



# CERTIFICATION PROGRAM

## Certified Irrigation Designer, General Landscape/Turf

Basic and non-irrigation equations and conversions are assumed to be known by candidates. POI refers to Principles of Irrigation, Irrigation Association 3<sup>rd</sup> Edition. 6<sup>th</sup> ed. refers to Irrigation, Irrigation Association. The equations are presented in the latest IA format and may appear different from those presented in the reference material.

1 cubic foot of water = 7.48 gallons		1 acre-inch = 27,154 gallons		1 acre-foot = 325,848 gallons	
$WC = \frac{WW - DW}{DW} \times 100$	POI 2-1	$AW = FC - PWP$			POI 5-1
$RAW = AW \times \frac{MAD}{100}$	POI 2-3	$AW_D = \frac{AW}{100} \times \frac{BD_{soil}}{BD_{water}} \times D$			POI 2-2
$PAW = AW \times RZ$	POI 2-4	$AD = PAW \times (MAD / 100)$			POI 2-5
$ET_L = ET_o \times K_L$ $ET_c = ET_o \times K_c$	POI 2-7 POI 2-8	$K_L = K_v \times K_d \times K_{mc}$			POI 2-6
$Q = \frac{18.86 \times A \times ET_c}{t \times (E_a / 100)}$	POI 5-6	$H = 2.31 \times P$			POI 8-1
$Q = A \times V$	POI 8-2	$V = \frac{0.408 \times Q}{ID^2}$			POI 8-3
$H_v = \frac{V^2}{2 \times g}$	POI 8-4	$H_{p1} + \frac{V_1^2}{2 \times g} + Z_1 = H_{p2} + \frac{V_2^2}{2 \times g} + Z_2 + H_L$			6 <sup>th</sup> ed. Ch. 7 p. 221
$H_z = k_z \times \frac{V^2}{2 \times g}$ Z = various values depending upon equation	POI 8-8, 8-9, 8-10, 8-11	$k = \left(1 - \frac{D_1^2}{D_2^2}\right)^2$			POI 8-12
$k = 0.7 \times \left(1 - \frac{D_1^2}{D_2^2}\right)^2$	POI 8-13	$H_f = 0.2083 \times \left(\frac{100}{C}\right)^{1.852} \times \frac{Q^{1.852}}{D^{4.866}} \times \frac{L}{100}$			POI 8-7
$Q = k \times C \times A \times \sqrt{P}$	POI 8-17	$\frac{Q}{Q_0} = \sqrt{\frac{P}{P_0}}$			6 <sup>th</sup> ed. Ch. 7 p. 254



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$PR = \frac{96.3 \times Q}{A}$	<p>Various A values</p> $A = S_1 \times S_2$ $A = 0.866 \times S^2$ $A = 0.8 \times D_t \times S$	POI 3-2, 3-4, 3-5	$Whp = \frac{Q \times H}{3,960}$	POI 9-2
$NPSHa = H_a - H_s - H_f - H_{vp}$		POI 9-1	$Bhp = \frac{Q \times H}{3,960 \times (E_p / 100)}$	POI 9-3
$\frac{Q_2}{Q_1} = \frac{N_2}{N_1}$		POI 9-5	$\frac{H_2}{H_1} = \left( \frac{N_2}{N_1} \right)^2$	POI 9-5
$\frac{Bhp_2}{Bhp_1} = \left( \frac{N_2}{N_1} \right)^3$		POI 9-5	$\frac{Q_2}{Q_1} = \frac{D_2}{D_1}$	POI 9-6
$\frac{H_2}{H_1} = \left( \frac{D_2}{D_1} \right)^2$		POI 9-6	$\frac{Bhp_2}{Bhp_1} = \left( \frac{D_2}{D_1} \right)^3$	POI 9-6
$V = I \times R$		POI 10-1	$R_w = \frac{1,000 \times AVL}{2 \times L \times I}$	POI C2-1
$IN_m = \frac{AD}{ET_c}$		POI 5-3	$IR_{gross} = \frac{IR_{net}}{E_a / 100}$	POI 5-4
$RT = 60 \times \frac{IR_{gross}}{PR}$		POI 5-5	$IR_{net} = IN_a \times ET_c$	POI 5-4 similar