

TABLE 1. CIRCULAR EQUIVALENTS OF RECTANGULAR DUCTS FOR EQUAL FRICTION

Size Rectangular Duct	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
8	6.9	7.6	8.2	8.8	9.9															
10	7.2	8.0	8.7	9.3	10.4	11.0	12.1													
11	8.0	8.8	9.6	10.2	10.9	11.5	12.1													
12	8.3	9.2	10.0	10.7	11.4	12.0	12.6	13.2	14.3											
13	8.7	9.6	10.4	11.1	11.8	12.5	13.1	13.7	14.3	15.4										
14	8.9	9.9	10.8	11.5	12.3	12.9	13.6	14.3	14.9	15.4	16.5									
15	9.2	10.2	11.1	11.9	12.7	13.4	14.1	14.7	15.3	16.0	16.5	17.6								
16	9.5	10.5	11.4	12.3	13.1	13.8	14.5	15.2	15.8	16.5	17.1	17.6	18.7							
17	9.8	10.8	11.8	12.6	13.5	14.2	15.0	15.7	16.3	17.0	17.6	18.2	18.7	19.8						
18	10.0	11.1	12.1	13.0	13.8	14.6	15.4	16.1	16.8	17.4	18.1	18.7	19.2	20.4	20.9					
19	10.3	11.4	12.4	13.3	14.2	15.0	15.8	16.5	17.2	17.9	18.6	19.2	19.8	20.4	20.9	21.5				
20	10.5	11.6	12.7	13.6	14.5	15.4	16.2	17.0	17.6	18.4	19.0	19.7	20.3	20.9	21.5	22.0	23.6			
22	11.0	12.1	13.2	14.2	15.2	16.1	16.9	17.8	18.5	19.3	19.9	20.6	21.3	21.9	22.5	23.1	24.7	25.2		
24	11.4	12.6	13.8	14.8	15.8	16.8	17.6	18.5	19.3	20.0	20.8	21.5	22.2	22.8	23.5	24.0	25.7	26.3	26.9	
26	11.8	13.1	14.3	15.4	16.4	17.3	18.3	19.2	20.0	20.8	21.6	22.3	23.0	23.8	24.4	25.1	26.6	27.3	28.0	
28	12.2	13.5	14.8	15.9	17.0	18.0	19.0	19.8	20.7	21.5	22.4	23.1	23.9	24.6	25.3	26.0	27.3	28.2	29.1	
30	12.6	13.9	15.2	16.4	17.5	18.5	19.5	20.5	21.4	22.2	23.1	23.9	24.7	25.4	26.2	27.0	28.5	29.4	30.3	
32	12.9	14.3	15.6	16.9	18.0	19.1	20.1	21.1	22.0	22.9	23.8	24.6	25.4	26.2	27.0	27.8	29.3	30.2	31.1	
34	13.2	14.7	16.1	17.3	18.5	19.6	20.7	21.6	22.6	23.5	24.4	25.3	26.2	26.9	27.7	28.5	29.2	30.0	30.7	
36	13.6	15.1	16.4	17.7	19.0	20.1	21.2	22.2	23.2	24.2	25.1	26.0	26.8	27.7	28.5	29.3	30.0	30.8	31.5	
38	13.9	15.4	16.8	18.2	19.4	20.6	21.7	22.8	23.8	24.8	25.8	26.7	27.5	28.4	29.2	30.0	30.8	31.5	32.2	
40	14.3	15.7	17.2	18.6	19.8	21.1	22.2	23.3	24.4	25.4	26.4	27.3	28.2	29.1	29.9	30.8	31.6	32.4	33.1	
42	14.5	16.1	17.6	19.0	20.3	21.6	22.7	23.8	24.9	25.9	26.9	27.9	28.8	29.8	30.7	31.4	32.2	33.0	33.8	
44	14.8	16.4	18.0	19.4	20.7	22.0	23.1	24.3	25.4	26.5	27.5	28.5	29.5	30.3	31.2	32.1	32.9	33.7	34.5	
46	15.1	16.7	18.4	19.8	21.1	22.4	23.6	24.8	25.9	27.0	28.1	29.1	30.1	31.0	31.9	32.8	33.6	34.6	35.4	
48	15.4	17.0	18.7	20.1	21.5	22.8	24.1	25.2	26.3	27.5	28.6	29.6	30.5	31.6	32.5	33.4	34.3	35.2	36.1	
50	15.7	17.3	19.0	20.4	21.9	23.2	24.5	25.7	26.9	28.0	29.2	30.3	31.3	32.2	33.1	34.1	35.0	35.9	36.8	
52	15.9	17.6	19.2	20.8	22.2	23.6	24.9	26.2	27.4	28.5	29.6	30.7	31.8	32.9	33.8	34.7	35.6	36.5	37.4	
54	16.1	17.9	19.6	21.1	22.6	24.0	25.3	26.6	27.8	29.0	30.1	31.2	32.3	33.4	34.4	35.3	36.3	37.2	38.0	
56	16.3	18.2	19.9	21.5	22.9	24.4	25.7	27.0	28.3	29.5	30.6	31.7	32.8	33.9	34.9	35.9	36.9	37.8	38.7	
58	16.6	18.4	20.2	21.8	23.3	24.7	26.1	27.4	28.7	30.0	31.1	32.2	33.3	34.4	35.4	36.4	37.4	38.4	39.4	
60	16.8	18.7	20.4	22.1	23.6	25.1	26.5	27.8	29.1	30.5	31.6	32.7	33.8	34.9	36.1	37.1	38.1	39.1	40.0	
62	17.0	19.0	20.7	22.4	24.0	25.5	26.9	28.2	29.5	31.0	32.1	33.2	34.3	35.4	36.6	37.7	38.7	39.6	40.6	
64	17.3	19.3	21.0	22.7	24.3	25.9	27.3	28.6	29.9	31.3	32.6	33.7	34.8	35.9	37.1	38.2	39.2	40.2	41.2	
66	17.5	19.5	21.2	23.0	24.6	26.2	27.7	29.0	30.3	31.7	33.0	34.2	35.3	36.4	37.6	38.7	39.8	40.8	41.8	

