.25 + 0.02 AF)$.
42.3)	± 0.2 2.3) S 2 $\pm 0.2 \pm 5\%$ |(23) > 2	± 0.5
CW	$W_{\omega} + \& \%$	
aw		
A,		$\pm i / 2 0^a + \& \%$
,	$\pm \circ + \& \%$	$\pm J15^a + \& \%_i$
	$\pm 10\%$	$\pm 15\%$
As	$\pm Jio^a + \& \%_-$	$\pm 20\%$
® < |	$\pm J10^a + \& \%_-$	$\pm J15^a * 5^{\wedge} \%$
*		

.1.1

6 ,

.1.2 *fou.*

.1.3 4.

@₂)' Q. ;

/ .1 ©) 60 .

.2 / 12 -

: *1) -

16 : ±6

: 16 : -

// (> ± 10 %; ± 1.5 %;

1 ±1.0 .

„ Q- •IQ0 4.1.4.4.2.4.4.3.2. <1 (z :

„= ()- '100 ;

- 1.2. / : .1.2, ;

- , : f_w.. fou. fou. f>. :

f_n- , :

Z- () , :

6j««- , :

.%.

[1] 2.2.4/2.1.8.582-96 « , »

55808—2013

620.179.16:006.354

17.020

: , ,

>02.10.2014. 60x84/4.
. . .6.05. 77 . .4554

« ».
123905 . ..4.
www.gostinfo.ru info@gostinfo.nj