TABLE 1. RATES OF FLOW THROUGH BRANCH PIPES WOODWORKING MACHINES

| Pipe Diameter, In. | Air Volume, Cfm | Pipe Diameter, In. | Air Volume, Cfm |
|---|---|---|---|
| 3 | 200 | 6 | 800 |
| 4 | 350 | 7 | 1100 |
| 5 | 550 | 8 | 1400 |

TABLE 2. BRANCH PIPE SIZE FOR WOODWORKING MACHINE HOODS

| Type of Machine | Size, In. | | No. of Branches | Minimum Diameter, In. | | |
|---|---|---|---|---|---|---|
| | Min. | Max. | | Bottom Branch | Top Branch | Others |
| Self feed table saw | | | 2 | 5 | 4 | |
| Other single saws | | 18 | 1 | | 4 | |
| | 18 | | 1 | | 5 | |
| Saws with Dado Head | | | 1 | | 5 | |
| Band saws | | 2 | 2 | 4 | 4 | |
| | 2 | 3 | 2 | 5 | 4 | |
| | 3 | 6 | 2 | 5 | 5 | |
| Disc sanders | | 18 | 1 | 4 | | |
| | 18 | 28 | 1 | 5 | | |
| | 26 | 32 | 2 | 4 | 4 | |
| | 32 | 38 | 2 | 5 | 4 | |
| | 38 | 48 | 3 | 5 | 4 | 4 |
| Triple drum sanders | | 30 | 1 | 7 | | |
| | 30 | 36 | 1 | 8 | | |
| | 36 | 42 | 1 | 9 | | |
| | 42 | 48 | 1 | 10 | | |
| Single drum sanders: (area in sq in.) | | 350 | 1 | 4[a] | | |
| | 350 | 700 | | 5 | | |
| | 700 | 1400 | | 6 | | |
| | 1400 | 2800 | | 7 | | |
| Horizontal belt sanders | | 9 | 2 | 5 | 4 | |
| | 9 | 14 | 2 | 6 | 4 | |
| Vertical belt sanders | | 6 | 1 | 4 | | |
| | 6 | 9 | 1 | 5 | | |
| | 9 | 14 | 1 | 6 | | |
| Jointers | | 8 | 1 | 4 | | |
| | 8 | 20 | 1 | 5 | | |
| Single planers | | 20 | 1 | 5 | | |
| | 20 | 26 | 1 | 6 | | |
| | 26 | 36 | 1 | 7 | | |
| Tenoner | | | 2 | 5 | 5 | |

[a]Not over 10 in. diameter.

TABLE 3. RATES OF FLOW THROUGH BRANCH PIPES GRINDING AND BUFFING WHEELS

| Pipe Diameter, In. | Air Volume, Cfm | Pipe Diameter, In. | Air Volume, Cfm |
|---|---|---|---|
| 3 | 225 | 6 | 900 |
| 4 | 400 | 7 | 1200 |
| 5 | 600 | | |



TABLE 4. BRANCH PIPE SIZES FOR GRINDING AND BUFFING HOODS

| Type of Wheel | Wheel Size Diameter, In. | | Maximum | | Branch Pipe Minimum Diameter, In. |
|---|---|---|---|---|---|
| | Min. | Max. | Width In. | Area Sq In. | |
| Grinding | --- | 9 | 1 | 30 | 3 |
| | 9 | 18 | 3 | 175 | 4 |
| | 18 | 24 | 4 | 300 | 5 |
| | 24 | 30 | 5 | 500 | 6 |
| | 30 | 36 | 6 | 700 | 7 |
| Disc Grinding | --- | 20 | --- | 300 | 4 |
| | 20 | 30 | --- | --- | 5 |
| Buffing, Polishing and Scratch Brushing | --- | 8 | 2 | 50 | 3½ |
| | 8 | 16 | 3 | 150 | 4 |
| | 16 | 24 | 4 | 300 | 5 |
| | 24 | 30 | 6 | 600 | 6 |

respect to the hood are known. This is clearly indicated by Equation 3 which shows that the velocity at any point along the axis varies approximately inversely as the square of the distance. This formula coupled with Equation 1 should serve to indicate the velocity conditions to be expected when operations are conducted externally to the hood opening.

### Design Based on Total Air Flow

Where the foregoing factors are not known, the usual method of designing an exhaust system is to base the air flow through the system on rates of flow through each hood which have been found by experience to provide adequate control. For woodworking systems the rates of flow given in Table 1, calculated on the basis of a branch velocity of 4000 fpm, are adequate for control. Using these air flow rates, Table 2 gives the size of pipe connections to be used with the more common woodworking machines. Properly designed grinding and buffing wheel hoods have been found to be adequately controlled when the rates of air flow given in Table 3, calculated on the basis of a branch velocity of 4500 fpm, are used. Table 4 gives the minimum branch pipe sizes to be used on the more common sizes of grinding and buffing wheels.

In some states grinding, polishing and buffing wheels are subject to regulation by codes. (See Standards, Chapter 51.) The static suction requirements, which range from 1½ to 5 in. water displacement in a *U*-tube, must be followed in such states although in several instances they appear to be excessive. Frequently, in these operations, a large part of the wheel must be exposed and the dust-laden air within the hood is thrown outward by the centrifugal action of the wheel, thus counteracting useful inward draft. This tendency may be diminished by locating the connecting duct so as to create an air flow of not less than 200 fpm past the lower edge of the wheel.

### Controlling Air Velocities

Exact determinations of hood control velocities are not available, but it is safe to assume that for most dusty operations velocities should not be less than 200 fpm at the point of origin. Recommended air velocities through hood openings for various processes are given in Table 5. For granite dust generated by pneumatic devices, velocities from 150 to