



## **SCOPE OF APPLICATION**

This document contains the torque values applicable for VAM TOP HT mill and field ends.

It covers torque values for carbon steel and material  $\leq 13\%$  Cr as well as for CRA material  $> 13\%$ Cr.

### **Make- up performed at production and repair shops.**

Standard make-up will be performed to a torque between the minimum and maximum values specified in the corresponding columns and is limited to 24000 ft.lbs due to mill tong limitation.

For special orders higher values are available upon request.

### **Make-up in the field.**

For Liner applications make-up can be performed to any torque comprised between the values specified in "Tubing + Liner min" and "Liner max" columns.

For Tubing applications make-up torque range is defined by the "Tubing + Liner min" and "Tubing max" columns.

Note : If the final torque exceeds 24000 ft.lbs a rotation of the mill end connection may occur.

## **DOPE APPLICATION**

For VAM TOP HT 100% of dope quantity on box is acceptable only for the mill end.

## DOPE QUANTITY

<b>MINIMUM DOPE QUANTITY FOR MAKE - UP</b>
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Nominal O.D.	Dope volume	
	(in.)	(in. <sup>3</sup> )
4 ½	10	0.6
5	14	0.9
5 ½	16	1.0
6 5/8	19	1.2
7	25	1.5

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 HT will be :  
 $25 \times 1.67 = 42\text{g}$  with a dope having a gravity of  $1.67 \text{ g/cm}^3$  and  $1.5 \times 1.00 = 1.5 \text{ oz}$  with a dope having a gravity of  $1.00 \text{ oz/in}^3$

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- -NESS	65 ksi					
			Field				Mill & licensee	
			Tubing + Liner		Tubing	Liner	min.	max.
min.	opti.	max.	Max.					
in. mm	lb/ft	in. mm	ft.lb. N.m.					
4 1/2" 114.30	<b>10.5</b>	<b>0.22</b> 5.69	<b>222</b> 3000	<b>246</b> 3330	<b>270</b> 3660	<b>289</b> 3920	<b>289</b> 3920	<b>317</b> 4310
	<b>11.6</b>	<b>0.25</b> 6.35	<b>280</b> 3800	<b>311</b> 4220	<b>342</b> 4640	<b>376</b> 5100	<b>376</b> 5100	<b>413</b> 5600
	<b>12.6</b>	<b>0.27</b> 6.88	<b>326</b> 4400	<b>362</b> 4900	<b>398</b> 5400	<b>441</b> 6000	<b>441</b> 6000	<b>485</b> 6600
	<b>13.5</b>	<b>0.29</b> 7.37	<b>371</b> 5000	<b>412</b> 5600	<b>453</b> 6200	<b>506</b> 6900	<b>506</b> 6900	<b>556</b> 7600
	<b>15.1</b>	<b>0.33</b> 8.56	<b>463</b> 6300	<b>514</b> 7000	<b>565</b> 7700	<b>637</b> 8600	<b>637</b> 8600	<b>700</b> 9500
	<b>17.0</b>	<b>0.38</b> 9.65	<b>560</b> 7600	<b>622</b> 8400	<b>684</b> 9200	<b>781</b> 10600	<b>781</b> 10600	<b>859</b> 11700
	<b>17.7</b>	<b>0.40</b> 10.21	<b>612</b> 8300	<b>680</b> 9200	<b>748</b> 10100	<b>855</b> 11600	<b>855</b> 11600	<b>940</b> 12800
	<b>18.9</b>	<b>0.43</b> 10.92	<b>684</b> 9300	<b>759</b> 10300	<b>834</b> 11300	<b>950</b> 12800	<b>950</b> 12800	<b>1045</b> 14100
	<b>21.5</b>	<b>0.50</b> 12.70	<b>815</b> 11100	<b>905</b> 12300	<b>995</b> 13500	<b>1120</b> 15200	<b>1120</b> 15200	<b>1230</b> 16700
	<b>23.7</b>	<b>0.56</b> 14.22	<b>915</b> 12300	<b>1015</b> 13700	<b>1115</b> 15100	<b>1265</b> 17200	<b>1265</b> 17200	<b>1385</b> 18900
5" 127.00	<b>15.0</b>	<b>0.29</b> 7.52	<b>437</b> 5900	<b>485</b> 6600	<b>533</b> 7300	<b>593</b> 8040	<b>593</b> 8040	<b>651</b> 8830
	<b>18.0</b>	<b>0.36</b> 9.19	<b>619</b> 8400	<b>687</b> 9300	<b>755</b> 10200	<b>870</b> 11800	<b>870</b> 11800	<b>950</b> 12900
	<b>20.3</b>	<b>0.40</b> 10.36	<b>747</b> 10200	<b>830</b> 11300	<b>913</b> 12400	<b>1050</b> 14250	<b>1050</b> 14250	<b>1150</b> 15600
	<b>20.8</b>	<b>0.42</b> 10.72	<b>783</b> 10600	<b>870</b> 11800	<b>957</b> 13000	<b>1085</b> 14700	<b>1085</b> 14700	<b>1195</b> 16200
	<b>21.4</b>	<b>0.43</b> 11.10	<b>846</b> 11400	<b>940</b> 12700	<b>1034</b> 14000	<b>1155</b> 15650	<b>1155</b> 15650	<b>1270</b> 17200
	<b>23.2</b>	<b>0.47</b> 12.14	<b>950</b> 12800	<b>1050</b> 14200	<b>1150</b> 15600	<b>1300</b> 17650	<b>1300</b> 17650	<b>1430</b> 19400
	<b>26.0</b>	<b>0.56</b> 14.22	<b>1115</b> 15100	<b>1230</b> 16700	<b>1350</b> 18300	<b>1520</b> 20800	<b>1520</b> 20800	<b>1670</b> 23200
5 1/2" 139.70	<b>17.0</b>	<b>0.30</b> 7.72	<b>522</b> 7000	<b>579</b> 7800	<b>636</b> 8600	<b>723</b> 9800	<b>723</b> 9800	<b>796</b> 10800
	<b>20.0</b>	<b>0.36</b> 9.17	<b>684</b> 9300	<b>759</b> 10300	<b>834</b> 11300	<b>975</b> 13200	<b>975</b> 13200	<b>1080</b> 14750
	<b>23.0</b>	<b>0.41</b> 10.54	<b>878</b> 11900	<b>975</b> 13200	<b>1072</b> 14500	<b>1230</b> 16700	<b>1230</b> 16700	<b>1350</b> 18300
	<b>26.0</b>	<b>0.47</b> 12.09	<b>1085</b> 14600	<b>1195</b> 16200	<b>1305</b> 17800	<b>1555</b> 21100	<b>1555</b> 21100	<b>1710</b> 23200

