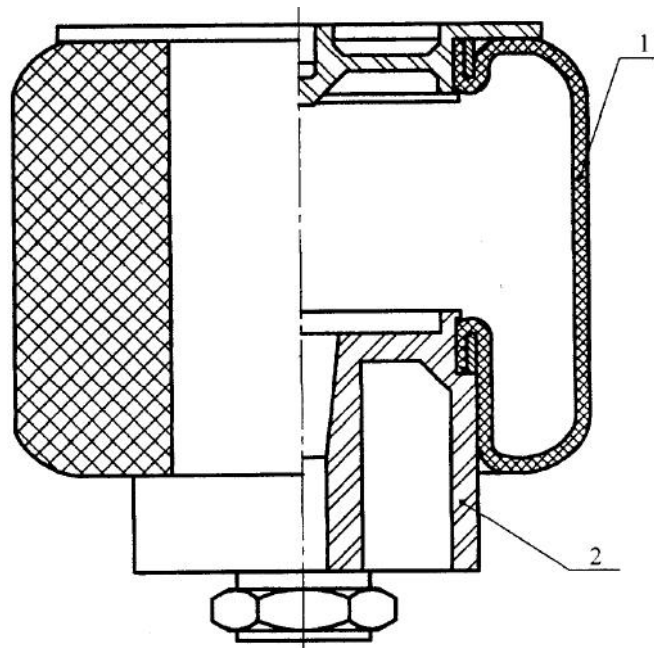


$$f_0 \approx 2,1 - 2,3 [2].$$



.1 - NTITECH: 1 - SZ 140-11
;2 -

[1, 3 - 5]

F -

P_u

F

$$F = P_u \cdot F$$

$$C = \frac{dF}{dX} = F \frac{dP_u}{dX} + \frac{dF}{dX},$$

$$C = \frac{P \cdot F^2}{V} + P_u \frac{dF}{dX},$$

P, P_u, V -

X . -

V

V_d .

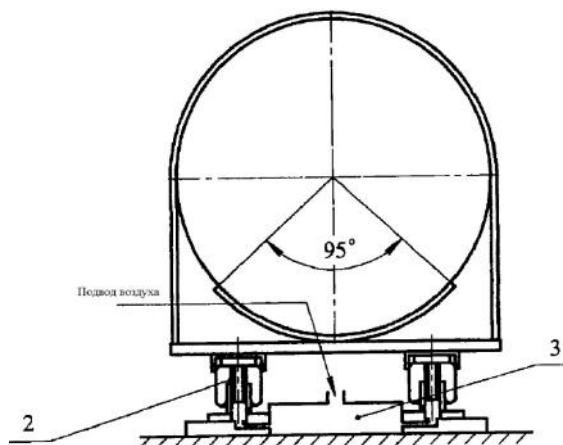
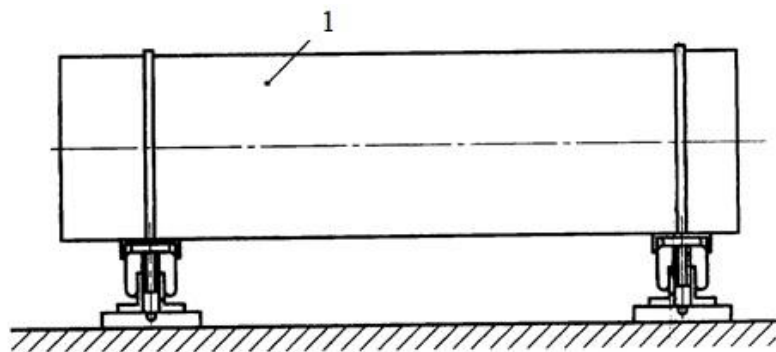
$$C = \frac{P \cdot F^2}{V + V_d} + P_u \frac{dF}{dX} .$$

V_d

$V \quad V_d$. -

$V \quad V_d$. -

. 2



. 2 -

: 1 - ;

2 - [6 - 11] ; 3 - [8]

[10]

