

Table 3.... A Guide to Ventilation Rates for Typical Industrial Equipment  
 State or Local Regulations Should be Consulted and Followed Where Higher Ventilation Rates are Specified

| Operation                                                                                                                  | Ventilation                                                                                   |                                                                                                                                                                                                                | Usual Transport Velocity Fpm | Remarks and References                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                            | Type of Hood                                                                                  | Air Flow                                                                                                                                                                                                       |                              |                                                                                                                                                                                                                                                              |
| Abrasive blast rooms (sand, grit, or shot)                                                                                 | Tight enclosure with air inlets (usually in roof)                                             | 60-100 fpm downdraft (long rooms of tunnel proportions 100 fpm crossdraft)                                                                                                                                     | 3500                         | Ref. 8. Many codes specify minimum downdraft of 80 fpm                                                                                                                                                                                                       |
| Abrasive blast cabinets                                                                                                    | Tight enclosure with access openings                                                          | 20 air changes per minute but not less than 500 fpm through all openings                                                                                                                                       | 3500                         | Ref. 14                                                                                                                                                                                                                                                      |
| Asbestos: Carding<br>Spool winding                                                                                         | Enclosure<br>Local Hoods                                                                      | 800 cfm per machine<br>50 cfm per spool                                                                                                                                                                        | 3000<br>3000                 | Ref. 2, 16, 17. See references for details and other operations                                                                                                                                                                                              |
| Bagging: Open Bag Top                                                                                                      | Booth or enclosure (provide spillage hopper)                                                  | Paper bags—100 cfm per sq ft open area                                                                                                                                                                         | 3500                         | Ref. 18                                                                                                                                                                                                                                                      |
|                                                                                                                            |                                                                                               | Cloth bags—200 cfm per sq ft open area                                                                                                                                                                         | 3500                         |                                                                                                                                                                                                                                                              |
| Barrels—Drums (filling or removing material by scoop)                                                                      | Local Hood                                                                                    | 100 cfm sq ft of container cross-section                                                                                                                                                                       | 3500                         | Ref. 15, 19. Hood with 1-in. slot extending 120 to 180 deg container. Does not confine spillage. Confine spillage—also recommended for container upsetting                                                                                                   |
|                                                                                                                            | Booth                                                                                         | 100 fpm at face                                                                                                                                                                                                | 3500                         |                                                                                                                                                                                                                                                              |
| Belt conveyors                                                                                                             | Hood at transfer point                                                                        | Belt speeds less than 200 fpm—350 cfm per foot of belt width, but not less than 150 fpm through open area. Belt speeds over 200 fpm—500 cfm per foot of belt width but not less than 200 fpm through open area | 3500                         | Ref. 18, 20                                                                                                                                                                                                                                                  |
| Bins (closed top)                                                                                                          | Connect to bin top away from feed point                                                       | 150-200 fpm through open area at feed points                                                                                                                                                                   | 3500                         | Ref. 19, 20                                                                                                                                                                                                                                                  |
| Bucket elevators                                                                                                           | Tight casing required                                                                         | 10 cfm per sq ft of elevator casing cross-section                                                                                                                                                              | 3500                         | Ref. 19                                                                                                                                                                                                                                                      |
| Brick cutting and sising (abrasive cut-off wheel used dry)                                                                 | Local Hood<br>Booth with saw at face of booth                                                 | 500 cfm                                                                                                                                                                                                        | 3500                         | Ref. 7, 19. For portable operations. Control not as effective as booth                                                                                                                                                                                       |
|                                                                                                                            |                                                                                               | 150 fpm at face                                                                                                                                                                                                | 3500                         |                                                                                                                                                                                                                                                              |
| Ceramics<br>Dry pan<br>Dry press                                                                                           | Enclosure<br>Local at die<br>Local at die<br>At supply bin<br>Booth<br>Downdraft or side hood | 200 fpm through all openings                                                                                                                                                                                   | 3500                         | Ref. 19, 21, 22<br>Automatic feed<br>Manual feed<br>Manual feed                                                                                                                                                                                              |
|                                                                                                                            |                                                                                               | 600 cfm                                                                                                                                                                                                        | 3500                         |                                                                                                                                                                                                                                                              |
|                                                                                                                            |                                                                                               | 800 cfm                                                                                                                                                                                                        | 3500                         |                                                                                                                                                                                                                                                              |
|                                                                                                                            |                                                                                               | 500 cfm                                                                                                                                                                                                        | 3500                         |                                                                                                                                                                                                                                                              |
| Aerographing<br>Fettling, brushing, sagger filling, and unload                                                             | Downdraft or side hood                                                                        | 100 fpm (face)                                                                                                                                                                                                 | 3500                         |                                                                                                                                                                                                                                                              |
|                                                                                                                            |                                                                                               | 100-150 cfm per sq ft of plan area of dust producing operation                                                                                                                                                 | 3500                         |                                                                                                                                                                                                                                                              |
| Cooling Tunnels (foundry molds)                                                                                            | Enclosure                                                                                     | 75-100 cfm per running foot of enclosure                                                                                                                                                                       |                              | Ref. 20                                                                                                                                                                                                                                                      |
| Crushers and grinders                                                                                                      | Enclosure                                                                                     | 200 fpm through openings                                                                                                                                                                                       | 3500                         | Ref. 18, 23                                                                                                                                                                                                                                                  |
| Furnaces<br>Stationary melting pots for nonferrous<br>Tilting or rocking melting for non-ferrous<br>Electric Arc for Steel | Enclosure                                                                                     | 100-200 fpm at hood opening                                                                                                                                                                                    | 1500-2000                    | Ref. 11, 15, 22, 24, 25<br>Use higher ventilation rate for toxic fumes<br>Ventilation rate can be materially reduced with more complete enclosures<br>General ventilation of melting room may be substituted but involves greatly increased ventilation rate |
|                                                                                                                            | Canopy                                                                                        | 3000-6000 cfm                                                                                                                                                                                                  | 1500-2000                    |                                                                                                                                                                                                                                                              |
|                                                                                                                            |                                                                                               |                                                                                                                                                                                                                |                              |                                                                                                                                                                                                                                                              |
|                                                                                                                            | Hood attached to roof ring                                                                    | 2500 cfm per ton charged                                                                                                                                                                                       | 2500-3500                    |                                                                                                                                                                                                                                                              |