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- -NESS	65 ksi					
			Field				Mill& licensee	
			Tubing + Liner		Tunbing	Liner	min.	max.
min.	opti	max.	Max.					
in. mm	lb/ft	in. mm	ft.lb. N.m.					
6 5/8" 168.28	23.20	0.330 8.38	7830 10600	8700 11800	9570 13000	11950 16200	11950 16200	13100 17750
	24.00	0.352 8.94	8780 11900	9750 13200	10720 14500	13400 18150	13400 18150	14800 20050
	28.00	0.417 10.59	10100 13700	11200 15200	12300 16700	17700 24000	17700 24000	19500 26450
	32.00	0.475 12.07	14050 19000	15550 21100	17050 23200	22050 29900	22050 29900	24250 32900
	36.70	0.562 14.27	15650 21100	17350 23500	19050 25900	27100 36700	27100 36700	30050 40700
	7" 177.80	26.00	0.362 9.19	9500 12800	10500 14200	11500 15600	14100 19100	14100 19100
29.00		0.408 10.36	11700 15900	13000 17700	14300 19500	18100 24550	18100 24550	19900 27000
32.00		0.453 11.51	13050 17600	14450 19600	15850 21600	20600 27950	20600 27950	22700 30800
35.00		0.498 12.65	14400 19400	15900 21600	17400 23800	25100 34050	25100 34050	27700 37550
38.00		0.540 13.72	16300 22000	18100 24500	19900 27000	27900 37850	27900 37850	31000 42050
41.00		0.590 14.99	18250 24700	20250 27500	22250 30300	31250 42350	31250 42350	34400 46650

