EWING® Irrigation & Landscape Supply **EwingIrrigation.com**

CONVERSION TABLE FOR U.S. AND METRIC SYSTEM

METRIC TO U.S.

MULTIPLY		TO OBTAIN
millimeter (mm)	x .03937	= inches
centimeters (cm)	x .3937	= inches
meters (m)	x 39.37	= inches
meters (m)	x 3.281	= feet
meters (m)	x 1.094	= yards
kilometers (km)	x .6214	= miles
kilometers (km)	x 1093.62	= yards
kilometers (km)	x 3280.87	= feet
liters (l)	x 1.0567	= quarts
liters (l)	x .2642	= gallons
liters (l)	x .455	= pounds
temperature in °C	(°C x 1.80) + 32°	= temp. in °F
kilograms/cubic centimeter (kg/cm^2)	x 14.223	= lb/sq in (PSI)
cubic feet (cu ft)	x 28.316	= liters

U.S. TO METRIC

MULTIPLY		TO OBTAIN
inches (in)	x 25.4	= millimeters
inches (in)	x 2.54	= centimeters
inches (in)	x .254	= meters
feet (ft)	x .3048	= meters
yards (yds)	x .9144	= meters
miles (mi)	x 1.6093	= kilometers
yards (yds)	x .0001943	= kilometers
feet (ft)	x .0003048	= kilometers
quarts (qts)	x .945	= liters
gallons (gals)	x 3.78	= liters
pounds (lbs)	x 2.2	= liters
temperature in °F	(°F - 32) x .5556	= temp. in °C

MISCELLANEOUS CONVERSION FACTORS

MULTIPLY		TO OBTAIN
AREA		
acres (ac)	x 43560	= square feet
acres (ac)	x 4046.8	= square meters
square meters (sq m)	x 10.764	= square feet
square feet (sq ft)	x 144	= square inches
square inches (sq in)	x 6.452	= square centimeters
hectares (ha)	x 10000	= square meters
hectares (ha)	x 2.471	= acres
POWER		
kilowatts (kW)	x 1.341	= horsepower
FLOW		
cubic feet/minute (cu ft/min)	x .0004719	= cubic meters/second
cubic feet/second (cu ft/sec)	x .02832	= cubic meters/second
cubic yards/minute (cu yd/min)	x .01274	= cubic meters/second
gallons/minute (gal/min)	x .22716	= cubic meters/hour
gallons/minute (gal/min)	x 3.7854	= liters/minute
gallons/minute (gal/min)	x .06309	= liters/second
cubic meters/hour (cu m/hr)	x 16.645	= liters/minute
cubic meters/hour (cu m/hr)	x .2774	= liters/second
liters/minute (l/min)	x 60	= liters/second
VELOCITY		
feet/second (ft/sec)	x .3048	= meters/second

MULTIPLY		TO OBTAIN
LENGTH		
feet (ft)	x 12	= inches
kilometers (km)	x .6214	= miles
miles (mi)	x 5280	= feet
miles (mi)	x 1609.34	= meters
millimeters (mm)	x .03937	= inches
PRESSURE		
PSI	x 6.89476	= kilopascals
PSI	x .068948	= bars
bars	x 100	= kilopascals
PSI	x 2.31	= feet of head
VOLUME		
cubic feet (cu ft)	x 7.48	= gallons
cubic feet (cu ft)	x 28.32	= liters
cubic meters (cu m)	x 35.31	= cubic feet
cubic meters (cu m)	x 1.3087	= cubic yards
cubic yards (cu yd)	x 27	= cubic feet
cubic yards (cu yd)	x 202	= gallons
acres/feet (ac/ft)	x 43,560	= cubic feet
gallons (gal)	x .003785	= cubic meters
gallons (gal)	x 3.785	= liters
imperial gallons (ig)	x 1.833	= gallons

SURGE PRESSURE

$$P = \left(\frac{VL}{T}\right)$$

WHERE:

P = Pressure rise (PSI) above the static pressure

V = Velocity of flow (ft/sec)

L = Length of pipe (ft) on the pressure side of the valve

T = Closing time of valve (sec)

WATER PRESSURE

Water pressure varies by .433 PSI for each foot of elevation change, or about 1 PSI for every 2.3 ft. gained or lost.

DEFINITIONS

Static Pressure – Water pressure without movement

Dynamic Pressure – Water pressure with movement

Precipitation Rate – How fast water is applied to the soil

Transpiration Rate – Amount of water plants require to live

CONVERSION TABLE FOR U.S. AND METRIC SYSTEM

Pressure drop calculations can be made for valves and strainers for different fluids, flow rates and sizes using the CV values and the following equation:

$$P = \frac{(G)^2 \text{ (specific gravity liquid)}}{(\text{CV Factor})^2}$$

WHERE:

P = Pressure drop in PSI; feet of water = $\frac{\text{PSI}}{.4332}$

G = Gallons per minute

CV = Gallons per minute per 1 PSI pressure drop

TYPICAL SOLENOID OHM READINGS

Irritrol	24
Hunter	24
Rain Bird PGA	36
Rain Bird DV	40
Weathermatic	30
Toro 252	29
Toro 1"	53

FRICTION LOSS THROUGH FITTINGS

Friction loss through fittings is expressed in equivalent feet of the same pipe size and schedule for the system flow rate.
Schedule 40 head loss per 100-feet values are usually used for other wall thicknesses and standard iron pipe size outside diameters.

