Acres in a circle = ($radius^2 \times \pi$) ÷ 43560

Radius needed for given acres = $\sqrt{\dfrac{\text{Acres} \times 43560}{\pi\ (\text{pi})}}$

Circumference = Radius x 2 x π or Diameter x π

Feet per Minute (FPM) (last tower @ 100%) = (Distance traveled x 60) ÷ Time (in seconds)

Hours per revolution (Hrs/Rev) = Circumference ÷ (FPM x 60)

GPM per acre (GPM/A) = GPM ÷ Acres Irrigated

Inches per day (In/Day) = GPM/A x .053

Inches per revolution (In/Rev) = (In/Day x Hrs/Rev) ÷ 24

Pi (π) = 3.14159
1 Acre = 43560 ft^2
1 Acre Foot of water = 325,851 Gallons

1 Acre Inch of Water = 27,154.29 gallons
1 psi = 2.307 Head Feet
1 Foot of Head = .4335 psi

0.30 m/s = 1 ft/s   1 m/s = 3.28 ft/s

1 inch = 24.4mm   1mm = .03937 inches

Volume

Cubic feet, gallons, acre-feet, acre-inches

Conversions

- 1 ft^3 = 7.480 gal
- 1 ac-ft = 43,560 ft^3 = 325,851 gal
- 1 ac-in = 3,630 ft^3 = 27,150 gal
- 1 acre = 43,560 ft^2

Discharge

Cubic feet per second, gallons per minute, millions of gallons per day

Conversions

- 1 cfs = 448.8 gpm
- 1 mgd = 1.547 cfs = 694.4 gpm
- 0.002228 cfs = 1 gpm

Volume = Discharge x Time

Pressure

Pressure is the normal force that a fluid exerts on a solid boundary, per unit surface area. Common units of pressure are pounds per square inch (psi) and pounds per square foot (psf).

- 1 psi = 144 psf
- atmospheric pressure is approximately 14 psi

Pressure can be reported in two different ways.

1) Absolute pressure: relative to absolute zero (perfect vacuum)
2) Gage pressure: relative to atmospheric pressure

In hydraulic engineering, pressures are always stated as gage pressures unless otherwise noted.

Hydrostatics

In a static liquid, pressure decreases with increasing elevation. The pressure difference between any two points can be calculated from the elevation difference and the liquid's specific weight (weight per unit volume).

- Specific weight of water = 62.4 lb/ft^3 = 8.34 lb/gal

Hydrostatic Law for Liquids (General)

Pressure difference = **-** (Specific weight of fluid) x (Elevation difference)

Hydrostatic Law for Water

Pressure difference in psi = **-**0.4333 x (Elevation difference in feet)