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- NESS	75-80-85 ksi					
			Field				Mill& licensee	
			Tubing + Liner		Tunbing	Liner	min. max.	
in. mm	lb/ft	in. mm	min.	opti	max.	Max.	min.	max.
			ft.lb. N.m.					
4 1/2" 114.30	10.50	0.224	2540	2820	3100	3470	3470	3810
		5.69	3440	3820	4200	4710	4710	5180
	11.60	0.250	3260	3620	3980	4560	4560	5010
		6.35	4400	4900	5400	6200	6200	6800
	12.60	0.271	3710	4120	4530	5420	5420	5960
		6.88	5000	5600	6200	7400	7400	8100
	13.50	0.290	4170	4630	5090	6150	6150	6760
		7.37	5700	6300	6900	8300	8300	9100
	15.10	0.337	5220	5790	6360	7670	7670	8430
		8.56	7000	7800	8600	10400	10400	11400
	17.00	0.380	6390	7090	7790	9400	9400	10340
		9.65	8600	9600	10600	12700	12700	14000
17.70	0.402	6840	7590	8340	10350	10350	11350	
	10.21	9300	10300	11300	14000	14000	15400	
18.90	0.430	7830	8700	9570	11450	11450	12550	
	10.92	10600	11800	13000	15500	15500	17100	
21.50	0.500	9500	10500	11500	13900	13900	15200	
	12.70	12800	14200	15600	18800	18800	20700	
23.70	0.560	10850	11950	13050	15600	15600	17100	
	14.22	14600	16200	17800	21200	21200	23300	
5" 127.00	15.00	0.296	4950	5500	6050	7090	7090	7800
		7.52	6700	7500	8300	9610	9610	10600
	18.00	0.362	7170	7960	8750	10150	10150	11100
		9.19	9700	10800	11900	13750	13750	15050
	20.30	0.408	8460	9400	10340	12650	12650	14000
		10.36	11400	12700	14000	17150	17150	19000
	20.80	0.422	9150	10150	11150	13400	13400	14800
	10.72	12300	13700	15100	18150	18150	20050	
21.40	0.437	9500	10500	11500	14100	14100	15550	
	11.10	12800	14200	15600	19100	19100	21100	
23.20	0.478	10850	11950	13050	16250	16250	17900	
	12.14	14600	16200	17800	22050	22050	24250	
5 1/2" 139.70	17.00	0.304	5930	6580	7230	8700	8700	9500
		7.72	8000	8900	9800	11800	11800	12900
	20.00	0.361	7830	8700	9570	11950	11950	13100
		9.17	10600	11800	13000	16200	16200	17750
	23.00	0.415	9850	10850	11850	15200	15200	16700
	10.54	13200	14700	16200	20600	20600	22650	
26.00	0.476	12100	13400	14700	18800	18800	20700	
	12.09	16300	18100	19900	25500	25500	28050	

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- -NESS	75-80-85 ksi					
			Field				Mill& licensee	
			Tubing + Liner		Tunbing	Liner	min.	max.
min.	opti	max.	Max.					
in. mm	lb/ft	in. mm	ft.lb. N.m.					
6 5/8" 168.28	23.20	0.330 8.38	9150 12300	10150 13700	11150 15100	14800 20050	14800 20050	16300 22100
	24.00	0.352 8.94	10100 13700	11200 15200	12300 16700	16650 22550	16650 22550	18300 24800
	28.00	0.417 10.59	13050 17600	14450 19600	15850 21600	21700 29400	21700 29400	23850 32350
	32.00	0.475 12.07	14400 19400	15900 21600	17400 23800	27000 36600	27000 36600	29650 40200
	36.70	0.562 14.27	18000 24300	19900 27000	21800 29700	33500 45400	33500 45400	37150 50400
7" 177.80	26.00	0.362 9.19	10850 14600	11950 16200	13050 17800	17350 23500	17350 23500	19100 25900
	29.00	0.408 10.36	13450 18100	14850 20100	16250 22100	22050 29900	22050 29900	24250 32900
	32.00	0.453 11.51	14050 19000	15550 21100	17050 23200	25450 34500	25450 34500	28000 37950
	35.00	0.498 12.65	16300 22000	18100 24500	19900 27000	30600 41500	30600 41500	33750 45750
	38.00	0.540 13.72	18600 25100	20600 27900	22600 30700	35150 47650	35150 47650	38250 51850
	41.00	0.590 14.99	20850 28300	23150 31400	25450 34500	38450 52150	38450 52150	42600 57750