ITEM	1/2"	3/4"	1"	1-3/4"	1-1/2"	2"	2-1/2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
Tee Run	1.0	1.4	1.7	2.3	2.7	4.0	4.9	6.1	7.9	12.3	14.0	17.5	20.0	25.0	27.0	32.0	35.0	42.0
Tee Branch	3.8	4.9	6.0	7.3	8.4	12.0	14.7	16.4	22.0	32.7	49.0	57.0	67.0	78.0	88.0	107.0	118.0	137.0
90 Ell	1.5	2.0	2.5	3.8	4.0	5.7	6.9	7.9	11.4	16.7	21.0	26.0	32.0	37.0	43.0	53.0	58.0	67.0
45 Ell	.8	1.1	1.4	1.8	2.1	2.6	3.1	4.0	5.1	8.0	10.6	13.5	15.5	18.0	20.0	23.0	25.0	30.0

LIGHTING WIRE GAUGE CHART

	WATTS													
FEET	**20**	**40**	**60**	**80**	**100**	**120**	**140**	**160**	**180**	**200**	**220**	**240**	**260**	**280**
20	12	12	12	12	12	12	12	12	12	10	10	10	8	8
40	12	12	12	12	12	12	12	12	10	10	10	10	8	8
60	12	12	12	12	12	12	12	10	10	10	10	10	8	8
80	12	12	12	12	12	12	10	10	10	10	8	8	8	8
100	12	12	12	12	12	10	10	10	10	8	8	8	8	
120	12	12	12	12	10	10	10	8	8	8	8	8		
140	12	12	12	10	10	10	10	8	8	8	8			
160	12	12	10	10	10	8	8	8	8					
180	12	10	10	10	8	8	8	8						
200	10	10	10	10	8	8	8							
220	10	10	10	8	8	8								
240	10	10	10	8	8	8								
260	10	10	8	8	8									
280	10	10	8	8	8									
300	10	10	8	8	8									

DISTRIBUTION UNIFORMITY

Formula for finding low quarter distribution uniformity

$$\mathbf{DUlq} = \frac{LQavg}{Vavg}$$

WHERE

DUlq = Low Quarter Distribution Uniformity
LQavg = Average Catch in Lower Quarter
Vavg = Average Catch Overall

DRIP IRRIGATION

Three Simple Steps to Getting Started

Step 1: Determine the water needs of plant. Consult the experts from which you purchased your plant materials, or locate the evapotranspiration (ET) data online.

Step 2: Calculate the drip application rate.

$$\textbf{Application Rate (in/hr)} = \frac{\text{GPH} \times 1.604}{\text{irrigated area } \textbf{(in square feet)}}$$

Step 3: Adjust the run times.

$$\textbf{Run Time } \textit{(in minutes)} = \frac{\text{in. of water required}}{\text{application rate}} \times 60$$

CONVERSION FORMULAS

V=W/A **A**=W/V VxA=**W**

V = Voltage
A = Amperage
W = Watts

HARDSCAPE

Sand Setting Bed and Compacted Aggregate Base Material Calculation Chart

	TONS	YDS³	TONS	YDS³	TONS	YDS³
SQUARE FEET	**100**		**150**		**200**	
1" Sand Setting Bed	0.45	0.3	0.75	0.5	0.9	0.6
4" Compacted Aggregate Base	2.3	1.3	3.5	2.0	4.6	2.6
6" Compacted Aggregate Base	3.6	2.0	5.4	3.0	7.2	4.0
12" Compacted Aggregate Base	7.2	4.0	10.8	6.0	14.4	8.0

Calculations are approximate. Quantities may vary depending upon material density and moisture content.

FORMULAS

Area of a rectangle	length x width
Area of a triangle	1/2 (base x height)
Area of a circle	3.14 (radius x radius)
Cubic feet	length x width x height
	(27 cubic feet = 1 yard)

VOLTAGE DROP

Cable Constant Voltage Drop Formulas
(run length in feet)

8 GAUGE

$$\frac{\text{watts x run length x 2}}{18{,}960} = \text{Voltage Drop}$$

10 GAUGE

$$\frac{\text{watts x run length x 2}}{11{,}920} = \text{Voltage Drop}$$

12 GAUGE

$$\frac{\text{watts x run length x 2}}{7{,}500} = \text{Voltage Drop}$$

16 GAUGE

$$\frac{\text{watts x run length x 2}}{2{,}200} = \text{Voltage Drop}$$

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