



# REFERENCE DATA

## Nozzle Total Flow Area

Nozzle Size	Number of Nozzles								
	1	2	3	4	5	6	7	8	9
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	0.301	0.451	0.601	0.752	0.902	1.052	1.203	1.353
15/32"	0.173	0.345	0.518	0.690	0.863	1.035	1.208	1.381	1.553
16/32"	0.196	0.393	0.589	0.785	0.982	1.178	1.374	1.571	1.767
18/32"	0.249	0.497	0.746	0.994	1.243	1.491	1.740	1.988	2.237
20/32"	0.307	0.614	0.920	1.227	1.534	1.841	2.148	2.454	2.761
22/32"	0.371	0.742	1.114	1.485	1.856	2.227	2.599	2.970	3.341
24/32"	0.442	0.884	1.325	1.767	2.209	2.651	3.093	3.534	3.976

## Recommended Bit Make-up Torque

Size of Bit	API Pin Size	Recommended Torque (ft-lbs)
3-3/4" - 4-1/2"	2-3/8" Reg	1,800 - 3,085
4-5/8" - 5"	2-7/8" Reg	3,075 - 4,650
5-1/8" - 7-3/8"	3-1/2" Reg	5,175 - 7,660
7-5/8" - 9"	4-1/2" Reg	12,450 - 17,750
9-1/2" - 14-1/2"	6-5/8" Reg	37,100 - 38,500
14-3/4" - 26"	7-5/8" Reg	48,300 - 60,900