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- NESS	90-95-100 ksi						
			Field				Mill& licensee		
			Tubing + Liner		Tunbing	Liner	min.	max.	
min.	opti	max.	Max.						
in. mm	lb/ft	in. mm	ft.lb. N.m.						
4 1/2" 114.30	10.50	0.224 5.69	2800 3800	3110 4220	3420 4640	4120 5600	4120 5600	4530 6200	
	11.60	0.250 6.35	3650 4900	4050 5500	4450 6100	5350 7300	5350 7300	5880 8000	
	12.60	0.271 6.88	4110 5600	4560 6200	5010 6800	6370 8600	6370 8600	7000 9500	
	13.50	0.290 7.37	4690 6400	5210 7100	5730 7800	7230 9800	7230 9800	7950 10800	
	15.10	0.337 8.56	5860 7900	6510 8800	7160 9700	9050 12300	9050 12300	9950 13500	
	17.00	0.380 9.65	7170 9700	7960 10800	8750 11900	11050 15000	11050 15000	12150 16500	
	17.70	0.402 10.21	7830 10600	8700 11800	9570 13000	12100 16400	12100 16400	13300 18000	
	18.90	0.430 10.92	8460 11400	9400 12700	10340 14000	13400 18100	13400 18100	14700 19900	
	21.50	0.500 12.70	10850 14600	11950 16200	13050 17800	16500 22400	16500 22400	18100 24600	
	23.70	0.560 14.22	12100 16300	13400 18100	14700 19900	18600 25200	18600 25200	20400 27700	
	5" 127.00	15.00	0.296 7.52	5480 7400	6080 8200	6680 9000	8300 11250	8300 11250	9200 12450
		18.00	0.362 9.19	7830 10600	8700 11800	9570 13000	11950 16200	11950 16200	13100 17750
20.30		0.408 10.36	9500 12800	10500 14200	11500 15600	14800 20050	14800 20050	16300 22100	
20.80		0.422 10.72	10100 13700	11200 15200	12300 16700	15550 21100	15550 21100	17100 23200	
21.40		0.437 11.10	10850 14600	11950 16200	13050 17800	16650 22550	16650 22550	18300 24800	
23.20		0.478 12.14	12100 16300	13400 18100	14700 19900	19150 25950	19150 25950	21000 28450	
5 1/2" 139.70		17.00	0.304 7.72	6510 8800	7230 9800	7950 10800	10500 14250	10500 14250	11500 15600
	20.00	0.361 9.17	8780 11900	9750 13200	10720 14500	13750 18650	13750 18650	15100 20450	
	23.00	0.415 10.54	11100 15000	12300 16700	13500 18400	17700 24000	17700 24000	19500 26450	
	26.00	0.476 12.09	13700 18500	15200 20600	16700 22700	22050 29900	22050 29900	24250 32900	

SIZE (OD)	NOMI- -NAL WEIGHT	WALL THICK- -NESS	90-95-100 ksi					
			Field				Mill & licensee	
			Tubing + Liner		Tunbing	Liner		
			min.	opti	max.	Max.	min.	max.
in. mm	lb/ft	in. mm	ft.lb. N.m.					
6 5/8" 168.28	23.20	0.330 8.38	10100 13700	11200 15200	12300 16700	17350 23500	17350 23500	19100 25900
	24.00	0.352 8.94	11450 15500	12650 17200	13850 18900	19500 26450	19500 26450	21500 29150
	28.00	0.417 10.59	13700 18500	15200 20600	16700 22700	25600 34700	25600 34700	28200 38250
	32.00	0.475 12.07	16300 22000	18100 24500	19900 27000	32100 43500	32100 43500	35350 47950
	36.70	0.562 14.27	20600 27800	22800 30900	25000 34000	39900 54200	39900 54200	44300 60100
	7" 177.80	26.00	0.362 9.19	12450 16700	13750 18600	15050 20500	20600 27950	20600 27950
29.00		0.408 10.36	15300 20700	17000 23000	18700 25300	26050 35300	26050 35300	28650 38850
32.00		0.453 11.51	16000 21600	17700 24000	19400 26400	31400 42550	31400 42550	33050 44800
35.00		0.498 12.65	18600 25100	20600 27900	22600 30700	36150 49050	36150 49050	39800 53950
38.00		0.540 13.72	20850 28300	23150 31400	25450 34500	41000 55600	41000 55600	45150 61200
41.00		0.590 14.99	20850 28300	23150 31400	25450 34500	46150 62600	46150 62600	50750 68800

