

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 3 which shows that the velocity at any point along the axis varies approximately inversely as the square of the distance. However, this formula coupled with Equation 1 should serve to indicate the velocity conditions to be expected when operations are conducted external to the hood opening.

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	18	1		4	
			1		5	
Saws with Dado Head			1		5	
Band saws	2	2	2	4	4	
	3	3	2	5	4	
		6	2	5	5	
Disc sanders	18	18	1	4		
	26	28	1	5		
	32	32	2	4	4	
	38	38	2	5	4	
		48	3	5	4	4
Triple drum sanders	30	30	1	7		
	36	36	1	8		
	42	42	1	9		
		48	1	10		
Single drum sanders: (area in sq in.)	350	350	1	4 ^a		
	700	700		5		
	1400	1400		6		
		2800		7		
Horizontal belt sanders	9	9	2	5	4	
		14	2	6	4	
Vertical belt sanders	6	6	1	4		
	9	9	1	5		
		14	1	6		
Jointers	8	8	1	4		
		20	1	5		
Single planers	20	20	1	5		
	26	26	1	6		
		36	1	7		
Tenoner			2	5	5	

^aNot over 10 in. diameter.

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

PIPE DIAMETER, IN.	AIR VOLUME, CFM
3	225
4	400
5	600
6	900
7	1200

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 48.) 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 may 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.

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	9	1	30	3
	18	18	3	175	4
	24	24	4	300	5
	30	30	5	500	6
		36	6	700	7
Disc Grinding	20	20	----	300	4
		30	----	----	5
Buffing, Polishing and Scratch Brushing	8	8	2	50	3½
	16	16	3	150	4
	24	24	4	300	5
		30	6	600	6