TABLE 2. BRANCH PIPE SIZE FOR WOODWORKING MACHINE HOODS

Based on a Pipe Velocity of 4000 fpm.

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.

No set rule can be given regarding the shape of a hood for a particular operation, but it is well to remember that its essential function is to create an adequate velocity distribution. The fact that the zone of greatest effectiveness does not extend laterally from the edges of the opening, may frequently be utilized in estimating the size of hood required. Where complete enclosure of a dusty operation is contemplated, it is desirable to leave enough free space to equal the area of the connecting duct. Hoods for grinding, polishing, and buffing should fit closely, but, at the same time should provide an easy means for changing the wheels. It is advisable to design these hoods with a removable hopper at the base to capture the heavy dust and articles dropped by the operator. Such provisions are of

assistance in keeping the ducts clear. The air quantity required to capture dust which is thrown or projected in a direction away from the hood at considerable velocity, may often be reduced by effective baffling or partial enclosure of an operation. This procedure is strongly urged where dusts are directed beyond the zone of influence of the hood.

Air Flow from Static Readings

State Codes for local exhaust systems at certain operations list minimum static suction requirements which may range from 1½ in. to 5 in. water column. Frequently, in grinding, buffing, and polishing 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.

The static suction at the throat of a hood is frequently used in practice as a measure of the effectiveness of control. Where the hood coefficient is known, the volume of air flow through any hood may be determined from the equation:

$$Q = 4005 f A \sqrt{h_s} \qquad (2)$$

where

Q = quantity of air exhausted, cubic feet per minute.
A = area of connecting duct, square feet.
h_s = static suction measured at approximately 3 diameters from throat of hood, inches of water.
f = orifice or restriction coefficient which varies from 0.6 to 0.95, depending on the shape of the hood.[5]

An average value of f is 0.8, although for a well-shaped opening a value of 0.85 to 0.9 may be used. The factor f is determined from the equation:

$$f = \sqrt{\frac{h_v}{h_s}} \qquad (3)$$

where h_v is the velocity head in the connecting duct.

The *static suction* is not a good measure of the effectiveness of a hood, unless the area of the opening and the location of the operation, with respect to the hood, are known. This is clearly indicated by Equation 4 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 2, should serve to indicate the velocity conditions to be expected when operations are conducted externally to the hood opening.

Axial Velocity Formula for Hoods

When the normal flow of air into a hood is unobstructed, Equation 4 may be used to determine the air velocity at any point along the axis:[11]

$$V = \frac{0.1\,Q}{x^2 + 0.1\,A} \qquad (4)$$

where

V = velocity at point, feet per minute.
Q = quantity of air exhausted, cubic feet per minute.
x = distance along axis, feet.
A = area of opening, square feet.