Fixed Cutter Bits - Make-up Torque, API Tolerances, TFA Chart

Fixed Cutter Bits - Recommended Make-up Torque

CONNECTION IN.	MAXIMUM PIN ID IN.	BIT SUB OD IN.	MINIMUM MAKE-UP TORQUE FT-LBS (with or without Relief Groove)
2-3/8 API Regular	1	3	1,793 *
		3-1/8	2,422 *
		3-1/4	3,089 *
2-7/8 API Regular	1-1/4	3-1/2	3,071 *
		3-3/4	4,620
		3-7/8	4,662
3-1/2 API Regular	1-1/2	4-1/8	5,173 *
		4-1/4	6,309 *
		4-1/2	7,665
4-1/2 API Regular	2-1/4	5-1/2	12,461 *
		5-3/4	16,488 *
		6	17,560
		6-1/4	17,766
4-1/2 API I.F. Box	2-1/4	6-1/2	23,743 *
		7	30,941
		8	32,169
6-5/8 API Regular	2-13/16	7-1/2	37,119 *
		7-3/4	42,769
		8	43,147
		8-1/4	43,525
6-5/8 API Regular	3	7-1/2	37,119 *
		7-3/4	40,753
		8	41,114
		8-1/4	41,474
7-5/8 API Regular	3-1/4	8-1/2	48,321 *
		8-3/4	57,735 *
		9	67,386
		9-1/4	67,908
		9-1/2	68,431
7-5/8 API Regular	3-1/2	8-1/2	48,321 *
		8-3/4	57,735 *
		9	63,824
		9-1/4	64,318
		9-1/2	64,813
8-5/8 API Regular	3-1/2	9-3/4	97,299
		10	98,012
		10-1/4	98,725
		10-1/2	99,437

Note: Torque figures followed by an asterisk (*) indicate that the weaker member for the corresponding outside diameter (OD) and bore is the BOX. For all other torque values the weaker member is the PIN.
Basis of calculations for recommended make-up torque assumed the use of a thread compound containing 40 to 60 percent by weight of finely powdered metallic zinc or 60 percent by weight of finely powdered metallic lead, with not more than 0.3 percent total active sulfur, applied thoroughly to all threads and shoulders (reference the CAUTION regarding the use of hazardous materials in Appendix G of API Specification 7) and using the modified Screw Jack formula in A.8 and a unit stress of 50,000 psi in the box or pin, whichever is the weaker.
Normal torque range is tabulated value plus 10 percent. Higher torque values may be used under extreme conditions.

Fixed Cutter Bits - API Tolerances

Fixed Cutter Bits - API Tolerances	
BIT SIZE IN.	**FIXED CUTTER BIT OD TOLERANCE** IN.
6-3/4 and Smaller	-0.015 to +0.00
6-25/32 to 9	-0.020 to +0.00
9-1/32 to 13-3/4	-0.030 to +0.00
13-25/32 to 17-1/2	-0.045 to +0.00
17-17/32 and Larger	-0.063 to +0.00

Total Flow Area (TFA) Chart

Nozzle Flow Areas (Square Inches)								
NOZZLE SIZE	**1 NOZZLE**	**2 NOZZLES**	**3 NOZZLES**	**4 NOZZLES**	**5 NOZZLES**	**6 NOZZLES**	**7 NOZZLES**	**8 NOZZLES**
7	0.0376	0.0752	0.1128	0.1504	0.1880	0.2256	0.2632	0.3007
8	0.0491	0.0982	0.1473	0.1964	0.2455	0.2946	0.3437	0.3927
9	0.0621	0.1242	0.1863	0.2484	0.3105	0.3728	0.4349	0.4970
10	0.0767	0.1534	0.2301	0.3068	0.3835	0.4602	0.5369	0.6136
11	0.0928	0.1856	0.2784	0.3712	0.4640	0.5568	0.6496	0.7424
12	0.1104	0.2208	0.3312	0.4418	0.5522	0.6627	0.7731	0.8836
13	0.1296	0.2592	0.3888	0.5184	0.6480	0.7776	0.9072	1.0370
14	0.1503	0.3006	0.4509	0.6012	0.7515	0.9020	1.0523	1.2026
15	0.1726	0.3452	0.5178	0.6904	0.8630	1.0354	1.2080	1.3806
16	0.1963	0.3926	0.5889	0.7854	0.9817	1.1781	1.3744	1.5708
17	0.2217	0.4433	0.6650	0.8866	1.1083	1.3300	1.5516	1.7733
18	0.2485	0.4970	0.7455	0.9940	1.2425	1.4910	1.7395	1.9880
19	0.2769	0.5538	0.8307	1.1076	1.3845	1.6614	1.9382	2.2151
20	0.3068	0.6136	0.9204	1.2272	1.5340	1.8408	2.1476	2.4544
21	0.3382	0.6764	1.10146	1.3530	1.6912	2.0295	2.3677	2.7059
22	0.3712	0.7424	1.1136	1.4848	1.8560	2.2272	2.5986	2.9698
24	0.4418	0.8836	1.3254	1.7671	2.2089	2.6507	3.0925	3.5343
26	0.5185	1.0370	1.5555	2.0739	2.5924	3.1109	3.294	4.1479
28	0.6013	1.2026	1.8040	2.4053	3.0066	3.6079	4.2092	4.8105

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