

## APPENDIX F

### SIZING A RAPID SAND FILTER

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A swimming pool containing 216,000 gallons of water, recirculated at a turnover rate of 6 hours would require a system filtration rate of 600 gal/min. The 3 gal/min/ft<sup>2</sup> filter flow rate as recommended in chapter 12 establishes the filter size at a total necessary area of 200 square feet. Since a standard 96-inch-diameter sand filter tank provides 50.3 square feet of cross sectional area, a four tank battery of 96-inch-diameter filter vessels would provide the exact sand surface area needed.

Carrying the example one step further, by backwashing the filter cells individually at the full circulation rate of 600 gal/min, each filter bed would receive a flow four times the rate it experiences during the filter cycle or 12 gal/min/ft<sup>2</sup>, the approximate rate needed for effective cleaning and for satisfying public health agency requirements.

Rapid Sand Filter Sizing Calculation.

Water Volume = 216,000 gal.

Turnover Rate = 6 hrs.

$$\frac{216,000 \text{ gal.}}{6 \text{ hrs.}} \times \frac{1 \text{ hr.}}{60 \text{ min.}} = 600 \text{ gal/min.}$$

$$\frac{600 \text{ gal/min.}}{3 \text{ gal./min/ft.}^2} = 200 \text{ ft.}^2$$

$$\frac{200 \text{ ft.}^2}{50.3 \text{ ft.}^2/\text{filter tanks}} = 4 \text{ filter tanks}$$

Backwashing Calculation:

Circulation Rate = 600 gal/min.

$$\frac{600 \text{ gal/min.}}{50.3 \text{ ft.}^2/\text{filter tank}} = 12 \text{ gal/min/ft.}^2/\text{filter tank}$$