[7] [6] V

V_d

ξ_0

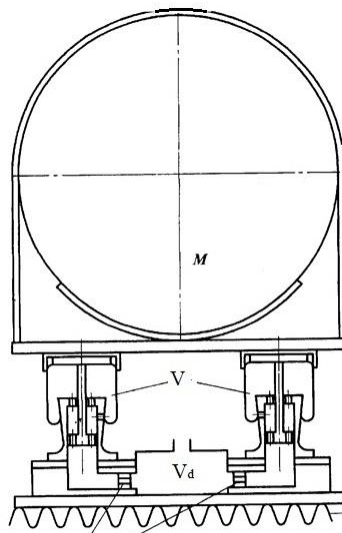
f_0

3

2

[6],

.3.



жиклеры между объемами V и Vd

.3 -

$$(\omega_0^2 - \omega^2 + 2i\omega\xi_0\omega_0)Z = (\omega_0^2 + 2i\omega\xi_0\omega_0)q,$$

$$\omega_0^2 = \frac{1}{M} \left(C_H \frac{\frac{C_P}{C_H} + \omega^2 Z^2}{1 + \omega^2 Z^2} \right) + C_F,$$

$$\xi = \frac{\tau C_H \left(1 - \frac{C_P}{C_H} \right)}{2M\omega_0(1 + \omega^2 Z)} + \frac{\eta F}{2M\omega_0\omega|\bar{X}|},$$

$$C_P = \frac{kPF^2}{V + V_d},$$

$$C_H = \frac{kPF}{V},$$

$\omega_0 -$

$;$ $\xi_0 - -$

$); M -$

$($
 $;$ $F -$
 $;$ $|\bar{X}| -$

$;$ $\eta - -$

$;$ $\omega -$

$;$ C_F

$;$ C_P C_H
 $V,$
 V $V_d.$

$($
 V $V_d)$ $\tau,$

$$\tau = \frac{0,85Vn^2\omega F |\bar{X}|}{2(1+n)^2 a^2 (\mu F)^2 \sqrt{1 + \omega^2 \tau^2}},$$

$n = \frac{V_d}{V}; a -$

$$\tau = \frac{\sqrt{1 + 4\omega^2 A^2} - 1}{2\omega^2},$$

$$A = \frac{0,85Vn^2\omega F |\bar{X}|}{2(1+n)^2 a^2 (\mu F)^2}.$$

$\tau,$

$V \quad V_d:$

$$(\mu F)^2 = \frac{0,85 V n^2 \omega F |X|}{2(1+n)^2 a^2 \tau \sqrt{1 + \omega^2 \tau^2}},$$

$\mu -$

$; F -$

ω_0

$$\frac{\omega_0}{\omega_{0p}} = \sqrt{\frac{k(1+n)-1}{k-1 + \frac{kn}{2}}}.$$

$$|C_F| = \frac{C_P}{k}.$$

ξ_0

$$\xi_0 = \xi_V + \xi.$$

$$\xi_V = \frac{\tau C_H \left(1 - \frac{C_p}{C_H}\right)}{2M \omega_0 (1 + \omega^2 \tau^2)}$$

$\dot{V} \quad V_d,$

$$\xi = \frac{\tau F}{2M \omega_0 \omega |X|}$$

$\omega_0 \tau,$

ξ_V

$$\omega_0 \tau = \sqrt{\frac{k-1}{k(1+n)-1}}.$$

$\xi_{V \max}$

$$\xi_{V_{\max}} = \frac{kn\sqrt{k-1}}{4(k-1)\sqrt{k(1+n)-1}}$$

$$\xi_{V_{\max}} \omega_0^2 = \frac{C_p (k-1)[k(k+n)-1]}{M k \left(k-1 + \frac{kn}{2} \right)}$$

$$(\omega = 0)$$

$$\omega_0^2 = \frac{C_p (k-1)}{M k}$$

$$\omega_0 \tau,$$

$$\left(\frac{V_d}{V} \quad \xi_{V_{\max}}, \quad \omega_0/\omega_{0P} \quad n \right. \\ \left. k=1,4, |C_F| = \frac{C_p}{k} \right).$$