Table 3.... A Guide to Ventilation Rates for Typical Industrial Equipment (Continued)  
 State or Local Regulations Should be Consulted and Followed Where Higher Ventilation Rates are Specified

| Operation                                                                  | Ventilation                            |                                                                                                                                                                                       | Usual Transport Velocity Fpm | Remarks and References                                                                                                                                                                                                           |
|----------------------------------------------------------------------------|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                            | Type of Hood                           | Air Flow                                                                                                                                                                              |                              |                                                                                                                                                                                                                                  |
| Furnaces<br>Forge (hand)                                                   | Canopy                                 | 200 fpm at face                                                                                                                                                                       | 1500                         | Ref. 24                                                                                                                                                                                                                          |
| Garage (tail pipe at servicing location)                                   | Local hood slipped over tail pipe      | 100 cfm thru 3-in. flexible duct for autos up to 200 hp<br>200 cfm thru 4-in. flexible duct for trucks and autos above 200 hp<br>400 cfm thru 4½-in. flexible duct for Diesel engines | 2000                         | Ref. 15                                                                                                                                                                                                                          |
| Granite cutting and finishing<br>Pneumatic hand tools<br>Surfacing machine | Local hood                             | 500 cfm                                                                                                                                                                               | 5500-6000                    | Ref. 26, 27<br>Typical hood 3 x 8 in. opening with 3-in. flange<br>Hood surrounds tool                                                                                                                                           |
|                                                                            |                                        | 500 cfm for tools up to 2½-in. diameter<br>1000 cfm for 2½- to 2¾-in. diameter                                                                                                        | 5500-6000                    |                                                                                                                                                                                                                                  |
| Grinders<br>Polishers, buffers, etc.<br>Portable                           | Standard wheel hood<br>Downdraft bench | See Table 5<br>Bench type, 2-400 cfm per sq ft of exhaust grille but not less than 150 cfm per sq ft of plan working area.<br>100 fpm at face                                         | 3500                         | Ref. 22, 28<br>Ref. 15, 19, 22, 29                                                                                                                                                                                               |
|                                                                            |                                        | 100-200 fpm indraft through opening in booth face                                                                                                                                     | 3500<br>3000                 |                                                                                                                                                                                                                                  |
| Swing frame                                                                | Booth<br>Booth                         |                                                                                                                                                                                       |                              | Recommended for larger parts (Usual cfm per grinder 2000-4000)                                                                                                                                                                   |
| Kitchen range                                                              | Canopy                                 | 100 fpm at hood face                                                                                                                                                                  | 1500-1800                    | Provide drip gutter on all interior vertical walls to catch condensed grease. Ref. 30                                                                                                                                            |
| Laboratory hood (provide with door)                                        | Booth type                             | 50-100 fpm                                                                                                                                                                            |                              | Ref. 24, 31. Air supply location very critical                                                                                                                                                                                   |
| Metalizing                                                                 | Local hood<br>Booth                    | 200 fpm at hood face                                                                                                                                                                  | 3500                         | Ref. 15. Not recommended for toxic materials<br>Use higher ventilation rates for toxic materials                                                                                                                                 |
|                                                                            |                                        | 125-200 fpm at booth face                                                                                                                                                             | 3000                         |                                                                                                                                                                                                                                  |
| Mixers                                                                     | Enclosure                              | 100-200 fpm through feed and inspection openings                                                                                                                                      | 3000-3500                    | Ref. 19, 22                                                                                                                                                                                                                      |
| Motion picture projector (carbon arc)                                      | Enclosure                              | 12-100 cfm (for fume and gas removal) directly exhausted from projector housing                                                                                                       |                              | Ref. 31. 1000-1500 cfm or 20-30 air changes per hour for heat removal                                                                                                                                                            |
| Pharmaceuticals<br>Blenders                                                | Fully enclosed                         | 100 to 200 fpm through opening                                                                                                                                                        | 2500-3500                    | Exhaust required only when filling or emptying<br>Flexible exhaust hood connection extended into pans.<br>Feed opening covered to greatest possible extent.<br>Centrifuge to be provided with cover for 50-75 percent of opening |
| Coating pans                                                               | Hood                                   | 120 cfm exh 24-in. dia pan<br>60 cfm supply direct to pan<br>Differential 60 cfm                                                                                                      | 3000                         |                                                                                                                                                                                                                                  |
| Centrifuges                                                                | Enclosure                              | 250-300 fpm through opening                                                                                                                                                           | 1500-2000                    |                                                                                                                                                                                                                                  |
| Hammer mills<br>Oscillators<br>Shakers<br>Mixers                           | Local hood                             | 200 fpm but not less than 50 cfm                                                                                                                                                      |                              |                                                                                                                                                                                                                                  |
| Process kettles and tanks                                                  | Enclosure                              | Not less than 75 cfm per sq ft of plan area                                                                                                                                           | 2500-3500                    | Hood with slot at each end of mixer<br>Ref. 33. Use higher ventilation rate when contents are being heated                                                                                                                       |
|                                                                            |                                        | 100-250 fpm through opening or manhole                                                                                                                                                | 1500-2000                    |                                                                                                                                                                                                                                  |