



# Irrigation ASSOCIATION CERTIFICATION PROGRAM

## Certified Landscape Water Manager Examination Equations

Basic and non-irrigation equations and conversions are assumed to be known by candidates. The equations are presented in the latest IA format and may appear different from those presented in the reference material. The following references are cited:

BMP refers to Landscape Irrigation Best Management Practices, Irrigation Association & ASIC, Nov. 2013


LIA refers to Landscape Irrigation Auditor, Irrigation Association, Feb. 2013

GIA refers to Golf Irrigation Auditors, Irrigation Association, July 2007

ICW refers to Landscape Irrigation Contractor Workbook, Irrigation Association, Oct. 2013

POI refers to Principles of Irrigation, Irrigation Association, Dec. 2012

1 cubic foot of water = 7.48 gallons	1 acre-inch = 27,154 gallons	1 acre-foot = 325,848 gallons
$PAW = AW \times RZ$	GIA Eq. 3-9 POI Eq. 2-4	$AD = PAW \times (MAD / 100)$
$RAW = AW \times (MAD / 100)$	POI Eq. 2-3	$K_L = K_s \times K_d \times K_{mc}$
$Q = \frac{18.86 \times A \times ET_c}{t \times (E_a / 100)}$	POI Eq. 5-6	$IWR = \frac{\text{Plant water requirement}}{(DU/100)}$ (IWR= Irrigation water requirement)
$Q = A \times V$	ICW Eq. 8-2 POI Eq. 8-2	$PR = \frac{3.66 \times V_{avg \ net}}{t_R \times A_{CD}}$
$DU_{lq} = \left( \frac{\text{Average catch in lower quarter}}{\text{Average catch overall}} \right) \times 100$	GIA Eq. 3-6 ICW Eq. 3-2 POI Eq. 4-3	$SC = \frac{\text{Average catch overall}}{\text{Average catch in critical dry area}}$
$CU = 100 \times \left( 1 - \frac{\text{Average deviation}}{\text{Average catch}} \right)$	ICW Eq. 3-1 POI Eq. 4-7	Minutes per irrigation day = $\frac{RT}{\text{Days}}$



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$\text{Irrigation Days} = \frac{\text{PWR}}{\text{AD}}$	GIA Eq. 3-15	$\text{CRT} = 60 \times \frac{\text{Basic intake rate}}{\text{PR}}$	ICW p. 52
$\text{PR} = \frac{96.3 \times Q}{A}$ <p style="text-align: center;"><u>Various A values</u></p> $A = S_r \times S_s$ $A = 0.866 \times S_s^2$ $A = 0.8 \times D_t \times S_s$	ICW Eq. 4-2 LIA Eq. 7-6 GIA Eq. 3-4 POI Eq. 3-2b	$\text{Cycles} = \frac{\text{Run time}}{\text{Cycle run time}}$	ICW Eq. 5-2
$\text{ET}_L = K_L \times \text{ET}_o$	LIA Eq. 7-12	$\text{WR}_H = \frac{((\text{ET}_o \times \text{PF}) - R_c) \times \text{LA} \times 0.623}{\text{IE}}$	BMP 31
$\text{LWA} = \text{ET} \times \text{AF} \times \text{LA} \times 0.623 \times \text{LF}$	BMP p. 30	$Q = \frac{18.86 \times A \times \text{ET}_c}{t \times (E_a / 100)}$	POI Eq. 5-6
Intentionally left blank		$\text{IR}_{\text{gross}} = \frac{\text{IR}_{\text{net}}}{E_a / 100}$	POI 5-4
$\text{Whp} = \frac{Q \times H}{3,960}$	POI 9-2	$\text{Bhp} = \frac{Q \times H}{3,960 \times (E_p / 100)}$	POI 9-3
$Q = 28.62 \times d^2 \times \sqrt{p}$	POI 8-17 similar, no constants.	Intentionally left blank	