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- NESS	105-110-115 ksi						
			Field				Mill& licensee		
			Tubing + Liner		Tunbing	Liner	min.	max.	
min.	opti	max.	Max.						
in. mm	lb/ft	in. mm	ft.lb. N.m.						
4 1/2" 114.30	10.50	0.224 5.69	3130 4240	3470 4710	3810 5180	4770 6500	4770 6500	5240 7200	
	11.60	0.250 6.35	4040 5500	4480 6100	4920 6700	6150 8300	6150 8300	6760 9100	
	12.60	0.271 6.88	4560 6200	5060 6900	5560 7600	7310 9900	7310 9900	8040 10900	
	13.50	0.290 7.37	5220 7000	5790 7800	6360 8600	8300 11300	8300 11300	9130 12400	
	15.10	0.337 8.56	6450 8700	7160 9700	7870 10700	10400 14100	10400 14100	11400 15500	
	17.00	0.380 9.65	7830 10600	8700 11800	9570 13000	12750 17300	12750 17300	13950 19000	
	17.70	0.402 10.21	8460 11400	9400 12700	10340 14000	13950 18900	13950 18900	15250 20800	
	18.90	0.430 10.92	9500 12800	10500 14200	11500 15600	15400 20900	15400 20900	16900 23000	
	21.50	0.500 12.70	11700 15900	13000 17700	14300 19500	19100 25900	19100 25900	21000 28500	
	23.70	0.560 14.22	13700 18500	15200 20600	16700 22700	21650 29300	21650 29300	23750 32200	
	5" 127.00	15.00	0.296 7.52	6060 8200	6730 9100	7400 10000	9400 12750	9400 12750	10300 13950
		18.00	0.362 9.19	8780 11900	9750 13200	10720 14500	13750 18650	13750 18650	15100 20450
20.30		0.408 10.36	10850 14600	11950 16200	13050 17800	17000 20350	17000 20350	18700 25350	
20.80		0.422 10.72	11100 15000	12300 16700	13500 18400	18100 24550	18100 24550	19900 27000	
21.40		0.437 11.10	11700 15900	13000 17700	14300 19500	19150 25950	19150 25950	21000 28450	
23.20		0.478 12.14	13450 18100	14850 20100	16250 22100	21700 29400	21700 29400	23850 32350	
5 1/2" 139.70		17.00	0.304 7.72	7470 10200	8300 11300	9130 12400	11950 16200	11950 16200	13100 17750
	20.00	0.361 9.17	9850 13200	10850 14700	11850 16200	15900 21550	15900 21550	17500 23750	
	23.00	0.415 10.54	12450 16700	13750 18600	15050 20500	20600 27950	20600 27950	22700 30800	
	26.00	0.476 12.09	15050 20300	16650 22600	18250 24900	25450 34500	25450 34500	28000 37950	

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- -NESS	105-110-115 ksi					
			Field				Mill & licensee	
			Tubing + Liner		Tunbing	Liner	min.	max.
min.	opti	max.	Max.					
in. mm	lb/ft	in. mm	ft.lb. N.m.					
6 5/8" 168.28	23.20	0.330 8.38	11450 15500	12650 17200	13850 18900	20250 27450	20250 27450	22300 30250
	24.00	0.352 8.94	13050 17600	14450 19600	15850 21600	22800 30900	22800 30900	25100 34050
	28.00	0.417 10.59	14650 19900	16250 22100	17850 24300	29600 40150	29600 40150	32650 44250
	32.00	0.475 12.07	18000 24300	19900 27000	21800 29700	37150 50350	37150 50350	40850 55400
	36.70	0.562 14.27	20850 28300	23150 31400	25450 34500	46100 62500	46100 62500	51200 69400
	7" 177.80	26.00	0.362 9.19	13700 18500	15200 20600	16700 22700	24000 32550	24000 32550
29.00		0.408 10.36	16000 21600	17700 24000	19400 26400	30100 40800	30100 40800	33150 44950
32.00		0.453 11.51	17650 23800	19550 26500	21450 29200	34700 47050	34700 47050	38200 51800
35.00		0.498 12.65	20600 27800	22800 30900	25000 34000	41800 56650	41800 56650	46050 62450
38.00		0.540 13.72	20850 28300	23150 31400	25450 34500	47300 64150	47300 64150	52150 70700
41.00		0.590 14.99	20850 28300	23150 31400	25450 34500	53750 72900	53750 72900	59150 80200

