# Introduction

Concrete is one of the most versatile and widely used materials in the construction industry. It can be custom-mixed for compressive strength or color application, placed in almost any shape or form, and finished to resemble masonry, stone, and other surfaces. Concrete is durable and virtually maintenance-free. It is also fairly easy to work with and installs relatively quickly.

Concrete estimating is generally divided into five basic areas:

- Concrete materials and placement
- Formwork
- Reinforcing
- Finishing
- Precast concrete

Concrete quantities are usually taken off in measures of cubic yards, as this is how supply companies charge for it. Formwork is taken off in square feet (generally in square feet of area in contact with the concrete as opposed to the actual area of the forms used). Reinforcing is normally taken off in tons of steel. Finishing is taken off in square feet of finished surface. Precast concrete quantities are taken off in either square feet or by the piece, depending on usage and the type of unit being considered.


Although concrete requires a large amount of energy to produce, there have been recent strides by manufacturers to reduce the environmental impacts of processing and using it. By adding blast furnace slag or coal fly ash (industrial waste products), the cement content of concrete is reduced along with the pollution and greenhouse gasses associated with its production. Using recycled aggregate reduces the amount of material needing to be transported to landfills. Concrete can also be formulated to be very porous; in this form it is useful in reducing pollution due to storm water runoff by allowing the water to seep into the ground where it can be absorbed naturally.

Traditional concrete does not have a high insulating value, but it does have a high mass. This can be used to its advantage. In passive solar spaces, concrete floors can soak up heat during hot summer days and release it during the cooler evenings. When additional insulation value is required for underground structures, permanent insulating formwork works well and saves the additional step of adding insulation after the concrete is cured.

Another green approach is finishing the concrete surface to a higher level of quality, possibly adding color or texture in lieu of adding carpeting or tile and their associated costs, both monetary and environmental.

# Checklist ✓

For an estimate to be reliable, all items must be accounted for. A complete estimate can also limit contingencies. The following checklist can be used to help ensure that all items are included.

- ☐ ***Access Flooring***
- ☐ ***Bases***
  - ☐ Cove
  - ☐ Sanitary
- ☐ ***Ceilings***
  - ☐ Acoustical
  - ☐ Dropped
  - ☐ Drywall
  - ☐ Insulation
    - ☐ Thermal
    - ☐ Acoustic
  - ☐ Plaster
  - ☐ Suspension system
- ☐ ***Drywall***
- ☐ ***Flooring***
  - ☐ Brick
  - ☐ Carpet
  - ☐ Carpet tile
  - ☐ Ceramic tile
  - ☐ Composition
  - ☐ Concrete topping
  - ☐ Metal tile
  - ☐ Paint
  - ☐ Epoxy
  - ☐ Urethane
  - ☐ Mosaic tile
  - ☐ Plastic tile
  - ☐ Quarry tile
  - ☐ Raised access
  - ☐ Resilient
    - ☐ Asphalt
    - ☐ Conductive
    - ☐ Cork
    - ☐ Linoleum
    - ☐ Polyurethane
    - ☐ Rubber tile
    - ☐ Sheet vinyl
    - ☐ Vinyl tile
  - ☐ Stone
  - ☐ Terrazzo
  - ☐ Wood
- ☐ ***Wall Finishes***
  - ☐ Ceramic tile
  - ☐ Planking
  - ☐ Plastic tile
  - ☐ Mosaic tile
  - ☐ Quarry tile
  - ☐ Metal tile
  - ☐ Paint
  - ☐ Paneling
  - ☐ Plaster
  - ☐ Stucco
  - ☐ Wainscoting
  - ☐ Wall coverings
    - ☐ Cloth
    - ☐ Paper
    - ☐ Vinyl

## **Figure 22-18** Roof Drain Sizing Chart

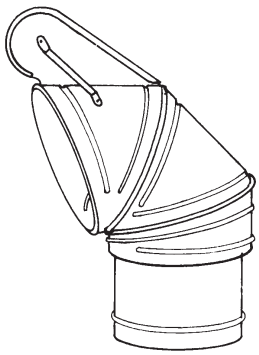
| Pipe Diameter | Max. S.F. Roof Area* | Gal./Min. |
|---|---|---|
| 2″ | 544 | 23 |
| 3″ | 1,610 | 67 |
| 4″ | 3,460 | 144 |
| 5″ | 6,280 | 261 |
| 6″ | 10,200 | 424 |
| 8″ | 22,000 | 913 |

*Design Assumptions: Vertical conductor size is based on a maximum rate of rainfall to 4" per hour. To convert roof area to other rates multiply "Max. S.F. Roof Area" shown by four and divide the result by desired local rate. The answer is the local roof area that may be handled by the indicated pipe diameter.

