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Landscape/Turf Specialty Commercial Examination Equations

Basic and non-irrigation equations and conversions are assumed to be known by candidates. POI refers to Principles of Irrigation, 3rd ed. Dec. 2012. Irrigation Association. 6th ed. refers to Irrigation, Irrigation Association. Handbook refers to Handbook of Technical Irrigation Information, Hunter, 2010. 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 gallon water weighs 8.328 lbs

$PAW = AW \times RZ$	POI 2-4	$AD = PAW \times (MAD / 100)$	POI 2-5
$ET_c = ET_o \times K_c$	POI 2-8	$Q = \frac{0.0104 \times ET_0 \times K_c \times Area}{(DU / 100) \times Hrs.\ Available}$	Handbook p. 14 similar
$Area = \frac{DU \times Q_{day}}{0.6233 \times ET_o \times K_c}$	Handbook p. 15 similar	This space intentionally left blank.	
$Q = \frac{18.86 \times A \times ET_c}{t \times (E_a / 100)}$	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	$H_{p1} + \frac{V_1^2}{2 \times g} + Z_1 = H_{p2} + \frac{V_2^2}{2 \times g} + Z_2 + H_L$	6th 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	$\frac{Q}{Q_0} = \sqrt{\frac{P}{P_0}}$	6TH ed. Ch. 7 p. 254

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$PR = \frac{96.3 \times Q}{A}$ Various A values $A = S_r \times S_s$ $A = 0.866 \times S_s^2$ $A = 0.8 \times D_t \times S_s$	POI 3-2, 3-4, 3-5	This space intentionally left blank.	
$Whp = \frac{Q \times H}{3,960}$	POI 9-2	$Bhp = \frac{Q \times H}{3,960 \times (E_p / 100)}$	POI 9-3
$NPSHa = H_a - H_s - H_f - H_{vp}$	POI 9-1	$\frac{Q_2}{Q_1} = \frac{N_2}{N_1}$	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
$p_s = \frac{0.07 \times (velocity) \times (length of straight pipe)}{(valve closing time)}$	POI 8-15	$IN_m = \frac{AD}{ET_c}$	POI 5-3
$IR_{net} = IN_a \times ET_c$	POI 5-4 similar	$IR_{gross} = \frac{IR_{net}}{E_a / 100}$	POI 5-4
$RT = 60 \times \frac{IR_{gross}}{PR}$	POI 5-5	This space intentionally left blank.	