TOTAL FLOW AREA (TFA)

SIZE (IN)	1 JET	2 JETS	3 JETS	4 JETS	5 JETS	6 JETS	7 JETS	8 JETS	9 JETS
7/32	0.038	0.076	0.114	0.152	0.190	0.228	0.226	0.305	0.342
8/32	0.049	0.098	0.147	0.196	0.245	0.295	0.344	0.393	0.442
9/32	0.062	0.124	0.186	0.249	0.311	0.373	0.435	0.497	0.559
10/32	0.077	0.153	0.230	0.307	0.383	0.460	0.537	0.614	0.690
11/32	0.093	0.186	0.278	0.371	0.464	0.557	0.650	0.742	0.835
12/32	0.110	0.221	0.331	0.442	0.552	0.663	0.773	0.884	0.994
13/32	0.130	0.259	0.389	0.518	0.648	0.778	0.907	1.037	1.167
14/32	0.150	0.300	0.450	0.600	0.750	0.900	1.050	1.200	1.350
15/32	0.172	0.344	0.516	0.688	0.860	1.032	1.204	1.376	1.548
16/32	0.196	0.392	0.588	0.784	0.980	1.176	1.372	1.568	1.764
18/32	0.249	0.498	0.747	0.996	1.245	1.494	1.743	1.992	2.241
20/32	0.306	0.612	0.918	1.224	1.530	1.836	2.142	2.448	2.754
22/32	0.371	0.742	1.113	1.484	1.855	2.226	2.597	2.468	3.339

EXAMPLE:

TFA = $\left(\frac{10}{64}\right)^2 \pi = 0.0777$ or $\frac{10}{32}$ jet

Nozzle size = $64\sqrt{\frac{0.451}{3\pi}} = 3\frac{14}{32}$

FORMULAS

HYDRAULIC POWER

Power (HP) = $\frac{P_b Q}{1714}$

P_b = Pressure drop across bit nozzle (psi)
Q = Flow Rate (US gpm)

Power (kW) = $\frac{P_b Q}{6000}$

P_b = Pressure drop across bit nozzle (kPa)
Q = Flow Rate (lpm)

MECHANICAL POWER

Power (HP) = $\frac{TN}{5252}$

T = Torque (ft.lbs)
N = Speed (rpm)

Power (kW) = $\frac{TN}{9548.8}$

T = Torque (N.m.)
N = Speed (rpm)

PRESSURE DROP ACROSS THE BIT JET NOZZLE (P_B)

P_b (psi) = $\frac{Q^2 W}{10858A^2}$

Q = Flow Rate (US gpm)
W = Mud Weight (lb/gal)
A = Area (in^2)

P_b (kPa) = $\frac{Q^2 W}{6.49643A^2}$

Q = Flow Rate (lpm)
W = Mud Weight (Kg/m^3)
A = Area (mm^2)

TOTAL FLOW AREA (TFA) TO OBTAIN A SPECIFIC BIT PRESSURE DROP

TFA (in^2) = $\sqrt{\frac{WQ^2}{10858P_b}}$

W = Mud Weight (lb/gal)
Q = Flow Rate (US gpm)
P_b = Bit Pressure Drop (psi)

TFA (mm^2) = $\sqrt{\frac{WQ^2}{6.49643P_b}}$

W = Mud Weight (Kg/m^3)
Q = Flow Rate (lpm)
P_b = Bit Pressure Drop (kPa)