ADACONN® INSERTA®

FLUID POWER FORMULAE

CYLINDERS

GALLONS PER INCH = $\frac{A\ (in^2)}{231\ (in^3/GALLON)}$

CYLINDER SPEED = (Inches/Minute) $\frac{231\ (in^3/GALLON) \times GPM}{A\ (in^2)}$

HYDRAULIC MOTORS

RPM = $\frac{231\ (in^3/GALLON) \times GPM}{DISPLACEMENT\ (in^3/REV)}$

THEORETICAL FLOW (GPM) = $\frac{RPM \times DISPLACEMENT\ (in^3/REV)}{231\ (in^3/GALLON)}$

TORQUE (LB.-IN.) = $\frac{PSI \times DISPLACEMENT\ (in^3/REV)}{2\ \pi}$

TORQUE (LB.-FT.) = $\frac{PSI \times DISPLACEMENT\ (in^3/REV)}{2\ \pi \times 12}$

HORSE POWER = $\frac{TORQUE\ (LB.\text{-}IN.) \times RPM}{63{,}025}$

HORSE POWER = $\frac{TORQUE\ (LB.\text{-}FT.) \times RPM}{5{,}252}$

FLUID PIPING

VELOCITY IN CONDUIT = (Feet per Second) $\frac{0.3208 \times GPM}{A\ (in^2)}$

TUBE BURST

BURST PRESSURE = (Barlow Formula) $\frac{2ST}{D}$

S = ULTIMATE TENSILE STRENGTH (PSI)
T = NOMINAL WALL THICKNESS (IN.)
D = NOMINAL OD OF TUBING (IN.)

FLOW THROUGH AN ORIFICE

$$Q = C_o \times A \times \sqrt{\frac{2\Delta P}{\rho}}$$

Q = FLOWRATE
C_o = ORIFICE COEFFICIENT (0.61 – 0.98; 0.65 for thin, sharp edge orifice)
A = ORIFICE AREA
ΔP = PRESSURE DROP
ρ = FLUID DENSITY

HORSE POWER

HORSE POWER TO DRIVE PUMP = $\frac{GPM \times PSI}{1{,}715}$ x EFFICIENCY