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- NESS	120-125-130 ksi						
			Field				Mill& licensee		
			Tubing + Liner		Tunbing	Liner	min.	max.	
min.	opti	max.	Max.						
in. mm	lb/ft	in. mm	ft.lb. N.m.						
4 1/2" 114.30	10.50	0.224 5.69	3450 4700	3830 5200	4210 5700	5420 7400	5420 7400	5960 8100	
	11.60	0.250 6.35	4500 6100	4990 6800	5480 7500	7020 9500	7020 9500	7720 10500	
	12.60	0.271 6.88	5020 6800	5570 7600	6120 8400	8300 11300	8300 11300	9130 12400	
	13.50	0.290 7.37	5740 7700	6370 8600	7000 9500	9500 12800	9500 12800	10450 14100	
	15.10	0.337 8.56	7170 9700	7960 10800	8750 11900	11800 16000	11800 16000	12900 17600	
	17.00	0.380 9.65	8780 11900	9750 13200	10720 14500	14450 19600	14450 19600	15850 21600	
	17.70	0.402 10.21	9500 12800	10500 14200	11500 15600	15750 21400	15750 21400	17250 23500	
	18.90	0.430 10.92	10450 14100	11550 15700	12650 17300	17500 23700	17500 23700	19200 26100	
	21.50	0.500 12.70	13050 17600	14450 19600	15850 21600	21650 29300	21650 29300	23750 32200	
	23.70	0.560 14.22	15050 20300	16650 22600	18250 24900	24650 33400	24650 33400	27050 36700	
	5" 127.00	15.00	0.296 7.52	6510 8800	7230 9800	7950 10800	10850 14700	10850 14700	11850 16200
		18.00	0.362 9.19	9500 12800	10500 14200	11500 15600	15550 21100	15550 21100	17100 23200
20.30		0.408 10.36	11700 15900	13000 17700	14300 19500	19150 25950	19150 25950	21050 28450	
20.80		0.422 10.72	12450 16700	13750 18600	15050 20500	20250 27450	20250 27450	22300 30250	
21.40		0.437 11.10	13050 17600	14450 19600	15850 21600	21350 28950	21350 28950	23500 31850	
23.20		0.478 12.14	14400 19400	15900 21600	17400 23800	24650 33450	24650 33450	27150 36750	
5 1/2" 139.70		17.00	0.304 7.72	8150 11100	9050 12300	9950 13500	13750 18650	13750 18650	15050 20450
	20.00	0.361 9.17	10850 14600	11950 16200	13050 17800	18100 24450	18100 24450	19900 27000	
	23.00	0.415 10.54	13700 18500	15200 20600	16700 22700	23150 31400	23150 31400	25650 34700	
	26.00	0.476 12.09	15650 21100	17350 23500	19050 25900	28850 39150	28850 39150	31800 43050	

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- -NESS	120-125-130 ksi					
			Field				Mill& licensee	
			Tubing + Liner		Tunbing	Liner	min.	max.
min.	opti	max.	Max.					
in. mm	lb/ft	in. mm	ft.lb. N.m.					
6 5/8" 168.28	23.20	0.330 8.38	12700 17200	14100 19100	15500 21000	22800 30900	22800 30900	25100 34050
	24.00	0.352 8.94	14400 19400	15900 21600	17400 23800	25950 35200	25950 35200	28600 38700
	28.00	0.417 10.59	16000 21600	17700 24000	19400 26400	33700 45700	33700 45700	37150 50300
	32.00	0.475 12.07	19850 26900	22050 29900	24250 32900	42250 57250	42250 57250	46450 62950
	36.70	0.562 14.27	20850 28300	23150 31400	25450 34500	52400 71000	52400 71000	58100 78800
7" 177.80	26.00	0.362 9.19	15050 20300	16650 22600	18250 24900	27350 37050	27350 37050	30100 40800
	29.00	0.408 10.36	16300 22000	18100 24500	19900 27000	34300 46500	34300 46500	37750 51100
	32.00	0.453 11.51	19600 26500	21700 29400	23800 32300	39400 53450	39400 53450	43400 58850
	35.00	0.498 12.65	20850 28300	23150 31400	25450 34500	47500 64450	47500 64450	52350 70900
	38.00	0.540 13.72	20850 28300	23150 31400	25450 34500	53800 72950	53800 72950	59150 80200
	41.00	0.590 14.99	20850 28300	23150 31400	25450 34500	61250 83050	61250 83050	67420 91400

