

TABLE 108. FRICTIONAL RESISTANCE OF STRAIGHT CONVEYOR PIPE
To Flow of Air Per 100 Feet of Pipe

VEL. OF AIR IN FT. PER MIN.	LOSS OF PRESSURE IN INCHES FOR GIVEN DIAMETER PIPE						
	4"	5"	6"	7"	8"	10"	12"
2000	1.92	1.53	1.28	1.09	0.962	0.770	0.640
2200	2.32	1.85	1.55	1.32	1.16	0.932	0.778
2400	2.77	2.22	1.84	1.58	1.39	1.01	0.924
2600	3.26	2.60	2.17	1.86	1.63	1.30	1.08
2800	3.76	3.01	2.52	2.15	1.89	1.51	1.26
3000	4.33	3.46	2.88	2.47	2.08	1.73	1.44
3200	4.93	3.94	3.28	2.82	2.47	1.97	1.64
3400	5.56	4.45	3.71	3.18	2.78	2.22	1.85
3600	6.23	4.98	4.15	3.56	3.12	2.49	2.08
3800	6.95	5.55	4.62	3.97	3.48	2.78	2.32
4000	7.69	6.15	5.13	4.40	3.85	3.08	2.57
4200	8.48	6.78	5.65	4.85	4.25	3.49	2.83
4400	9.26	7.41	6.18	5.30	4.63	3.71	3.09
4800	11.05	8.85	7.38	6.32	5.55	4.43	3.69
5200	13.00	10.50	8.66	7.44	6.50	5.21	4.34
5600	15.25	12.05	10.05	8.61	7.55	6.03	5.05
6000	17.30	13.85	11.52	9.89	8.66	6.92	5.76
	14"	16"	18"	20"	22"	24"	30"
2000	0.550	0.482	0.428	0.385	0.350	0.320	0.257
2200	0.655	0.582	0.578	0.465	0.423	0.388	0.310
2400	0.790	0.693	0.617	0.553	0.504	0.462	0.369
2600	0.930	0.810	0.722	0.650	0.590	0.542	0.434
2800	1.07	0.932	0.838	0.754	0.685	0.628	0.503
3000	1.24	1.08	0.961	0.865	0.788	0.722	0.577
3200	1.41	1.23	1.09	0.985	0.895	0.820	0.657
3400	1.59	1.43	1.24	1.11	1.01	0.925	0.742
3600	1.78	1.56	1.38	1.25	1.13	1.04	0.832
3800	1.99	1.74	1.54	1.39	1.26	1.16	0.926
4000	2.20	1.92	1.71	1.54	1.40	1.28	1.03
4200	2.43	2.12	1.88	1.70	1.54	1.42	1.13
4400	2.66	2.33	2.06	1.85	1.68	1.54	1.24
4800	3.17	2.77	2.46	2.22	2.02	1.85	1.48
5200	3.72	3.25	2.89	2.61	2.36	2.16	1.75
5600	4.32	3.78	3.35	3.02	2.74	2.52	2.01
6000	4.95	4.33	3.85	3.46	3.14	2.89	2.31

FRICTIONAL RESISTANCE OF ELBOWS

Elbows having a radius equal to the pipe diameter set up a resistance equivalent to a section of straight pipe approximately 10 diameters long. With a radius of $1\frac{1}{4}$ times the diameter the resistance is about the same as seven diameters of straight pipe.

The usual types of ventilating fans are unsuitable for exhaust systems which are required to handle materials such as shavings, sawdust, emery dust, etc. Higher pressures are required than in ventilating work and in addition housings and blast wheel must be so constructed that the materials handled do not deposit in same. While the fans used in different exhaust systems are more or less of the same general type, modifications are frequently necessary to fit them for handling such materials as long shavings, strips of paper, cotton, pulverized coal, etc.

The most common method of separating the dust and other materials from the air is to pass the mixture through a centrifugal or "cyclone"

collector. In this type of collector the mixture of the air and material is introduced on a tangent, near the cylindrical top of the collector, and the whirling motion sets up a centrifugal action causing the comparatively heavy materials suspended in the air to be thrown against the side of the separator, from which position it spirals down to the tail piece, while the air escapes through the stack at the center of the collector.

For most systems, the nominal size and number of the collector will be the same as the diameter in inches of the main pipe leading to it. The nominal sizes of the different makes of collectors vary greatly, and it is advisable to make sure that a collector is large enough to do the work without excessive pressure drop, irrespective of nominal number or size. The larger the collector the better will be the separation, and the less will be the back pressure on the fan and power consumed.



FIG. 83. EXHAUST AND CONVEYING SYSTEM HANDLES WASTE FROM WOOD-WORKING MACHINES

Special construction is sometimes required for fine dust, also some blow pipe manufacturers use a special type of collector for furnace feed, the object being to deliver the material to furnaces as uniformly as possible.

When more than one fan delivers into a single collector a back pressure valve is required to prevent one fan blowing back through the other in case the second fan should stop for any reason.

In most plants, where wood refuse is used for fuel, it is delivered by gravity directly from the collector to the furnace. The discharge pipe leading from the bottom of the collector is divided and the junction furnished with a switch or valve so arranged that when the material comes too fast for the fires it can be diverted into a reserve bin.

The furnace feeder should be hinged where it is attached to the lower end of the discharge pipe, in order that it may be disconnected from the