$$\frac{1}{V} \quad k=1,4, |C_F| = \frac{C_p}{k}$$

. 1

$n = \frac{V_d}{V}$	8,0	4,0	3,0	2,0	1,5	1,0	0,5	0,25
$\omega_0 \tau$	0,186	0,258	0,295	0,354	0,4	0,471	0,603	0,73
$\xi_{V_{\max}}$	1,3	0,9	0,77	0,62	0,53	0,41	0,26	0,16
ω_0/ω_{0P}	1,39	1,37	1,36	1,33	1,31	1,28	1,21	1,14

$$\frac{V_d}{V}$$

$$\frac{\omega_0}{V} \quad V_d$$

$$\omega_0 \tau, \xi_{V_{\max}} \quad \omega_0/\omega_{0P}$$

$$V_d/V = n$$

$$C_F = 0$$

$$\omega_0 \tau = \sqrt{\frac{1}{1+n}}$$

$$\xi_{V_{\max}} = \frac{n}{4} \sqrt{\frac{1}{1+n}}$$

$$\omega_0^2 = \frac{C_P}{M} \frac{(1+n)}{\left(1 + \frac{n}{2}\right)}$$

$$\omega_{0P}^2 = \frac{C_P}{M}$$

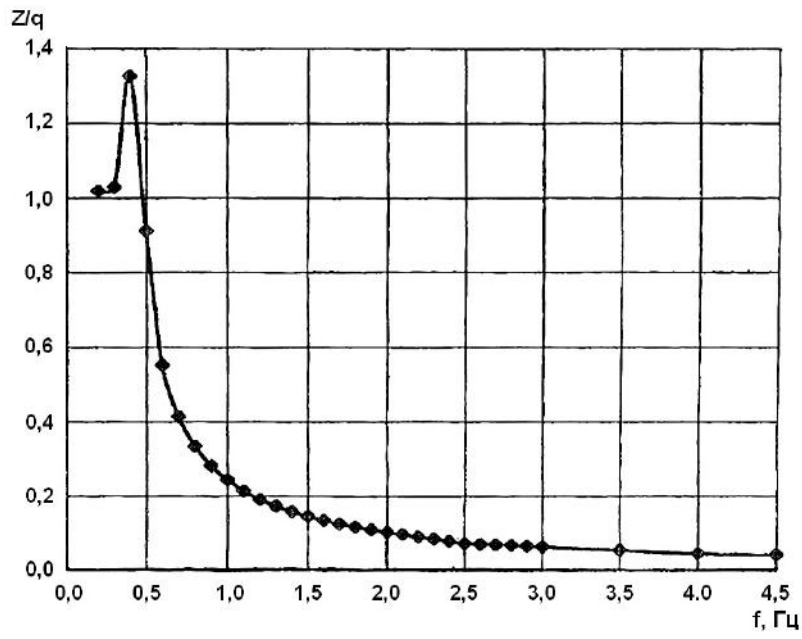
$$\omega_0 / \omega_{0P} \quad \frac{V_d}{V} \quad k = 1,4 \quad C_F = 0. \quad \omega_0 \tau, \quad \xi_{V_{\max}}$$

$n = \frac{V_d}{V}$	8,0	4,0	3,0	2,0	1,5	1,0	0,5	0,25
$\omega_0 \tau$	0,33	0,45	0,5	0,58	0,63	0,71	0,82	0,89
$\xi_{V_{\max}}$	0,66	0,45	0,375	0,29	0,24	0,18	0,1	0,056
ω_0 / ω_{0P}	1,34	1,29	1,27	1,23	1,20	1,16	1,1	1,05

$\omega_0 \tau$, $\xi_{V_{\max}}$, ω_0 / ω_{0P} vs $n = \frac{V_d}{V}$ for $k = 1,4$ and $C_F = 0$.

Z

q



. 4 -

. 4

1. , 1962. 289 .
2. Product Catalog Air Actuators for Pneumatic Applications, Contitech. 142 .
3. , 1987. 288 .

