



CERTIFICATION PROGRAM

Agriculture Specialty Sprinkler Examination Equations

Basic and non-irrigation equations and conversions are assumed to be known by candidates. POI references PRINCIPLES OF IRRIGATION, 2012. The equations are presented in the latest IA format and may appear different from those presented in the reference material.

1 cubic ft of water = 7.48 gal. 1 hp = 0.746 Kw	1 acre-inch = 27,154 gal. 1 acre = 43,560 sq ft	1 gal. water weighs 8.328 lbs	
$Q = \frac{18.86 \times A \times ET_c}{t \times (E_a / 100)}$	POI 5-6	$H = 2.31 \times P$	POI 8-1
$P_l = P_a + \gamma_c \times (0.75 \times H_f + 0.5 \times \Delta H_e + H_r)$	IRRIG6th ed Eq. 7.38	This space intentionally left blank.	
$Q = A \times V$	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	$H_1 + \frac{V_1^2}{2 \times g} + Z_1 = H_2 + \frac{V_2^2}{2 \times g} + Z_2 + H_{f1-2}$	IRRIG6 th ed Eq. 7.8
$H_z = K_z \times \frac{V^2}{2 \times g}$ 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	$\frac{Q}{Q_0} = \sqrt{\frac{P}{P_0}}$	IRRIG6 th ed. p. 254 & 416
$PR = \frac{96.3 \times Q}{A}$ <u>Various A values</u> $A = S_1 \times S_2$ $A = 0.866 \times S^2$ $A = 0.8 \times D_t \times S$	POI 3-2, 3-4, 3-5	$InputPower = \frac{BrakePower}{(E_{pump} / 100)}$	POI 9-4



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$W_{hp} = \frac{Q \times H}{3,960}$	POI 9-2	$B_{hp} = \frac{Q \times H}{3,960 \times (E_p / 100)}$	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	$\frac{B_{hp_2}}{B_{hp_1}} = \left(\frac{N_2}{N_1} \right)^3$	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
$\frac{B_{hp_2}}{B_{hp_1}} = \left(\frac{D_2}{D_1} \right)^3$	POI 9-6	$V = I \times R$	POI 10-1
$RT = 60 \times \frac{IR_{gross}}{PR}$	POI 5-5	$IN_m = \frac{AD}{ET_c}$	POI 5-3
$IR_{gross} = \frac{IR_{net}}{E_a / 100}$	POI 5-4	$IR_{net} = IN_a \times ET_c$	POI 5-4 similar
Traveler $D_t = 96.3 \times \left(\frac{Q}{W \times v} \right)$	Irrigation 6 th ed. p. 804	Center Pivot $PR_{aip} = 96.3 \times \left(\frac{Q \times r_i}{R_m^2 \times R_t} \right)$	POI 3-8
Center Pivot $D_p = 96.3 \times \left(\frac{Q \times t}{A} \right)$	Irrigation 6 th ed. p. 797	Linear Move $PR = 96.3 \times \left(\frac{Q}{2 \times R_t \times L} \right)$	POI 3-9