

TABLE 5. FRICTIONAL RESISTANCE OF STRAIGHT CONVEYOR PIPE  
To Flow of Air Per 100 Feet of Pipe

| VEL. OF AIR<br>IN FT.<br>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 throat radius equal to the pipe diameter set up a resistance equivalent to a section of straight pipe approximately 10 diameters long. With a throat 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.

## COLLECTORS

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

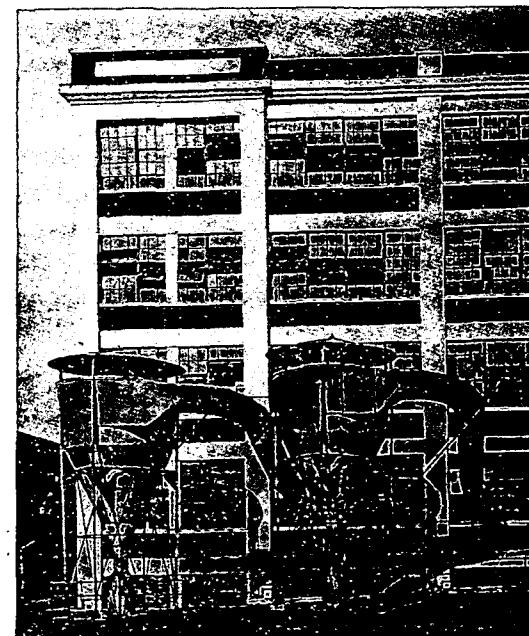


FIG. 1. COLLECTORS ON ROOF PIANO FACTORY

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 within certain limits the better will be the separation, and the less will be the back pressure on the fan and power consumed.

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