TABLE 2. CIRCULAR EQUIVALENTS OF RECTANGULAR DUCTS FOR EQUAL FRICTION AND CAPACITY (CONCLUDED)

Dimensions in Inches

Side Rectangular Duct	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	56	60	64	68	72	76	80	84	88	Side Rectangular Duct
20	21.9	24.1																									20
22	22.9	25.1	26.2																								22
24	23.9	26.1	27.2	28.4																							24
26	24.8	26.1	27.2	28.4	29.5																						26
28	25.7	27.1	28.2	29.5	30.6	32.8																					28
30	25.7	28.0	29.3	30.5	31.6	32.8	35.0	37.2																			30
32	27.5	28.9	30.1	31.4	32.6	33.8	35.0		39.4	41.6	43.8	46.9															32
34	28.3	29.7	31.0	32.3	33.6	34.8	36.0	37.2	38.4	40.4	42.6	44.8	48.1														34
36	29.0	30.5	32.0	33.0	34.6	35.8	37.0	38.2	39.4	41.6	43.8	46.9	49.1	50.3													36
38	29.8	31.4	32.8	34.2	35.5	36.7	38.0	39.2	40.4	42.6	44.8	47.9	50.2	51.3	52.0												38
40	30.5	32.1	33.6	35.1	36.4	37.6	39.0	40.2	41.4	43.6	45.8	48.9	51.2	52.3	53.6	54.7											40
42	31.2	32.8	34.4	35.9	37.3	38.6	39.9	41.1	42.4	44.6	46.8	49.8	52.1	53.2	54.6	55.8	56.9										42
44	31.9	33.5	35.2	36.7	38.1	39.5	40.8	42.0	43.4	45.6	46.8	49.8	52.1	53.2	54.6	55.8	56.9	58.9									44
46	32.5	34.2	35.9	37.4	38.9	40.3	41.7	43.0	44.3	45.6	46.8	49.8	52.1	53.2	54.6	55.8	56.9	58.9	61.0								46
48	33.1	34.9	36.6	38.2	39.7	41.2	42.6	43.9	45.2	46.5	47.8	49.8	53.2	54.3	55.7	56.9	58.0	60.0	62.2	64.3							48
50	33.7	35.5	37.4	38.9	40.4	42.0	43.5	44.8	46.1	47.4	48.8	51.2	53.6	54.7	56.8	58.0	59.1	61.1	63.3	65.4	67.5						50
52	34.3	36.2	38.0	39.6	41.2	42.8	44.3	45.7	47.1	48.3	49.7	52.1	54.6	55.8	56.9	58.1	59.2	61.2	63.4	65.5	67.6	69.7					52
54	34.9	36.8	38.7	40.3	42.0	43.6	45.0	46.5	48.0	49.2	50.6	53.1	55.6	56.8	58.0	59.2	60.3	62.3	64.5	66.6	68.8	70.9	73.0				54
56	35.5	37.4	39.3	41.0	42.7	44.3	45.8	47.3	48.8	50.1	51.5	54.0	56.6	57.8	59.0	60.2	61.3	63.4	65.6	67.8	69.9	72.1	74.2	76.3			56
58	36.0	38.0	39.8	41.7	43.4	45.0	46.6	48.1	49.6	51.0	52.4	54.9	57.5	58.8	60.0	61.2	62.4	64.5	66.7	68.9	71.0	73.2	75.4	77.5			58
60	36.5	38.6	40.4	42.3	44.0	45.8	47.3	48.9	50.4	51.8	53.2	55.8	58.4	59.6	60.9	62.1	63.3	65.5	67.7	69.9	72.1	74.3	76.5	78.6	80.8		60
62	37.1	39.2	41.0	42.9	44.7	46.5	48.0	49.7	51.2	52.6	54.0	56.6	59.2	60.4	61.7	63.0	64.2	66.4	68.6	70.8	73.0	75.2	77.4	79.6	81.7		62
64	37.6	39.7	41.6	43.5	45.4	47.2	48.7	50.4	52.0	53.4	54.8	57.4	60.0	61.2	62.5	63.8	65.0	67.2	69.4	71.6	73.8	76.0	78.2	80.3	82.5		64
66	38.1	40.2	42.2	44.1	46.0	47.8	49.5	51.1	52.8	54.2	55.6	58.2	60.8	62.0	63.3	64.6	65.8	68.0	70.2	72.4	74.6	76.8	79.0	81.1	83.3		66
68	38.6	40.7	42.8	44.7	46.6	48.4	50.2	51.8	53.5	55.0	56.6	59.0	61.6	62.8	64.1	65.4	66.6	68.8	71.0	73.2	75.4	77.6	79.8	81.9	84.1		68
70	39.1	41.3	43.3	45.2	47.2	49.0	50.9	52.5	54.2	55.8	57.3	59.8	62.4	63.6	64.9	66.2	67.4	69.6	71.8	74.0	76.2	78.4	80.6	82.7	84.9		70
72	39.6	41.8	43.8	45.9	47.8	49.7	51.5	53.2	54.9	56.6	58.0	60.6	63.2	64.4	65.7	67.0	68.2	70.4	72.6	74.8	77.0	79.2	81.4	83.5	85.7		72
74	40.0	42.3	44.4	46.4	48.4	50.3	52.1	53.9	55.6	57.2	58.8	61.3	63.9	65.2	66.5	67.8	69.0	71.2	73.4	75.6	77.8	80.0	82.2	84.3	86.5		74
76	40.5	42.8	44.9	47.0	49.0	50.8	52.7	54.6	56.3	57.9	59.5	62.1	64.7	65.9	67.3	68.6	69.8	72.0	74.2	76.4	78.6	80.8	83.0	85.1	87.3	89.3	76
78	40.9	43.3	45.5	47.5	49.5	51.5	53.3	55.2	57.0	58.6	60.3	62.9	65.5	66.7	68.1	69.4	70.6	72.8	75.0	77.2	79.4	81.6	83.8	85.9	88.1	90.2	78
80	41.3	43.8	46.0	48.0	50.1	52.0	53.9	55.8	57.6	59.3	61.0	63.7	66.3	67.5	68.9	70.2	71.4	73.6	75.8	78.0	80.2	82.4	84.6	86.7	88.9	91.0	80
82	41.8	44.2	46.4	48.6	50.6	52.6	54.5	56.4	58.2	59.9	61.7	64.4	67.0	68.2	69.6	71.0	72.2	74.4	76.6	78.8	81.0	83.2	85.4	87.5	89.7	91.8	82
84	42.2	44.6	46.9	49.2	51.1	53.2	55.1	57.0	58.9	60.7	62.4	65.1	67.8	69.0	70.4	71.8	73.0	75.2	77.4	79.6	81.8	84.0	86.2	88.3	90.5	92.6	84
86	42.6	45.0	47.4	49.6	51.6	53.7	55.7	57.6	59.5	61.3	63.0	65.8	68.5	69.8	71.1	72.5	73.8	76.0	78.2	80.4	82.6	84.8	87.0	89.1	91.3	93.4	86
88	43.0	45.4	47.9	50.1	52.2	54.3	56.3	58.2	60.1	62.0	63.7	66.5	69.2	70.5	71.9	73.3	74.5	76.8	79.0	81.2	83.4	85.6	87.8	89.9	92.1	94.2	88
90	43.4	45.9	48.3	50.6	52.8	54.8	56.9	58.8	60.7	62.6	64.4	67.3	70.0	71.3	72.7	74.1	75.4	77.6	79.9	82.1	84.3	86.5	88.7	90.8	93.0	95.1	90
92	43.8	46.3	48.7	51.1	53.4	55.4	57.4	59.4	61.3	63.2	65.0	68.0	70.8	72.1	73.5	74.9	76.2	78.5	80.8	83.0	85.2	87.4	89.6	91.8	93.9	96.0	92
94	44.2	46.7	49.1	51.6	53.9	55.9	57.9	59.9	61.9	63.8	65.6	68.6	71.5	72.8	74.2	75.6	76.9	79.2	81.5	83.8	86.0	88.2	90.4	92.6	94.8	96.9	94
96	44.6	47.2	49.5	52.0	54.4	56.3	58.4	60.5	62.4	64.4	66.2	69.2	72.1	73.5	74.9	76.3	77.6	79.9	82.3	84.6	86.8	89.0	91.2	93.4	95.6	97.8	96

