Flow Profile Data and Recommended Pump Rates

For optimum hole-cleaning, the following formulas should be used.

$$AV = \frac{11{,}800}{\text{Diameter of hole} \times \text{Mud Wt.}}$$

AV = Annular Velocity (ft/min)

11,800 = k constant

Diameter of hole = inches

Mud Wt = ppg

$$PO = \frac{AV \times (\text{Dia. H2} - \text{Dia. Dp2})}{1029}$$

PO = Pump Output (bbl)

AV = Annular Velocity (ft/min)

Dia. H2 = Diameter of Hole Squared

Dia. Dp2 = Diameter of Drill Pipe Squared

The two formulas, when used, will help to find the optimum mud pump for the job. The **"mud pump data"** page will provide all detailed information about pumps that are available to you. All pump data is listed with numbers indicating 100% efficiency. The output data should be rated to 90% for triplex pumps and 85% for duplex pumps.

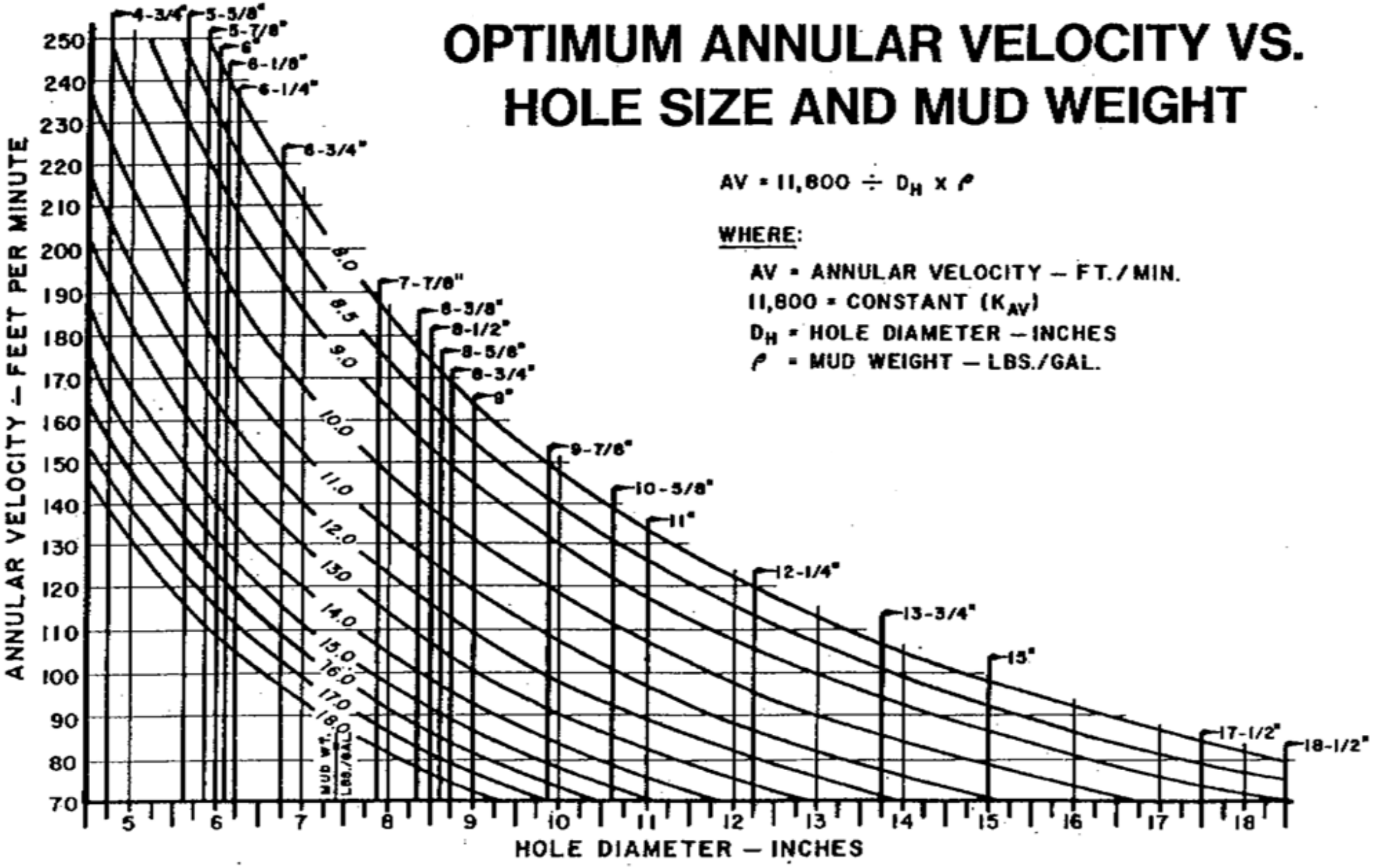
When calculating working pressures for a particular pump, the listed pressures in the "mud pump data" section should be reduced to 85% of what is shown. This will ensure safe operating conditions. The formulas for optimum hole cleaning will provide optimum requirements for your mud job. However, a pump of slightly lesser volume output (85% of optimum requirements) will probably suffice.

OPTIMUM ANNULAR VELOCITY VS. HOLE SIZE AND MUD WEIGHT

$AV = 11{,}800 \div D_H \times \rho$

WHERE:

AV = ANNULAR VELOCITY – FT./MIN.
11,800 = CONSTANT (K_{AV})
D_H = HOLE DIAMETER – INCHES
ρ = MUD WEIGHT – LBS./GAL.



Courtesy Hal B. Fullerton, Jr., Whittier, Calif.