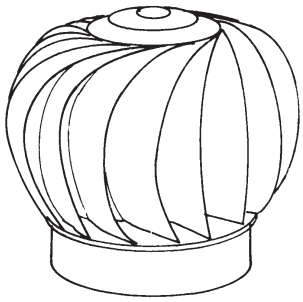
The above chart is meant to be used as a guide. Local building codes and requirements may vary from the values indicated and should be used when available.

**Figure 23-27** Installation Time in Labor-Hours for Roof Ventilators

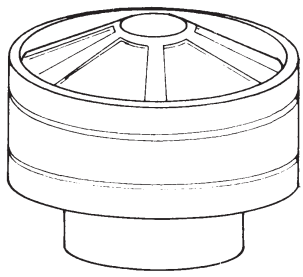
| Description | Labor-Hours | Unit |
|---|---|---|
| Rotary Syphons | | |
| 6″ Diameter 185 CFM | 1.000 | Ea. |
| 8″ Diameter 215 CFM | 1.143 | Ea. |
| 10″ Diameter 260 CFM | 1.333 | Ea. |
| 12″ Diameter 310 CFM | 1.600 | Ea. |
| 14″ Diameter 500 CFM | 1.600 | Ea. |
| 16″ Diameter 635 CFM | 1.778 | Ea. |
| 18″ Diameter 835 CFM | 1.778 | Ea. |
| 20″ Diameter 1080 CFM | 2.000 | Ea. |
| 24″ Diameter 1530 CFM | 2.000 | Ea. |
| 30″ Diameter 2500 CFM | 2.286 | Ea. |
| 36″ Diameter 3800 CFM | 2.667 | Ea. |
| 42″ Diameter 4500 CFM | 4.000 | Ea. |
| Spinner Ventilators | | |
| 4″ Diameter 180 CFM | .800 | Ea. |
| 5″ Diameter 210 CFM | .889 | Ea. |
| 6″ Diameter 250 CFM | 1.000 | Ea. |
| 8″ Diameter 360 CFM | 1.143 | Ea. |
| 10″ Diameter 540 CFM | 1.333 | Ea. |
| 12″ Diameter 770 CFM | 1.600 | Ea. |
| 14″ Diameter 830 CFM | 1.600 | Ea. |
| 16″ Diameter 1200 CFM | 1.778 | Ea. |
| 18″ Diameter 1700 CFM | 1.778 | Ea. |
| 20″ Diameter 2100 CFM | 2.000 | Ea. |
| 24″ Diameter 3100 CFM | 2.000 | Ea. |
| 30″ Diameter 4500 CFM | 2.286 | Ea. |
| 36″ Diameter 5500 CFM | 2.667 | Ea. |
| Stationary Gravity Syphons | | |
| 3″ Diameter 40 CFM | .667 | Ea. |
| 4″ Diameter 50 CFM | .800 | Ea. |
| 5″ Diameter 58 CFM | .889 | Ea. |
| 6″ Diameter 66 CFM | 1.000 | Ea. |
| 7″ Diameter 86 CFM | 1.067 | Ea. |
| 8″ Diameter 110 CFM | 1.143 | Ea. |
| 10″ Diameter 140 CFM | 1.333 | Ea. |
| 12″ Diameter 160 CFM | 1.600 | Ea. |
| 14″ Diameter 250 CFM | 1.600 | Ea. |
| 16″ Diameter 380 CFM | 1.778 | Ea. |
| 18″ Diameter 500 CFM | 1.778 | Ea. |
| 20″ Diameter 625 CFM | 2.000 | Ea. |
| 24″ Diameter 900 CFM | 2.000 | Ea. |
| 30″ Diameter 1375 CFM | 2.286 | Ea. |
| 36″ Diameter 2000 CFM | 2.667 | Ea. |
| 42″ Diameter 3000 CFM | 4.000 | Ea. |



**Rotary Syphon**



**Spinner Ventilator**



**Stationary Gravity Syphon**

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