

TABLE 12—FRICTION OF RECTANGULAR ELBOWS






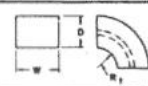
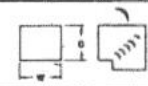
DUCT DIMENSIONS (in.)		RADIUS ELBOW NO VANES 	RADIUS ELBOW—WITH VANES‡				SQUARE ELBOWS‡	
								
W	D	Radius Ratio† R/D = 1.25	R _f = 6" (Recommended)		R _f = 3" (Acceptable)		Double Thickness Turning Vanes	Single Thickness Turning Vanes
ADDITIONAL EQUIVALENT LENGTH OF STRAIGHT DUCT (FT)								
			Vaness		Vaness			
96	48	31	45	2	43	3	40	60
	36	25	36	2	31	3	30	45
	30	22	31	2	38	2	25	37
	24	19	33	1	29	2	20	30
	20	16	28	1	25	2	17	25
72	48	28	44	2	41	3	35	60
	36	23	33	2	29	3	29	45
	30	21	28	2	33	2	25	37
	24	17	29	1	25	2	21	30
	20	15	23	1	19	2	18	25
	16	13	18	1	16	2	15	20
12	12			15	1	11	15	
60	48	27	41	2	39	3	33	60
	36	22	31	2	27	3	27	45
	30	19	25	2	31	2	23	37
	24	16	27	1	26	2	20	30
	20	14	22	1	21	2	17	25
	16	12	16	1	15	2	13	20
12	10			14	1	10	15	
48	96*	45	35	3				
	48	26	35	2	34	3	29	60
	36	20	26	2	22	3	23	45
	30	18	23	2	28	2	21	37
	24	15	24	1	21	2	18	30
	20	14	19	1	17	2	15	25
	16	11	15	1	14	2	12	20
	12	9			13	1	10	15
	10	8			11	1	8	12
8	8			9	1	7	10	
42	42	23	28	2	26	3	24	53
	36	20	24	2	21	3	22	45
	30	17	21	2	26	2	20	37
	24	15	21	1	19	2	16	30
	20	13	18	1	16	2	14	25
	16	11	14	1	13	2	12	20
	12	9			13	1	9	15
	10	8			10	1	8	12
	8	7			8	1	6	10
36	72*	34	27	3				
	36	19	22	2	19	3	20	45
	30	16	19	2	22	2	18	37
	24	14	20	1	22	2	15	30
	20	12	17	1	15	2	13	25
	16	10	13	1	12	2	11	20
	12	9			12	1	9	15
	10	8			9	1	8	12
	8	7			8	1	6	10
32	32	17	19	2	16	3	17	40
	30	16	18	2	21	2	17	37
	24	14	19	1	17	2	15	30
	20	12	16	1	14	2	12	25
	16	10	12	1	12	2	11	20
	12	8			12	1	8	15
	10	7			9	1	7	12
	8	6			8	1	6	10

TABLE 12—FRICTION OF RECTANGULAR ELBOWS (CONT.)

DUCT DIMENSIONS (in.)		RADIUS ELBOW NO VANES 	RADIUS ELBOW—WITH VANES‡		SQUARE ELBOWS‡			
								
W	D	Radius Ratio† R/D = 1.25	R _t = 6" (Recommended)	R _t = 3" (Acceptable)	Double Thickness Turning Vanes	Single Thickness Turning Vanes		
ADDITIONAL EQUIVALENT LENGTH OF STRAIGHT DUCT (FT)								
			Vaness		Vaness			
28	28	15	14	2	17	2	14	34
	24	13	17	1	15	2	13	30
	20	12	15	1	13	2	12	25
	16	10	11	1	11	2	10	20
	12	8			11	1	8	15
	10	7			9	1	7	12
	8	6			8	1	6	10
24	96*	38	19	3			23	80
	72*	32	17	3			21	72
	48*	22	20	2	20	3	18	62
	24	13	16	1	14	2	12	30
	20	11	13	1	12	2	10	25
	16	10	11	1	10	2	9	20
	12	8			10	1	8	15
	10	7			8	1	7	12
	8	6			7	1	6	10
	6	5					4	8
20	80*	32	16	3			19	66
	60*	26	19	2			17	58
	40*	22	15	2	14	3	14	49
	20	11	12	1	10	2	10	25
	16	9	9	1	9	2	8	20
	12	7			9	1	7	15
	10	6			8	1	6	12
	8	5			7	1	5	10
	6	4					4	8
16	64*	26	9	3			14	48
	48*	21	12	2	12	3	12	43
	32*	15	11	2	9	3	11	38
	16	9	8	1	8	2	7	20
	12	7			8	1	6	15
	10	6			6	1	5	12
	8	5			6	1	5	10
	6	4					4	8
12	48*	19	8	2	8	3	10	33
	36*	16	7	2	7	3	9	30
	24*	11	8	1	8	2	8	26
	12	7			7	1	5	15
	10	6			5	1	5	12
	8	5			5	1	4	10
	6	4					3	8
10	40*	19	6	2	6	3	8	27
	30*	13	6	2	8	2	7	24
	20*	9	7	1	6	2	6	21
	10	5			5	1	4	12
	8	4			5	1	4	10
	6	4					3	8
8	32*	13	5	2	4	3	6	21
	24*	11	6	1	5	2	6	19
	16*	8	4	1	5	2	5	16
	8	4			4	1	3	10
	6	3					3	8
6	24*	10	4	1	4	2	4	15
	18*	8	3	1	4	2	4	13
	12*	6			4	1	3	11
	6	3					3	8

*Denotes Hard Bends as shown

Hard Bend



Easy Bend



†For other radius ratios, see Table 10.

‡For other sizes, see Table 10.

Vaness must be located as illustrated in Chart 6, page 24, to have these minimum losses.