Irrigation Association CERTIFICATION PROGRAM

Agriculture Specialty Drip/Micro Examination Equations

Basic and non-irrigation equations and conversions are assumed to be known by candidates. DMI refers to DRIP AND MICRO IRRIGATION DESIGN AND MANAGEMENT by Burt and Styles. 2016. 6th refers to IRRIGATION published by the Irrigation Association. The equations are presented in the latest IA format and may appear different from those presented in the reference material. **Units of some of the variables may also be different from your reference material. Review these equations before taking the exam.**

1 cubic foot of water = 7.48 gallons   1 acre-inch = 27,154 gallons   1 acre-foot = 325,848 gallons

$DU_{LQ} = \frac{\text{Average low quarter depth of water}}{\text{Average depth of water accumulated in all elements}}$	DMI p. 17
$IE(\%) = \frac{\text{Irrigation Water Beneficially Used}}{\text{Irrigation Water Applied}} \times 100$	DMI p. 20
$IS(\%) = \frac{\text{Irrigation Water Beneficially or Reasonably Used}}{\text{Irrigation Water Applied}} \times 100$	DMI p. 20
$C_v = \frac{\text{Standard Deviation}}{\text{Mean}}$	DMI p. 26 6th p. 420
$DU_{system} = DU_{\text{flow rate difference}} \times DU_{\text{uneven drainage}} \times DU_{\text{unequal spacing}}$	DMI p. 30
$DU_{new} \cong \left(1 - \frac{1.27 \times C_v}{\sqrt{n}}\right) \times \frac{q_{min}}{q_{avg}}$	DMI p. 30
$\text{Gross Applic. Rate} = \frac{\text{Peak Crop ET Rate - Contribution from Rain or High Water Table}}{\left(1 - \frac{\text{\% spray losses}}{100}\right) \times DU}$	DMI p. 58
$\text{Flow Rate} = \frac{\text{Volume}}{\text{Time}} = \frac{\text{Depth} \times \text{Area}}{\text{constant} \times \text{Time}}$	DMI p. 59
$\text{meq/l} = \frac{ppm}{\text{mellieqivalent weight in milligrams}}$	DMI p. 72
$\text{LR} = \frac{ECw}{(5 \text{ x ECe}) - ECw}$	DMI p. 85

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$Q = k \times P^x \,;\; x = \dfrac{\log\left(\dfrac{Q_1}{Q_2}\right)}{\log\left(\dfrac{P_1}{P_2}\right)}$	DMI p. 29 DMI p. 95-97 6TH p. 419
$H_f = f \times \dfrac{L \times V^2}{2 \times g \times D}$	DMI p. 108
$H_f = 4.55 \times \dfrac{(Q / C)^{1.852}}{D^{4.87}} \times L$	DMI p. 110
$H_{f(lateral)} = H_{f(mainline)} \times F$	DMI p. 117
$H_f = (4.37 \times 10^{-7}) \times \dfrac{Q^{1.75}}{D^{4.77}}$	DMI p. 120
$H_f = (5.92 \times 10^{-7}) \times \dfrac{Q^2}{D^4}$	DMI p. 121
$P_{inlet} = P_{\text{at emitter with avg. Q}} + 0.75 \times H_f + 0.5 \times (\text{Elevation Change}) + \text{Minor Losses}$	DMI p. 122
$\dfrac{Q_{min}}{Q_{avg}} = \left(\dfrac{P_{min}}{P_{avg}}\right)^x$	DMI p. 140
Allowable Pressure Difference = $2.5 \times (P_{avg} - P_{min})$	DMI p. 145
$CRF = \dfrac{i \times (i+1)^n}{(i+1)^n - 1}$	DMI p. 154
$Kw = \dfrac{P \text{ x } Q}{23 \text{ x (Pumping Plant Efficiency)}}$	DMI p.158