



**MINIMUM DOPE QUANTITY FOR MAKE - UP**

Nominal O.D.	Weight	Dope volume		Nominal O.D.	Dope volume	
		(in.)	llb/ft		(cm <sup>3</sup> )	(in <sup>3</sup> )
2 3/8	4.6 & 5.1	2	0.1	5 1/2	16	1.0
2 3/8	5.8 to 7.35	3	0.2	5 3/4	17	1.1
2 7/8	6.4	3	0.2	6 5/8	19	1.2
2 7/8	7.8 to 10.7	4	0.2	7	25	1.5
2 7/8	11.5	5	0.3	7 5/8	27	1.7
3 1/2	6.5 to 10.2	4	0.2	7 3/4	28	1.7
3 1/2	12.7 to 14.7	6	0.4	8 5/8	37	2.3
3 1/2	15.7 & 16.7	7	0.4	9 5/8	41	2.5
4	8.2 to 13.2	5	0.3	9 7/8	43	2.6
4	14.8 to 16.5	7	0.4	10	44	2.7
4	18.9 & 22.2	8	0.5	10 3/4	46	2.8
4 1/2	10.5 to 15.1	6	0.4	11 3/4	59	3.6
4 1/2	17 to 18.9	8	0.5	11 7/8	60	3.6
4 1/2	21.5 & 23.7	9	0.5	13 3/8	67	4.1
5		14	0.9	14	70	4.3
				15	78	4.8

The weight of dope to apply on a connection depends of the specific gravity of the used dope. For example, the make – up dope quantity in 7" VAM TOP will be :

25\*1.67=42g with a dope having a gravity of 1.67 g/cm<sup>3</sup> and 1.5\*1.00=1.5 oz with a dope having a gravity of 1.00 oz/in<sup>3</sup>



Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	55 ksi			65 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
2 3/8" 60.33	4.60	0.190 4.83				960 1300	1010 1370	1060 1440
	5.10	0.218 5.54				1190 1620	1250 1700	1310 1780
	5.80	0.254 6.45				1560 2120	1640 2230	1720 2340
	6.30	0.280 7.11				1790 2420	1880 2550	1970 2680
	6.60	0.295 7.49				1900 2590	2000 2720	2100 2850
	7.35	0.336 8.53				2280 3090	2390 3250	2500 3410
	2 7/8" 73.03	6.40	0.217 5.51				1530 2080	1610 2190
7.80		0.276 7.01				2170 2940	2280 3090	2390 3240
8.60		0.308 7.82				2510 3400	2640 3580	2770 3760
9.35		0.340 8.64				2890 3920	3040 4120	3190 4320
9.80		0.362 9.19				3120 4220	3280 4440	3440 4660
10.50		0.392 9.96				3440 4650	3620 4900	3800 5150
10.70		0.405 10.29				3520 4750	3700 5000	3880 5250
11.50		0.440 11.18				3970 5300	4170 5600	4370 5900
3 1/2" 88.90	6.50	0.170 4.32				1290 1730	1350 1820	1410 1910
	7.70	0.216 5.49				2040 2760	2140 2900	2240 3040
	9.20	0.254 6.45				2630 3560	2760 3740	2890 3920
	10.20	0.289 7.34				3210 4340	3370 4570	3530 4800
	12.70	0.375 9.53				4660 6250	4900 6600	5140 6950
	13.70	0.413 10.49				5200 7050	5470 7400	5740 7750
	14.30	0.430 10.92				5440 7400	5720 7800	6000 8200
	14.70	0.449 11.40				5700 7700	6000 8100	6300 8500
	15.50	0.476 12.09				6020 8150	6330 8600	6640 9050
	16.70	0.510 12.95				6470 8750	6810 9200	7150 9650



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SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	55 ksi			65 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
4" 101.60	8.20	0.190 4.83				1940 2630	2040 2770	2140 2910
	9.50	0.226 5.74				2670 3610	2810 3800	2950 3990
	10.90	0.262 6.65				3390 4570	3560 4820	3730 5070
	12.10	0.299 7.59				4140 5600	4350 5900	4560 6200
	13.20	0.330 8.38				4750 6450	4990 6800	5230 7150
	14.80	0.380 9.65				5910 8000	6220 8400	6530 8800
	16.10	0.415 10.54				6650 9000	6990 9500	7330 10000
	16.50	0.430 10.92				6920 9400	7280 9900	7640 10400
	18.90	0.500 12.70				8030 10850	8450 11400	8870 11950
	22.20	0.610 15.49				9900 13400	10400 14100	10900 14800
4 1/2" 114.30	10.50	0.224 5.69				2890 3930	3040 4130	3190 4340
	11.60	0.250 6.35				3440 4650	3620 4900	3800 5150
	12.60	0.271 6.88				3890 5200	4090 5500	4290 5800
	13.50	0.290 7.37				4370 5900	4600 6200	4830 6500
	15.10	0.337 8.56				5490 7400	5770 7800	6060 8200
	17.00	0.380 9.65				6880 9300	7240 9800	7600 10300
	17.70	0.402 10.21				7500 10150	7890 10700	8280 11250
	18.90	0.430 10.92				8270 11200	8700 11800	9140 12400
	21.50	0.500 12.70				10100 13700	10600 14400	11100 15100
	23.70	0.560 14.22				11350 15300	11900 16100	12450 16900
5" 127.00	13.00	0.253 6.43	3000 4060	3330 4510	3660 4960	3330 4500	3690 5000	4050 5500
	15.00	0.296 7.52	3910 5300	4340 5900	4770 6500	4230 5800	4700 6400	5170 7000
	18.00	0.362 9.19	4560 6200	5060 6900	5560 7600	4880 6700	5420 7400	5960 8100
	20.30	0.408 10.36	5540 7500	6150 8300	6760 9100	5860 7900	6510 8800	7160 9700



Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	55 ksi			65 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
5" 127.00	20.80	0.422 10.72	5860 7900	6510 8800	7160 9700	6510 8800	7230 9800	7950 10800
	21.40	0.437 11.10	6190 8400	6870 9300	7550 10200	6840 9300	7590 10300	8340 11300
	23.20	0.478 12.14	7170 9700	7960 10800	8750 11900	8150 11100	9050 12300	9950 13500
	24.10	0.500 12.70	8010 10800	8900 12000	9790 13200	8730 11900	9700 13200	10670 14500
5 1/2" 139.70	14.00	0.244 6.20	3190 4330	3540 4810	3890 5290	3590 4900	3980 5400	4370 5900
	15.50	0.275 6.99	3590 4900	3980 5400	4370 5900	4230 5800	4700 6400	5170 7000
	17.00	0.304 7.72	3910 5300	4340 5900	4770 6500	4560 6200	5060 6900	5560 7600
	20.00	0.361 9.17	4880 6700	5420 7400	5960 8100	5220 7000	5790 7800	6360 8600
	23.00	0.415 10.54	6190 8400	6870 9300	7550 10200	6840 9300	7590 10300	8340 11300
	26.00	0.476 12.09	7830 10600	8700 11800	9570 13000	8780 11900	9750 13200	10720 14500
	26.80	0.500 12.70	8730 11900	9700 13200	10670 14500	9700 13000	10700 14500	11700 16000
	28.40	0.530 13.46	9750 13100	10750 14600	11750 16100	10750 14400	11850 16000	12950 17600
	29.70	0.562 14.27	10600 14300	11700 15900	12800 17500	11750 15900	13050 17700	14350 19500
5 3/4" 146.05	18.10	0.304 7.72	4370 5900	4850 6600	5330 7300	5540 7500	6150 8300	6760 9100
6 5/8" 168.28	20.00	0.288 7.32	4230 5800	4700 6400	5170 7000	4880 6700	5420 7400	5960 8100
	23.20	0.330 8.38	4560 6200	5060 6900	5560 7600	5220 7000	5790 7800	6360 8600
	24.00	0.352 8.94	4880 6700	5420 7400	5960 8100	5540 7500	6150 8300	6760 9100
	28.00	0.417 10.59	7170 9700	7960 10800	8750 11900	7830 10600	8700 11800	9570 13000
	32.00	0.475 12.07	8780 11900	9750 13200	10720 14500	9500 12800	10500 14200	11500 15600
7" 177.80	36.70	0.562 14.27	11700 15900	13000 17700	14300 19500	12700 17200	14100 19100	15500 21000
	23.00	0.317 8.05	5540 7500	6150 8300	6760 9100	6190 8400	6870 9300	7550 10200
	26.00	0.362 9.19	6190 8400	6870 9300	7550 10200	6840 9300	7590 10300	8340 11300
	29.00	0.408 10.36	7170 9700	7960 10800	8750 11900	7830 10600	8700 11800	9570 13000
	32.00	0.453 11.51	8460 11400	9400 12700	10340 14000	9150 12300	10150 13700	11150 15100
35.00	0.498 12.65	9850 13200	10850 14700	11850 16200	11100 15000	12300 16700	13500 18400	



Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	55 ksi			65 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
7" 177.80	38.00	0.540 13.72	11450 15500	12650 17200	13850 18900	12700 17200	14100 19100	15500 21000
	41.00	0.590 14.99	13050 17600	14450 19600	15850 21600	15050 20300	16650 22600	18250 24900
	42.70	0.625 15.88	15050 20300	16650 22600	18250 24900	16300 22000	18100 24500	19900 27000
7 5/8" 193.68	26.40	0.328 8.33	6510 8800	7230 9800	7950 10800	7170 9700	7960 10800	8750 11900
	29.70	0.375 9.53	7170 9700	7960 10800	8750 11900	7830 10600	8700 11800	9570 13000
	33.70	0.430 10.92	7830 10600	8700 11800	9570 13000	8460 11400	9400 12700	10340 14000
	35.80	0.465 11.81	9150 12300	10150 13700	11150 15100	10100 13700	11200 15200	12300 16700
	39.00	0.500 12.70	10450 14100	11550 15700	12650 17300	11700 15900	13000 17700	14300 19500
	42.80	0.562 14.27	13700 18500	15200 20600	16700 22700	14650 19900	16250 22100	17850 24300
	45.30	0.595 15.11	15050 20300	16650 22600	18250 24900	16300 22000	18100 24500	19900 27000
	47.10	0.625 15.88	16300 22000	18100 24500	19900 27000	18000 24300	19900 27000	21800 29700
7 3/4" 196.85	46.10	0.595 15.11	15050 20300	16650 22600	18250 24900	17000 22900	18800 25500	20600 28100
8 5/8" 219.08	36.00	0.400 10.16	7170 9700	7960 10800	8750 11900	7470 10200	8300 11300	9130 12400
	40.00	0.450 11.43	9150 12300	10150 13700	11150 15100	10450 14100	11550 15700	12650 17300
	44.00	0.500 12.70	11700 15900	13000 17700	14300 19500	13400 18100	14800 20100	16200 22100
	49.00	0.557 14.15	15050 20300	16650 22600	18250 24900	17000 22900	18800 25500	20600 28100
	52.00	0.595 15.11	17000 22900	18800 25500	20600 28100	18900 25600	21000 28400	23100 31200
9 5/8" 244.48	40.00	0.395 10.03	7170 9700	7960 10800	8750 11900	7830 10600	8700 11800	9570 13000
	43.50	0.435 11.05	9850 13200	10850 14700	11850 16200	10450 14100	11550 15700	12650 17300
	47.00	0.472 11.99	11700 15900	13000 17700	14300 19500	13050 17600	14450 19600	15850 21600
	53.50	0.545 13.84	16300 22000	18100 24500	19900 27000	18250 24700	20250 27500	22250 30300
	58.40	0.595 15.11	19600 26500	21700 29400	23800 32300	20850 28300	23150 31400	25450 34500
9 7/8" 250.83	62.80	0.625 15.88	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	65.30	0.650 16.51	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	66.40	0.661 16.79	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500



Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	55 ksi			65 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
9 7/8" 250.83	66.90	0.668 16.97	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	67.50	0.678 17.22	22800 30900	25300 34300	27800 37700	22800 30900	25300 34300	27800 37700
	68.00	0.694 17.63	24800 33600	27500 37300	30200 41000	24800 33600	27500 37300	30200 41000
	68.90	0.700 17.78	24800 33600	27500 37300	30200 41000	24800 33600	27500 37300	30200 41000
	70.50	0.720 18.29	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
	72.00	0.725 18.42	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
	10" 254.00	67.20	0.672 17.07	25400 34400	28200 38200	31000 42000	27000 36600	30000 40700
	68.70	0.688 17.48	26700 36200	29650 40200	32600 44200	27000 36600	30000 40700	33000 44800
	71.80	0.722 18.34	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
10 3/4" 273.05	45.50	0.400 10.16	7830 10600	8700 11800	9570 13000	8780 11900	9750 13200	10720 14500
	51.00	0.450 11.43	11100 15000	12300 16700	13500 18400	13050 17600	14450 19600	15850 21600
	55.50	0.495 12.57	14400 19400	15900 21600	17400 23800	16300 22000	18100 24500	19900 27000
	60.70	0.545 13.84	18250 24700	20250 27500	22250 30300	20200 27400	22400 30400	24600 33400
	65.70	0.595 15.11	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	71.10	0.650 16.51	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
11 3/4" 298.45	54.00	0.435 11.05	11100 15000	12300 16700	13500 18400	12450 16700	13750 18600	15050 20500
	60.00	0.489 12.42	15050 20300	16650 22600	18250 24900	17600 23800	19500 26500	21400 29200
	65.00	0.534 13.56	18900 25600	21000 28400	23100 31200	20850 28300	23150 31400	25450 34500
	71.00	0.582 14.78	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
11 7/8" 301.63	67.80	0.550 13.97	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	71.80	0.582 14.78	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500



### Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	55 ksi			65 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
<b>13 3/8"</b> <i>339.73</i>	<b>61.00</b>	<b>0.430</b>	<b>11700</b>	<b>13000</b>	<b>14300</b>	<b>13050</b>	<b>14450</b>	<b>15850</b>
			<i>15900</i>	<i>17700</i>	<i>19500</i>	<i>17600</i>	<i>19600</i>	<i>21600</i>
	<b>68.00</b>	<b>0.480</b>	<b>17000</b>	<b>18800</b>	<b>20600</b>	<b>18900</b>	<b>21000</b>	<b>23100</b>
			<i>22900</i>	<i>25500</i>	<i>28100</i>	<i>25600</i>	<i>28400</i>	<i>31200</i>
	<b>72.00</b>	<b>0.514</b>	<b>19600</b>	<b>21700</b>	<b>23800</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>
			<i>26500</i>	<i>29400</i>	<i>32300</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>
	<b>77.00</b>	<b>0.550</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>
		<i>28300</i>	<i>31400</i>	<i>34500</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>	
	<b>80.70</b>	<b>0.580</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>
		<i>14.73</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>
	<b>85.00</b>	<b>0.608</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>
		<i>15.44</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>
	<b>86.00</b>	<b>0.625</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>
		<i>15.88</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>
<b>13 5/8"</b> <i>346.08</i>	<b>88.20</b>	<b>0.625</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>
			<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
	<b>118.20</b>	<b>0.850</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>
		<i>21.59</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
<b>14"</b> <i>355.60</i>	<b>86.00</b>	<b>0.600</b>	<b>22550</b>	<b>24950</b>	<b>27350</b>	<b>25750</b>	<b>28550</b>	<b>31350</b>
			<i>30400</i>	<i>33800</i>	<i>37200</i>	<i>34800</i>	<i>38700</i>	<i>42600</i>
	<b>93.00</b>	<b>0.650</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>
			<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
	<b>100.00</b>	<b>0.700</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>
			<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
	<b>106.00</b>	<b>0.750</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>
			<i>19.05</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>
	<b>112.00</b>	<b>0.797</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	
		<i>20.24</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	
	<b>114.00</b>	<b>0.800</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	
		<i>20.32</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	
	<b>120.00</b>	<b>0.850</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	
		<i>21.59</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	
<b>15"</b> <i>381.00</i>	<b>92.50</b>	<b>0.578</b>	<b>30000</b>	<b>33300</b>	<b>36600</b>	<b>30000</b>	<b>33300</b>	<b>36600</b>
			<i>40600</i>	<i>45100</i>	<i>49600</i>	<i>40600</i>	<i>45100</i>	<i>49600</i>



Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	75-80-85 ksi			90-95-100 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
2 3/8" 60.33	4.60	0.190 4.83	1110 1490	1160 1570	1210 1650	1170 1580	1290 1760	1410 1940
	5.10	0.218 5.54	1360 1850	1430 1940	1500 2030	1430 1930	1580 2150	1730 2370
	5.80	0.254 6.45	1680 2270	1760 2390	1840 2510	1800 2430	1990 2700	2180 2970
	6.30	0.280 7.11	1940 2630	2040 2770	2140 2910	2070 2790	2290 3100	2510 3410
	6.60	0.295 7.49	2090 2820	2190 2970	2290 3120	2210 2990	2450 3320	2690 3650
	7.35	0.336 8.53	2490 3370	2620 3550	2750 3730	2640 3570	2930 3970	3220 4370
	2 7/8" 73.03	6.40	0.217 5.51	1670 2260	1850 2510	2030 2760	1800 2430	1990 2700
7.80		0.276 7.01	2360 3190	2620 3550	2880 3910	2670 3610	2960 4010	3250 4410
8.60		0.308 7.82	2750 3730	3050 4140	3350 4550	3090 4180	3430 4650	3770 5120
9.35		0.340 8.64	3150 4270	3490 4740	3830 5210	3520 4800	3910 5300	4300 5800
9.80		0.362 9.19	3420 4700	3800 5200	4180 5700	3830 5200	4250 5800	4670 6400
10.50		0.392 9.96	3780 5100	4190 5700	4600 6300	4240 5800	4710 6400	5180 7000
10.70		0.405 10.29	3900 5300	4330 5900	4760 6500	4410 5900	4900 6600	5390 7300
11.50		0.440 11.18	4200 5700	4660 6300	5120 6900	4790 6500	5320 7200	5850 7900
3 1/2" 88.90	6.50	0.170 4.32	1380 1860	1530 2070	1680 2280	1440 1940	1590 2160	1740 2380
	7.70	0.216 5.49	2040 2750	2260 3060	2480 3370	2130 2880	2360 3200	2590 3520
	9.20	0.254 6.45	2610 3540	2900 3930	3190 4320	2720 3690	3020 4100	3320 4510
	10.20	0.289 7.34	3200 4320	3550 4820	3900 5320	3330 4500	3700 5000	4070 5500
	12.70	0.375 9.53	4950 6700	5500 7500	6050 8300	5310 7200	5890 8000	6470 8800
	13.70	0.413 10.49	5610 7600	6230 8500	6850 9400	6020 8200	6680 9100	7340 10000
	14.30	0.430 10.92	5900 8000	6550 8900	7200 9800	6340 8500	7040 9500	7740 10500
	14.70	0.449 11.40	6210 8400	6890 9300	7570 10200	6690 9100	7430 10100	8170 11100
	15.50	0.476 12.09	6670 9000	7410 10000	8150 11000	7310 9900	8120 11000	8930 12100
	16.70	0.510 12.95	7160 9700	7950 10800	8740 11900	7880 10700	8750 11900	9620 13100



Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	75-80-85 ksi			90-95-100 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
4" 101.60	8.20	0.190 4.83	2020 2740	2240 3040	2460 3340	2110 2860	2340 3180	2570 3500
	9.50	0.226 5.74	2660 3600	2950 4000	3240 4400	2780 3760	3080 4180	3380 4600
	10.90	0.262 6.65	3380 4600	3750 5100	4120 5600	3520 4800	3910 5300	4300 5800
	12.10	0.299 7.59	4130 5600	4580 6200	5030 6800	4310 5800	4780 6500	5250 7200
	13.20	0.330 8.38	4730 6400	5250 7100	5770 7800	4940 6700	5480 7400	6020 8100
	14.80	0.380 9.65	6250 8500	6940 9400	7630 10300	6530 8800	7250 9800	7970 10800
	16.10	0.415 10.54	7070 9500	7850 10600	8630 11700	7380 10000	8190 11100	9000 12200
	16.50	0.430 10.92	7400 10100	8220 11200	9040 12300	7740 10400	8600 11600	9460 12800
	18.90	0.500 12.70	9000 12100	9900 13400	10800 14700	9800 13200	10800 14700	11800 16200
	22.20	0.610 15.49	11000 14800	12200 16500	13400 18200	12300 16600	13600 18400	14900 20200
4 1/2" 114.30	10.50	0.224 5.69	2890 3910	3210 4350	3530 4790	3150 4260	3490 4730	3830 5200
	11.60	0.250 6.35	3500 4800	3880 5300	4260 5800	3800 5100	4220 5700	4640 6300
	12.60	0.271 6.88	4000 5400	4440 6000	4880 6600	4340 5800	4820 6500	5300 7200
	13.50	0.290 7.37	4450 6000	4940 6700	5430 7400	4830 6600	5360 7300	5890 8000
	15.10	0.337 8.56	5550 7500	6160 8300	6770 9100	6010 8100	6670 9000	7330 9900
	17.00	0.380 9.65	6620 9000	7350 10000	8080 11000	7140 9600	7930 10700	8720 11800
	17.70	0.402 10.21	7190 9700	7980 10800	8770 11900	7740 10500	8600 11700	9460 12900
	18.90	0.430 10.92	7920 10800	8800 12000	9680 13200	8550 11600	9500 12900	10450 14200
	21.50	0.500 12.70	9950 13500	11050 15000	12150 16500	10400 14000	11500 15600	12600 17200
	23.70	0.560 14.22	11450 15400	12650 17100	13850 18800	11750 15900	13050 17700	14350 19500
5" 127.00	13.00	0.253 6.43	3710 5000	4120 5600	4530 6200	4230 5800	4700 6400	5170 7000
	15.00	0.296 7.52	4560 6200	5060 6900	5560 7600	5220 7000	5790 7800	6360 8600
	18.00	0.362 9.19	5220 7000	5790 7800	6360 8600	5540 7500	6150 8300	6760 9100
	20.30	0.408 10.36	6510 8800	7230 9800	7950 10800	7170 9700	7960 10800	8750 11900



Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	75-80-85 ksi			90-95-100 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
5" 127.00	20.80	0.422 10.72	7170 9700	7960 10800	8750 11900	7830 10600	8700 11800	9570 13000
	21.40	0.437 11.10	7470 10200	8300 11300	9130 12400	8460 11400	9400 12700	10340 14000
	23.20	0.478 12.14	8780 11900	9750 13200	10720 14500	9500 12800	10500 14200	11500 15600
	24.10	0.500 12.70	9900 13400	11000 14900	12100 16400	11050 14900	12250 16600	13450 18300
5 1/2" 139.70	14.00	0.244 6.20	4040 5500	4480 6100	4920 6700	4560 6200	5060 6900	5560 7600
	15.50	0.275 6.99	4560 6200	5060 6900	5560 7600	5220 7000	5790 7800	6360 8600
	17.00	0.304 7.72	4880 6700	5420 7400	5960 8100	5540 7500	6150 8300	6760 9100
	20.00	0.361 9.17	5860 7900	6510 8800	7160 9700	6510 8800	7230 9800	7950 10800
	23.00	0.415 10.54	7470 10200	8300 11300	9130 12400	8150 11100	9050 12300	9950 13500
	26.00	0.476 12.09	9850 13200	10850 14700	11850 16200	10850 14600	11950 16200	13050 17800
	26.80	0.500 12.70	11000 14800	12200 16500	13400 18200	12400 16700	13700 18600	15000 20500
	28.40	0.530 13.46	12200 16500	13500 18300	14800 20100	13650 18500	15150 20600	16650 22700
	29.70	0.562 14.27	13500 18200	14900 20200	16300 22200	15200 20500	16800 22800	18400 25100
5 3/4" 146.05	18.10	0.304 7.72	6250 8500	6940 9400	7630 10300	7170 9700	7960 10800	8750 11900
6 5/8" 168.28	20.00	0.288 7.32	5540 7500	6150 8300	6760 9100	6190 8400	6870 9300	7550 10200
	23.20	0.330 8.38	5860 7900	6510 8800	7160 9700	6510 8800	7230 9800	7950 10800
	24.00	0.352 8.94	6190 8400	6870 9300	7550 10200	6840 9300	7590 10300	8340 11300
	28.00	0.417 10.59	8460 11400	9400 12700	10340 14000	9150 12300	10150 13700	11150 15100
	32.00	0.475 12.07	10850 14600	11950 16200	13050 17800	11700 15900	13000 17700	14300 19500
36.70	0.562 14.27	14400 19400	15900 21600	17400 23800	16000 21600	17700 24000	19400 26400	
7" 177.80	23.00	0.317 8.05	6840 9300	7590 10300	8340 11300	7470 10200	8300 11300	9130 12400
	26.00	0.362 9.19	7470 10200	8300 11300	9130 12400	8150 11100	9050 12300	9950 13500
	29.00	0.408 10.36	8460 11400	9400 12700	10340 14000	9150 12300	10150 13700	11150 15100
	32.00	0.453 11.51	10100 13700	11200 15200	12300 16700	11100 15000	12300 16700	13500 18400
	35.00	0.498 12.65	12100 16300	13400 18100	14700 19900	13700 18500	15200 20600	16700 22700



Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	75-80-85 ksi			90-95-100 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
7" 177.80	38.00	0.540 13.72	14050 19000	15550 21100	17050 23200	15650 21100	17350 23500	19050 25900
	41.00	0.590 14.99	16300 22000	18100 24500	19900 27000	18250 24700	20250 27500	22250 30300
	42.70	0.625 15.88	18250 24700	20250 27500	22250 30300	20850 28300	23150 31400	25450 34500
7 5/8" 193.68	26.40	0.328 8.33	8150 11100	9050 12300	9950 13500	9150 12300	10150 13700	11150 15100
	29.70	0.375 9.53	8460 11400	9400 12700	10340 14000	9850 13200	10850 14700	11850 16200
	33.70	0.430 10.92	9150 12300	10150 13700	11150 15100	10450 14100	11550 15700	12650 17300
	35.80	0.465 11.81	11100 15000	12300 16700	13500 18400	12450 16700	13750 18600	15050 20500
	39.00	0.500 12.70	13050 17600	14450 19600	15850 21600	14400 19400	15900 21600	17400 23800
	42.80	0.562 14.27	17000 22900	18800 25500	20600 28100	18900 25600	21000 28400	23100 31200
	45.30	0.595 15.11	18900 25600	21000 28400	23100 31200	20850 28300	23150 31400	25450 34500
	47.10	0.625 15.88	20200 27400	22400 30400	24600 33400	20850 28300	23150 31400	25450 34500
7 3/4" 196.85	46.10	0.595 15.11	18250 24700	20250 27500	22250 30300	20850 28300	23150 31400	25450 34500
8 5/8" 219.08	36.00	0.400 10.16	8150 11100	9050 12300	9950 13500	9150 12300	10150 13700	11150 15100
	40.00	0.450 11.43	11100 15000	12300 16700	13500 18400	12450 16700	13750 18600	15050 20500
	44.00	0.500 12.70	15050 20300	16650 22600	18250 24900	16300 22000	18100 24500	19900 27000
	49.00	0.557 14.15	18900 25600	21000 28400	23100 31200	20200 27400	22400 30400	24600 33400
	52.00	0.595 15.11	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
9 5/8" 244.48	40.00	0.395 10.03	8460 11400	9400 12700	10340 14000	9150 12300	10150 13700	11150 15100
	43.50	0.435 11.05	11700 15900	13000 17700	14300 19500	13050 17600	14450 19600	15850 21600
	47.00	0.472 11.99	14400 19400	15900 21600	17400 23800	15650 21100	17350 23500	19050 25900
	53.50	0.545 13.84	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	58.40	0.595 15.11	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
9 7/8" 250.83	62.80	0.625 15.88	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	65.30	0.650 16.51	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	66.40	0.661 16.79	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500



Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	75-80-85 ksi			90-95-100 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
9 7/8" 250.83	66.90	0.668 16.97	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	67.50	0.678 17.22	22800 30900	25300 34300	27800 37700	22800 30900	25300 34300	27800 37700
	68.00	0.694 17.63	24800 33600	27500 37300	30200 41000	24800 33600	27500 37300	30200 41000
	68.90	0.700 17.78	24800 33600	27500 37300	30200 41000	24800 33600	27500 37300	30200 41000
	70.50	0.720 18.29	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
	72.00	0.725 18.42	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
	10" 254.00	67.20	0.672 17.07	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700
	68.70	0.688 17.48	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
	71.80	0.722 18.34	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
10 3/4" 273.05	45.50	0.400 10.16	9850 13200	10850 14700	11850 16200	10450 14100	11550 15700	12650 17300
	51.00	0.450 11.43	14400 19400	15900 21600	17400 23800	15650 21100	17350 23500	19050 25900
	55.50	0.495 12.57	18250 24700	20250 27500	22250 30300	20850 28300	23150 31400	25450 34500
	60.70	0.545 13.84	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	65.70	0.595 15.11	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	71.10	0.650 16.51	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
11 3/4" 298.45	54.00	0.435 11.05	13700 18500	15200 20600	16700 22700	15050 20300	16650 22600	18250 24900
	60.00	0.489 12.42	19600 26500	21700 29400	23800 32300	20850 28300	23150 31400	25450 34500
	65.00	0.534 13.56	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	71.00	0.582 14.78	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
11 7/8" 301.63	67.80	0.550 13.97	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	71.80	0.582 14.78	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500



### Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	75-80-85 ksi			90-95-100 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
<b>13 3/8"</b> <i>339.73</i>	<b>61.00</b>	<b>0.430</b>	<b>15050</b>	<b>16650</b>	<b>18250</b>	<b>17000</b>	<b>18800</b>	<b>20600</b>
			<i>20300</i>	<i>22600</i>	<i>24900</i>	<i>22900</i>	<i>25500</i>	<i>28100</i>
	<b>68.00</b>	<b>0.480</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>
			<i>28300</i>	<i>31400</i>	<i>34500</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>
	<b>72.00</b>	<b>0.514</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>
			<i>28300</i>	<i>31400</i>	<i>34500</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>
	<b>77.00</b>	<b>0.550</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>
		<i>28300</i>	<i>31400</i>	<i>34500</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>	
<b>80.70</b>	<b>0.580</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	
		<i>28300</i>	<i>31400</i>	<i>34500</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>	
<b>85.00</b>	<b>0.608</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	
		<i>28300</i>	<i>31400</i>	<i>34500</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>	
<b>86.00</b>	<b>0.625</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	
		<i>28300</i>	<i>31400</i>	<i>34500</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>	
<b>13 5/8"</b> <i>346.08</i>	<b>88.20</b>	<b>0.625</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>
			<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
	<b>118.20</b>	<b>0.850</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>
		<i>21.59</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
<b>14"</b> <i>355.60</i>	<b>86.00</b>	<b>0.600</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>
			<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
	<b>93.00</b>	<b>0.650</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>
			<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
	<b>100.00</b>	<b>0.700</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>
			<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
	<b>106.00</b>	<b>0.750</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>
			<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
<b>112.00</b>	<b>0.797</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	
		<i>20.24</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
<b>114.00</b>	<b>0.800</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	
		<i>20.32</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
<b>120.00</b>	<b>0.850</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	
		<i>21.59</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
<b>15"</b> <i>381.00</i>	<b>92.50</b>	<b>0.578</b>	<b>30000</b>	<b>33300</b>	<b>36600</b>	<b>30000</b>	<b>33300</b>	<b>36600</b>
			<i>40600</i>	<i>45100</i>	<i>49600</i>	<i>40600</i>	<i>45100</i>	<i>49600</i>



Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	105-110-115 ksi			120-125-130 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
2 3/8" 60.33	4.60	0.190 4.83	1240 1670	1370 1860	1500 2050	1310 1770	1450 1970	1590 2170
	5.10	0.218 5.54	1520 2050	1680 2280	1840 2510	1560 2110	1730 2340	1900 2570
	5.80	0.254 6.45	1950 2640	2160 2930	2370 3220	2050 2770	2270 3080	2490 3390
	6.30	0.280 7.11	2230 3010	2470 3350	2710 3690	2340 3180	2600 3530	2860 3880
	6.60	0.295 7.49	2390 3240	2650 3600	2910 3960	2520 3410	2790 3790	3060 4170
	7.35	0.336 8.53	2840 3850	3150 4280	3460 4710	2980 4040	3310 4490	3640 4940
	2 7/8" 73.03	6.40	0.217 5.51	1860 2510	2060 2790	2260 3070	1920 2590	2130 2880
7.80		0.276 7.01	2830 3830	3140 4260	3450 4690	3000 4060	3330 4510	3660 4960
8.60		0.308 7.82	3290 4400	3650 4900	4010 5400	3480 4700	3860 5200	4240 5700
9.35		0.340 8.64	3740 5000	4150 5600	4560 6200	3960 5400	4390 6000	4820 6600
9.80		0.362 9.19	4060 5500	4510 6100	4960 6700	4290 5800	4760 6500	5230 7200
10.50		0.392 9.96	4500 6100	4990 6800	5480 7500	4750 6400	5270 7100	5790 7800
10.70		0.405 10.29	4680 6300	5190 7000	5700 7700	4940 6700	5480 7400	6020 8100
11.50		0.440 11.18	5290 7200	5870 8000	6450 8800	5580 7600	6190 8400	6800 9200
3 1/2" 88.90	6.50	0.170 4.32	1500 2020	1660 2250	1820 2480	1540 2080	1710 2310	1880 2540
	7.70	0.216 5.49	2220 3000	2460 3330	2700 3660	2350 3190	2610 3540	2870 3890
	9.20	0.254 6.45	2860 3870	3170 4300	3480 4730	3030 4100	3360 4560	3690 5020
	10.20	0.289 7.34	3500 4800	3880 5300	4260 5800	3710 5000	4120 5600	4530 6200
	12.70	0.375 9.53	5510 7500	6120 8300	6730 9100	5680 7700	6310 8600	6940 9500
	13.70	0.413 10.49	6230 8500	6920 9400	7610 10300	6440 8700	7150 9700	7860 10700
	14.30	0.430 10.92	6570 8900	7300 9900	8030 10900	6790 9200	7540 10200	8290 11200
	14.70	0.449 11.40	6930 9400	7700 10400	8470 11400	7170 9700	7960 10800	8750 11900
	15.50	0.476 12.09	7790 10600	8650 11800	9510 13000	8060 10900	8950 12100	9840 13300
	16.70	0.510 12.95	8420 11400	9350 12700	10280 14000	8690 11800	9650 13100	10610 14400



Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	105-110-115 ksi			120-125-130 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
4" 101.60	8.20	0.190 4.83	2190 2970	2430 3300	2670 3630	2260 3060	2510 3400	2760 3740
	9.50	0.226 5.74	2950 3990	3270 4430	3590 4870	3140 4250	3480 4720	3820 5190
	10.90	0.262 6.65	3740 5000	4150 5600	4560 6200	3980 5400	4420 6000	4860 6600
	12.10	0.299 7.59	4570 6200	5070 6900	5570 7600	4860 6600	5400 7300	5940 8000
	13.20	0.330 8.38	5220 7100	5790 7900	6360 8700	5550 7600	6160 8400	6770 9200
	14.80	0.380 9.65	6770 9200	7520 10200	8270 11200	7000 9400	7770 10500	8540 11600
	16.10	0.415 10.54	7650 10300	8500 11500	9350 12700	7880 10700	8750 11900	9620 13100
	16.50	0.430 10.92	8010 10900	8900 12100	9790 13300	8280 11200	9200 12500	10120 13800
	18.90	0.500 12.70	10150 13700	11250 15200	12350 16700	10500 14100	11600 15700	12700 17300
	22.20	0.610 15.49	13100 17600	14500 19600	15900 21600	13550 18300	14950 20300	16350 22300
4 1/2" 114.30	10.50	0.224 5.69	3390 4600	3760 5100	4130 5600	3620 4900	4020 5500	4420 6100
	11.60	0.250 6.35	4090 5600	4540 6200	4990 6800	4380 5900	4860 6600	5340 7300
	12.60	0.271 6.88	4680 6300	5200 7000	5720 7700	5010 6700	5560 7500	6110 8300
	13.50	0.290 7.37	5200 7000	5770 7800	6340 8600	5560 7600	6170 8400	6780 9200
	15.10	0.337 8.56	6460 8700	7170 9700	7880 10700	6890 9400	7650 10400	8410 11400
	17.00	0.380 9.65	7650 10300	8500 11500	9350 12700	8150 11000	9050 12200	9950 13400
	17.70	0.402 10.21	8280 11200	9200 12500	10120 13800	8900 12000	9800 13300	10700 14600
	18.90	0.430 10.92	9200 12400	10200 13800	11200 15200	9850 13200	10850 14700	11850 16200
	21.50	0.500 12.70	11150 15000	12350 16700	13550 18400	11800 16000	13100 17800	14400 19600
	23.70	0.560 14.22	12600 17100	14000 19000	15400 20900	13450 18200	14850 20200	16250 22200
5" 127.00	13.00	0.253 6.43	4560 6200	5060 6900	5560 7600	5220 7000	5790 7800	6360 8600
	15.00	0.296 7.52	5860 7900	6510 8800	7160 9700	6510 8800	7230 9800	7950 10800
	18.00	0.362 9.19	6190 8400	6870 9300	7550 10200	6840 9300	7590 10300	8340 11300
	20.30	0.408 10.36	8150 11100	9050 12300	9950 13500	8780 11900	9750 13200	10720 14500



Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	105-110-115 ksi			120-125-130 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
5" 127.00	20.80	0.422 10.72	8780 11900	9750 13200	10720 14500	9500 12800	10500 14200	11500 15600
	21.40	0.437 11.10	9150 12300	10150 13700	11150 15100	9850 13200	10850 14700	11850 16200
	23.20	0.478 12.14	10850 14600	11950 16200	13050 17800	12100 16300	13400 18100	14700 19900
	24.10	0.500 12.70	12300 16600	13600 18400	14900 20200	13500 18200	14900 20200	16300 22200
5 1/2" 139.70	14.00	0.244 6.20	5080 6800	5640 7600	6200 8400	5670 7600	6290 8500	6910 9400
	15.50	0.275 6.99	5860 7900	6510 8800	7160 9700	6510 8800	7230 9800	7950 10800
	17.00	0.304 7.72	6190 8400	6870 9300	7550 10200	6840 9300	7590 10300	8340 11300
	20.00	0.361 9.17	6840 9300	7590 10300	8340 11300	7470 10200	8300 11300	9130 12400
	23.00	0.415 10.54	9500 12800	10500 14200	11500 15600	10100 13700	11200 15200	12300 16700
	26.00	0.476 12.09	12450 16700	13750 18600	15050 20500	13700 18500	15200 20600	16700 22700
	26.80	0.500 12.70	13700 18500	15200 20600	16700 22700	15200 20400	16800 22700	18400 25000
	28.40	0.530 13.46	15250 20600	16850 22900	18450 25200	16800 22700	18600 25200	20400 27700
	29.70	0.562 14.27	16850 22800	18650 25300	20450 27800	18600 25100	20600 27900	22600 30700
5 3/4" 146.05	18.10	0.304 7.72	7830 10600	8700 11800	9570 13000	8460 11400	9400 12700	10340 14000
6 5/8" 168.28	20.00	0.288 7.32	7170 9700	7960 10800	8750 11900	7830 10600	8700 11800	9570 13000
	23.20	0.330 8.38	7470 10200	8300 11300	9130 12400	8150 11100	9050 12300	9950 13500
	24.00	0.352 8.94	7830 10600	8700 11800	9570 13000	8460 11400	9400 12700	10340 14000
	28.00	0.417 10.59	10100 13700	11200 15200	12300 16700	11100 15000	12300 16700	13500 18400
	32.00	0.475 12.07	13050 17600	14450 19600	15850 21600	14400 19400	15900 21600	17400 23800
7" 177.80	23.00	0.317 8.05	8460 11400	9400 12700	10340 14000	9150 12300	10150 13700	11150 15100
	26.00	0.362 9.19	9150 12300	10150 13700	11150 15100	9850 13200	10850 14700	11850 16200
	29.00	0.408 10.36	10450 14100	11550 15700	12650 17300	11100 15000	12300 16700	13500 18400
	32.00	0.453 11.51	12450 16700	13750 18600	15050 20500	13400 18100	14800 20100	16200 22100
	35.00	0.498 12.65	15050 20300	16650 22600	18250 24900	16300 22000	18100 24500	19900 27000



### Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	105-110-115 ksi			120-125-130 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
7" 177.80	38.00	0.540 13.72	17000 22900	18800 25500	20600 28100	18900 25600	21000 28400	23100 31200
	41.00	0.590 14.99	19600 26500	21700 29400	23800 32300	20850 28300	23150 31400	25450 34500
	42.70	0.625 15.88	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
7 5/8" 193.68	26.40	0.328 8.33	10450 14100	11550 15700	12650 17300	11450 15500	12650 17200	13850 18900
	29.70	0.375 9.53	11100 15000	12300 16700	13500 18400	11700 15900	13000 17700	14300 19500
	33.70	0.430 10.92	11700 15900	13000 17700	14300 19500	12450 16700	13750 18600	15050 20500
	35.80	0.465 11.81	13700 18500	15200 20600	16700 22700	15050 20300	16650 22600	18250 24900
	39.00	0.500 12.70	16300 22000	18100 24500	19900 27000	18250 24700	20250 27500	22250 30300
	42.80	0.562 14.27	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	45.30	0.595 15.11	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
7 3/4" 196.85	46.10	0.595 15.11	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	46.10	0.595 15.11	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
8 5/8" 219.08	36.00	0.400 10.16	9850 13200	10850 14700	11850 16200	10450 14100	11550 15700	12650 17300
	40.00	0.450 11.43	13700 18500	15200 20600	16700 22700	15050 20300	16650 22600	18250 24900
	44.00	0.500 12.70	18250 24700	20250 27500	22250 30300	19600 26500	21700 29400	23800 32300
	49.00	0.557 14.15	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	52.00	0.595 15.11	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
9 5/8" 244.48	40.00	0.395 10.03	10450 14100	11550 15700	12650 17300	11100 15000	12300 16700	13500 18400
	43.50	0.435 11.05	14400 19400	15900 21600	17400 23800	15650 21100	17350 23500	19050 25900
	47.00	0.472 11.99	18250 24700	20250 27500	22250 30300	19600 26500	21700 29400	23800 32300
	53.50	0.545 13.84	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	58.40	0.595 15.11	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
9 7/8" 250.83	62.80	0.625 15.88	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	65.30	0.650 16.51	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	66.40	0.661 16.79	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500



Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	105-110-115 ksi			120-125-130 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
9 7/8" 250.83	66.90	0.668 16.97	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	67.50	0.678 17.22	22800 30900	25300 34300	27800 37700	22800 30900	25300 34300	27800 37700
	68.00	0.694 17.63	24800 33600	27500 37300	30200 41000	24800 33600	27500 37300	30200 41000
	68.90	0.700 17.78	24800 33600	27500 37300	30200 41000	24800 33600	27500 37300	30200 41000
	70.50	0.720 18.29	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
	72.00	0.725 18.42	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
	10" 254.00	67.20	0.672 17.07	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700
	68.70	0.688 17.48	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
	71.80	0.722 18.34	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
10 3/4" 273.05	45.50	0.400 10.16	11700 15900	13000 17700	14300 19500	13050 17600	14450 19600	15850 21600
	51.00	0.450 11.43	17600 23800	19500 26500	21400 29200	19600 26500	21700 29400	23800 32300
	55.50	0.495 12.57	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	60.70	0.545 13.84	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	65.70	0.595 15.11	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	71.10	0.650 16.51	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	11 3/4" 298.45	54.00	0.435 11.05	17000 22900	18800 25500	20600 28100	18900 25600	21000 28400
	60.00	0.489 12.42	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	65.00	0.534 13.56	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	71.00	0.582 14.78	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
11 7/8" 301.63	67.80	0.550 13.97	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	71.80	0.582 14.78	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500



### Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	105-110-115 ksi			120-125-130 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
<b>13 3/8"</b> <i>339.73</i>	<b>61.00</b>	<b>0.430</b>	<b>18900</b>	<b>21000</b>	<b>23100</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>
			<i>25600</i>	<i>28400</i>	<i>31200</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>
	<b>68.00</b>	<b>0.480</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>
			<i>28300</i>	<i>31400</i>	<i>34500</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>
	<b>72.00</b>	<b>0.514</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>
			<i>28300</i>	<i>31400</i>	<i>34500</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>
	<b>77.00</b>	<b>0.550</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>
		<i>28300</i>	<i>31400</i>	<i>34500</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>	
<b>80.70</b>	<b>0.580</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	
		<i>28300</i>	<i>31400</i>	<i>34500</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>	
<b>85.00</b>	<b>0.608</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	
		<i>28300</i>	<i>31400</i>	<i>34500</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>	
<b>86.00</b>	<b>0.625</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	<b>20850</b>	<b>23150</b>	<b>25450</b>	
		<i>28300</i>	<i>31400</i>	<i>34500</i>	<i>28300</i>	<i>31400</i>	<i>34500</i>	
<b>13 5/8"</b> <i>346.08</i>	<b>88.20</b>	<b>0.625</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>
			<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
	<b>118.20</b>	<b>0.850</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>
		<i>21.59</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
<b>14"</b> <i>355.60</i>	<b>86.00</b>	<b>0.600</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>
			<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
	<b>93.00</b>	<b>0.650</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>
			<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
	<b>100.00</b>	<b>0.700</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>
			<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
	<b>106.00</b>	<b>0.750</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>
			<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
<b>112.00</b>	<b>0.797</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	
		<i>20.24</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
<b>114.00</b>	<b>0.800</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	
		<i>20.32</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
<b>120.00</b>	<b>0.850</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	<b>27000</b>	<b>30000</b>	<b>33000</b>	
		<i>21.59</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>	<i>36600</i>	<i>40700</i>	<i>44800</i>
<b>15"</b> <i>381.00</i>	<b>92.50</b>	<b>0.578</b>	<b>30000</b>	<b>33300</b>	<b>36600</b>	<b>30000</b>	<b>33300</b>	<b>36600</b>
			<i>40600</i>	<i>45100</i>	<i>49600</i>	<i>40600</i>	<i>45100</i>	<i>49600</i>



Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	135-140 ksi			145-150-155 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
2 3/8" 60.33	4.60	0.190 4.83	1340 1810	1480 2010	1620 2210	1350 1840	1500 2040	1650 2240
	5.10	0.218 5.54	1590 2150	1760 2390	1930 2630	1620 2190	1790 2430	1960 2670
	5.80	0.254 6.45	2120 2870	2350 3190	2580 3510	2180 2960	2420 3290	2660 3620
	6.30	0.280 7.11	2430 3280	2690 3650	2950 4020	2510 3390	2780 3770	3050 4150
	6.60	0.295 7.49	2600 3510	2880 3900	3160 4290	2680 3630	2970 4030	3260 4430
	7.35	0.336 8.53	3070 4170	3410 4630	3750 5090	3170 4300	3520 4780	3870 5260
	2 7/8" 73.03	6.40	0.217 5.51	1960 2650	2170 2940	2380 3230	1990 2690	2210 2990
7.80		0.276 7.01	3060 4140	3390 4600	3720 5060	3110 4210	3450 4680	3790 5150
8.60		0.308 7.82	3540 4800	3930 5300	4320 5800	3600 4900	4000 5400	4400 5900
9.35		0.340 8.64	4040 5500	4480 6100	4920 6700	4110 5600	4560 6200	5010 6800
9.80		0.362 9.19	4370 5900	4850 6600	5330 7300	4450 6000	4940 6700	5430 7400
10.50		0.392 9.96	4840 6600	5370 7300	5900 8000	4930 6700	5470 7400	6010 8100
10.70		0.405 10.29	5040 6800	5590 7600	6140 8400	5130 6900	5690 7700	6250 8500
11.50		0.440 11.18	5760 7800	6400 8700	7040 9600	5950 8100	6610 9000	7270 9900
3 1/2" 88.90	6.50	0.170 4.32	1570 2120	1740 2360	1910 2600	1620 2200	1800 2440	1980 2680
	7.70	0.216 5.49	2440 3310	2710 3680	2980 4050	2530 3430	2810 3810	3090 4190
	9.20	0.254 6.45	3150 4260	3490 4730	3830 5200	3260 4400	3620 4900	3980 5400
	10.20	0.289 7.34	3860 5200	4280 5800	4700 6400	3990 5400	4430 6000	4870 6600
	12.70	0.375 9.53	5800 7800	6440 8700	7080 9600	5900 8000	6550 8900	7200 9800
	13.70	0.413 10.49	6570 8900	7290 9900	8010 10900	6680 9100	7420 10100	8160 11100
	14.30	0.430 10.92	6920 9400	7680 10400	8440 11400	7040 9500	7820 10600	8600 11700
	14.70	0.449 11.40	7300 9900	8110 11000	8920 12100	7440 10100	8260 11200	9080 12300
	15.50	0.476 12.09	8240 11200	9150 12400	10060 13600	8370 11300	9300 12600	10230 13900
	16.70	0.510 12.95	8950 12100	9850 13400	10750 14700	9000 12200	10000 13600	11000 15000



Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	135-140 ksi			145-150-155 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
4" 101.60	8.20	0.190 4.83	2350 3190	2610 3540	2870 3890	2440 3300	2710 3670	2980 4040
	9.50	0.226 5.74	3260 4400	3620 4900	3980 5400	3380 4600	3750 5100	4120 5600
	10.90	0.262 6.65	4140 5600	4600 6200	5060 6800	4300 5800	4770 6500	5240 7200
	12.10	0.299 7.59	5050 6800	5610 7600	6170 8400	5240 7100	5820 7900	6400 8700
	13.20	0.330 8.38	5760 7800	6400 8700	7040 9600	5970 8100	6630 9000	7290 9900
	14.80	0.380 9.65	7130 9600	7920 10700	8710 11800	7320 9900	8130 11000	8940 12100
	16.10	0.415 10.54	8060 10900	8950 12100	9840 13300	8240 11200	9150 12400	10060 13600
	16.50	0.430 10.92	8420 11400	9350 12700	10280 14000	8640 11700	9600 13000	10560 14300
	18.90	0.500 12.70	10700 14400	11800 16000	12900 17600	10850 14700	12050 16300	13250 17900
	22.20	0.610 15.49	13750 18600	15250 20700	16750 22800	14000 18900	15500 21000	17000 23100
4 1/2" 114.30	10.50	0.224 5.69	3780 5100	4200 5700	4620 6300	3940 5300	4370 5900	4800 6500
	11.60	0.250 6.35	4570 6200	5070 6900	5570 7600	4760 6500	5280 7200	5800 7900
	12.60	0.271 6.88	5220 7100	5800 7900	6380 8700	5430 7400	6030 8200	6630 9000
	13.50	0.290 7.37	5790 7800	6430 8700	7070 9600	6030 8200	6690 9100	7350 10000
	15.10	0.337 8.56	7180 9700	7970 10800	8760 11900	7470 10100	8290 11200	9110 12300
	17.00	0.380 9.65	8460 11400	9400 12700	10340 14000	8780 11900	9750 13200	10720 14500
	17.70	0.402 10.21	9200 12400	10200 13800	11200 15200	9550 12900	10550 14300	11550 15700
	18.90	0.430 10.92	10150 13800	11250 15300	12350 16800	10550 14200	11650 15800	12750 17400
	21.50	0.500 12.70	12300 16600	13600 18400	14900 20200	12650 17200	14050 19100	15450 21000
	23.70	0.560 14.22	13950 18800	15450 20900	16950 23000	14400 19500	16000 21700	17600 23900
5" 127.00	13.00	0.253 6.43	5540 7500	6150 8300	6760 9100	5860 7900	6510 8800	7160 9700
	15.00	0.296 7.52	6840 9300	7590 10300	8340 11300	7170 9700	7960 10800	8750 11900
	18.00	0.362 9.19	7170 9700	7960 10800	8750 11900	7830 10600	8700 11800	9570 13000
	20.30	0.408 10.36	9500 12800	10500 14200	11500 15600	10100 13700	11200 15200	12300 16700



Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	135-140 ksi			145-150-155 ksi			
			min.	opti.	max.	min.	opti.	max.	
in. mm	ft.lb.	in. mm.	ft.lb. N.m.						
5" 127.00	20.80	0.422 10.72	10450 14100	11550 15700	12650 17300	11100 15000	12300 16700	13500 18400	
	21.40	0.437 11.10	10850 14600	11950 16200	13050 17800	11700 15900	13000 17700	14300 19500	
	23.20	0.478 12.14	12700 17200	14100 19100	15500 21000	13700 18500	15200 20600	16700 22700	
	24.10	0.500 12.70	14400 19500	16000 21700	17600 23900	15400 20900	17100 23200	18800 25500	
	5 1/2" 139.70	14.00	0.244 6.20	6120 8300	6800 9200	7480 10100	6510 8800	7230 9800	7950 10800
5 1/2" 139.70	15.50	0.275 6.99	7170 9700	7960 10800	8750 11900	7470 10200	8300 11300	9130 12400	
	17.00	0.304 7.72	7470 10200	8300 11300	9130 12400	7830 10600	8700 11800	9570 13000	
	20.00	0.361 9.17	8150 11100	9050 12300	9950 13500	8460 11400	9400 12700	10340 14000	
	23.00	0.415 10.54	11100 15000	12300 16700	13500 18400	11700 15900	13000 17700	14300 19500	
	26.00	0.476 12.09	15050 20300	16650 22600	18250 24900	15650 21100	17350 23500	19050 25900	
	26.80	0.500 12.70	16300 22000	18100 24500	19900 27000	17500 23700	19400 26300	21300 28900	
	28.40	0.530 13.46	18050 24500	20050 27200	22050 29900	19400 26200	21500 29100	23600 32000	
	29.70	0.562 14.27	20000 27100	22200 30100	24400 33100	20850 28300	23150 31400	25450 34500	
	5 3/4" 146.05	18.10	0.304 7.72	8780 11900	9750 13200	10720 14500	9150 12300	10150 13700	11150 15100
	6 5/8" 168.28	20.00	0.288 7.32	8460 11400	9400 12700	10340 14000	9150 12300	10150 13700	11150 15100
23.20		0.330 8.38	8780 11900	9750 13200	10720 14500	9500 12800	10500 14200	11500 15600	
24.00		0.352 8.94	9150 12300	10150 13700	11150 15100	9850 13200	10850 14700	11850 16200	
28.00		0.417 10.59	11700 15900	13000 17700	14300 19500	12450 16700	13750 18600	15050 20500	
32.00		0.475 12.07	15300 20700	17000 23000	18700 25300	16300 22000	18100 24500	19900 27000	
36.70		0.562 14.27	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500	
7" 177.80	23.00	0.317 8.05	10100 13700	11200 15200	12300 16700	10850 14600	11950 16200	13050 17800	
	26.00	0.362 9.19	10850 14600	11950 16200	13050 17800	11450 15500	12650 17200	13850 18900	
	29.00	0.408 10.36	11700 15900	13000 17700	14300 19500	12450 16700	13750 18600	15050 20500	
	32.00	0.453 11.51	14400 19400	15900 21600	17400 23800	15050 20300	16650 22600	18250 24900	
	35.00	0.498 12.65	17600 23800	19500 26500	21400 29200	18900 25600	21000 28400	23100 31200	



Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	135-140 ksi			145-150-155 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
7" 177.80	38.00	0.540 13.72	20200 27400	22400 30400	24600 33400	20850 28300	23150 31400	25450 34500
	41.00	0.590 14.99	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	42.70	0.625 15.88	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
7 5/8" 193.68	26.40	0.328 8.33	12450 16700	13750 18600	15050 20500	13450 18100	14850 20100	16250 22100
	29.70	0.375 9.53	12700 17200	14100 19100	15500 21000	13700 18500	15200 20600	16700 22700
	33.70	0.430 10.92	13400 18100	14800 20100	16200 22100	14400 19400	15900 21600	17400 23800
	35.80	0.465 11.81	16300 22000	18100 24500	19900 27000	17600 23800	19500 26500	21400 29200
	39.00	0.500 12.70	19600 26500	21700 29400	23800 32300	20850 28300	23150 31400	25450 34500
	42.80	0.562 14.27	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	45.30	0.595 15.11	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
7 3/4" 196.85	46.10	0.595 15.11	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	36.00	0.400 10.16	11100 15000	12300 16700	13500 18400	11700 15900	13000 17700	14300 19500
8 5/8" 219.08	40.00	0.450 11.43	16300 22000	18100 24500	19900 27000	17600 23800	19500 26500	21400 29200
	44.00	0.500 12.70	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	49.00	0.557 14.15	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	52.00	0.595 15.11	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
9 5/8" 244.48	40.00	0.395 10.03	11700 15900	13000 17700	14300 19500	12450 16700	13750 18600	15050 20500
	43.50	0.435 11.05	16650 22500	18450 25000	20250 27500	17600 23800	19500 26500	21400 29200
	47.00	0.472 11.99	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	53.50	0.545 13.84	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	58.40	0.595 15.11	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
9 7/8" 250.83	62.80	0.625 15.88	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	65.30	0.650 16.51	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	66.40	0.661 16.79	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500



Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	135-140 ksi			145-150-155 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
9 7/8" 250.83	66.90	0.668 16.97	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	67.50	0.678 17.22	22800 30900	25300 34300	27800 37700	22800 30900	25300 34300	27800 37700
	68.00	0.694 17.63	24800 33600	27500 37300	30200 41000	24800 33600	27500 37300	30200 41000
	68.90	0.700 17.78	24800 33600	27500 37300	30200 41000	24800 33600	27500 37300	30200 41000
	70.50	0.720 18.29	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
	72.00	0.725 18.42	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
	10" 254.00	67.20	0.672 17.07	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700
	68.70	0.688 17.48	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
	71.80	0.722 18.34	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
10 3/4" 273.05	45.50	0.400 10.16	13700 18500	15200 20600	16700 22700	27000 36600	30000 40700	33000 44800
	51.00	0.450 11.43	20200 27400	22400 30400	24600 33400	14400 19400	15900 21600	17400 23800
	55.50	0.495 12.57	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	60.70	0.545 13.84	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	65.70	0.595 15.11	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	71.10	0.650 16.51	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
11 3/4" 298.45	54.00	0.435 11.05	20200 27400	22400 30400	24600 33400	20850 28300	23150 31400	25450 34500
	60.00	0.489 12.42	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	65.00	0.534 13.56	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	71.00	0.582 14.78	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
11 7/8" 301.63	67.80	0.550 13.97	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	71.80	0.582 14.78	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500



Make-up torques

SIZE (OD)	NOMINAL WEIGHT	WALL THICKNESS	135-140 ksi			145-150-155 ksi		
			min.	opti.	max.	min.	opti.	max.
in. mm	ft.lb.	in. mm.	ft.lb. N.m.					
13 3/8" 339.73	61.00	0.430 10.92	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	68.00	0.480 12.19	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	72.00	0.514 13.06	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	77.00	0.550 13.97	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	80.70	0.580 14.73	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	85.00	0.608 15.44	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
	86.00	0.625 15.88	20850 28300	23150 31400	25450 34500	20850 28300	23150 31400	25450 34500
13 5/8" 346.08	88.20	0.625 15.88	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
	118.20	0.850 21.59	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
14" 355.60	86.00	0.600 15.24	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
	93.00	0.650 16.51	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
	100.00	0.700 17.78	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
	106.00	0.750 19.05	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
	112.00	0.797 20.24	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
	114.00	0.800 20.32	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
	120.00	0.850 21.59	27000 36600	30000 40700	33000 44800	27000 36600	30000 40700	33000 44800
15" 381.00	92.50	0.578 14.73	30000 40600	33300 45100	36600 49600	30000 40600	33300 45100	36600 49600