TABLE 1. CIRCULAR EQUIVALENTS OF RECTANGULAR DUCTS FOR EQUAL FRICTION—(Continued)

Size Rectangular Duct	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	42	44	46	48
26	28.1	28.6																		
28	29.1	29.7	30.2	30.8																
30	30.1	30.7	31.3	31.9	32.5	33.0														
32	31.1	31.7	32.3	32.9	33.5	34.1	34.6	35.2	35.8	36.8	37.4	39.6								
34	32.0	32.7	33.3	33.9	34.5	35.1	35.7	36.3	36.8	37.4	38.5									
36	32.9	33.7	34.3	34.9	35.5	36.1	36.7	37.3	37.9											
38	33.8	34.6	35.3	35.9	36.5	37.1	37.7	38.4	39.0	39.5	40.1	40.7	41.2	41.8						
40	34.6	35.3	36.0	36.7	37.4	38.0	38.6	39.3	39.9	40.5	41.1	41.7	42.3	42.9	43.4	44.0	44.5	45.1	46.2	
42	35.2	36.0	36.8	37.6	38.3	39.0	39.6	40.3	40.9	41.5	42.1	42.7	43.4	44.0	44.5	45.1	45.6	46.2	46.7	
44	36.1	36.9	37.7	38.5	39.2	39.9	40.5	41.2	41.8	42.5	43.1	43.7	44.3	44.9	45.5	46.1	46.6	47.2	47.8	
46	37.0	37.8	38.5	39.3	40.0	40.8	41.5	42.2	42.9	43.5	44.2	44.8	45.4	46.0	46.6	47.2	47.8	48.4	49.0	
48	37.8	38.5	39.2	40.0	40.8	41.5	42.3	43.0	43.7	44.4	45.0	45.6	46.3	46.9	47.5	48.1	48.7	49.3	50.0	
50	38.4	39.2	40.0	40.8	41.5	42.3	43.0	43.8	44.5	45.2	45.9	46.5	47.1	47.9	48.5	49.1	50.4	51.6	52.9	
52	39.1	40.0	40.8	41.6	42.3	43.1	43.9	44.7	45.4	46.1	46.8	47.5	48.2	48.9	49.5	50.1	51.3	52.5	53.8	
54	39.8	40.7	41.5	42.4	43.2	44.0	44.7	45.5	46.4	47.0	47.6	48.4	49.2	49.9	50.5	51.1	52.3	53.5	54.8	
56	40.4	41.3	42.1	43.0	43.8	44.6	45.4	46.2	46.9	47.7	48.5	49.1	49.9	50.6	51.3	52.0	53.3	54.6	55.9	
58	41.2	42.1	42.9	43.8	44.5	45.4	46.2	47.0	47.8	48.5	49.4	50.0	50.8	51.5	52.2	52.9	54.2	55.5	56.8	
60	41.8	42.7	43.6	44.5	45.4	46.1	46.9	47.8	48.5	49.3	50.1	50.9	51.6	52.3	53.0	53.8	55.0	56.4	57.7	
62	42.5	43.4	44.3	45.1	46.0	46.8	47.6	48.4	49.3	50.0	50.9	51.7	52.4	53.0	53.9	54.5	55.9	57.2	58.5	
64	43.1	44.0	44.9	45.8	46.7	47.5	48.4	49.2	50.0	50.9	51.7	52.4	53.2	53.9	54.7	55.5	56.8	58.1	59.4	
66	43.7	44.7	45.6	46.5	47.3	48.2	49.1	50.0	50.7	51.6	52.4	53.1	53.9	54.7	55.5	56.2	57.6	59.1	60.4	
68	44.4	45.3	46.3	47.2	48.0	48.9	49.7	50.7	51.4	52.2	53.1	53.8	54.6	55.5	56.2	56.9	58.4	59.9	61.3	
70	45.0	46.0	46.9	47.8	48.7	49.5	50.4	51.3	52.0	52.9	53.7	54.5	55.4	56.2	57.0	57.7	59.1	60.6	62.1	
72	45.5	46.5	47.5	48.4	49.3	50.1	51.0	51.9	52.8	53.7	54.6	55.4	56.2	57.0	57.8	58.7	60.0	61.3	63.0	