the air, and are therefore conveniently expressed as a fraction of the velocity head:

$$h_v = C\frac{v^2}{2g} \tag{4}$$

and for standard air

$$H_v = C\left(\frac{V}{4005}\right)^2 \tag{5}$$

where

h_v = dynamic pressure loss, feet of fluid flowing.
H_v = dynamic pressure loss, inches of water.
v = velocity of fluid, feet per second.

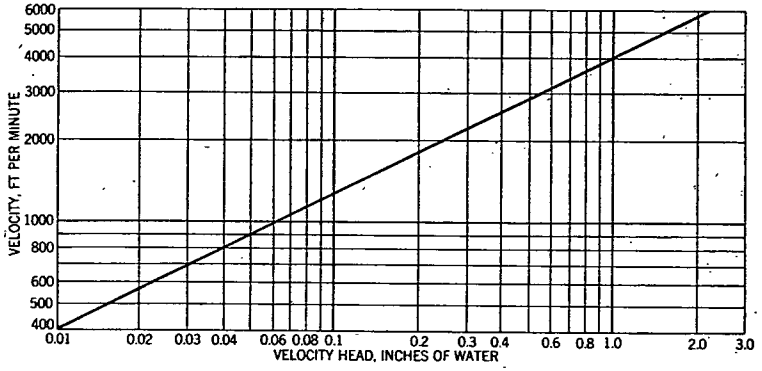


FIG. 4. RELATION BETWEEN VELOCITY AND VELOCITY HEAD FOR STANDARD AIR

$\frac{v^2}{2g}$ = the velocity pressure corresponding to the mean velocity of flow, feet of fluid flowing.
V = mean velocity of standard air, feet per minute.
C = an experimentally determined constant (dynamic loss coefficient).

It can be seen from Equation 4 that the dynamic loss coefficient is independent of both density and the units used, and that it represents the number of velocity heads lost at the conduit transition or bend. Values of the dynamic loss coefficient for various duct elements are sometimes tabulated,[6, 7, 8] though it should be kept in mind that absolutely reliable dynamic loss coefficients have not yet been fully established for all duct elements.

Fig. 4, which shows the relation of velocity pressure to velocity for standard air ($V = 4005\sqrt{H_v}$), can be conveniently used to find the total dynamic pressure loss for any duct element with known *dynamic loss coefficient C*. This coefficient is nearly independent of the air velocity and the roughness of the duct walls; therefore dynamic losses cannot theoretically be computed as friction losses. For duct components where intense eddying flow is not