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- NESS	135-140 ksi						
			Field				Mill& licensee		
			Tubing + Liner		Tunbing	Liner	min.	max.	
min.	opti	max.	Max.						
in. mm	lb/ft	in. mm	ft.lb. N.m.						
4 1/2" 114.30	10.50	0.224 5.69	3710 5000	4120 5600	4530 6200	5930 8000	5930 8000	6520 8800	
	11.60	0.250 6.35	4820 6600	5350 7300	5880 8000	7740 10500	7740 10500	8510 11600	
	12.60	0.271 6.88	5400 7300	6000 8100	6600 8900	9100 12400	9100 12400	10010 13600	
	13.50	0.290 7.37	6120 8300	6800 9200	7480 10100	10400 14100	10400 14100	11400 15500	
	15.10	0.337 8.56	7830 10600	8700 11800	9570 13000	13000 17700	13000 17700	14300 19500	
	17.00	0.380 9.65	9500 12800	10500 14200	11500 15600	15900 21600	15900 21600	17400 23800	
	17.70	0.402 10.21	10100 13700	11200 15200	12300 16700	17350 23500	17350 23500	19050 25900	
	18.90	0.430 10.92	11450 15500	12650 17200	13850 18900	19150 26000	19150 26000	21050 28600	
	21.50	0.500 12.70	14050 19000	15550 21100	17050 23200	23700 32200	23700 32200	26000 35400	
	23.70	0.560 14.22	15300 20700	17000 23000	18700 25300	27250 37000	27250 37000	29950 40700	
	5" 127.00	15.00	0.296 7.52	7170 9700	7960 10800	8750 11900	11950 16200	11950 16200	13100 17750
		18.00	0.362 9.19	10450 14100	11550 15700	12650 17300	17350 23500	17350 23500	19100 25900
20.30		0.408 10.36	12450 16700	13750 18600	15050 20500	20950 28400	20950 28400	23100 31300	
20.80		0.422 10.72	13050 17600	14450 19600	15850 21600	22400 30350	22400 30350	24650 33400	
21.40		0.437 11.10	14050 19000	15550 21100	17050 23200	23500 31850	23500 31850	25900 35100	
23.20		0.478 12.14	15050 20300	16650 22600	18250 24900	27050 36650	27050 36650	29750 40350	
5 1/2" 139.70		17.00	0.304 7.72	8780 11900	9750 13200	10720 14500	15200 20600	15200 20600	16700 22650
	20.00	0.361 9.17	11700 15900	13000 17700	14300 19500	19900 27000	19900 27000	21900 29700	
	23.00	0.415 10.54	14400 19400	15900 21600	17400 23800	25600 34700	25600 34700	28150 38150	
	26.00	0.476 12.09	16300 22000	18100 24500	19900 27000	31700 43000	31700 43000	34850 47250	

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- -NESS	135-140 ksi					
			Field				Mill& licensee	
			Tubing + Liner		Tunbing	Liner	min.	max.
min.	opti	max.	Max.					
in. mm	lb/ft	in. mm	ft.lb. N.m.					
6 5/8" 168.28	23.20	0.330 8.38	13700 18500	15200 20600	16700 22700	25250 34250	25250 34250	27750 37600
	24.00	0.352 8.94	15050 20300	16650 22600	18250 24900	28550 38700	28550 38700	31450 42650
	28.00	0.417 10.59	17250 23400	19150 26000	21050 28600	37200 50450	37200 50450	40850 55400
	32.00	0.475 12.07	20850 28300	23150 31400	25450 34500	46500 63050	46500 63050	51150 69350
	36.70	0.562 14.27	20850 28300	23150 31400	25450 34500	57600 78200	57600 78200	63900 86700
	7" 177.80	26.00	0.362 9.19	16000 21600	17700 24000	19400 26400	30100 40800	30100 40800
29.00		0.408 10.36	17650 23800	19550 26500	21450 29200	37750 51200	37750 51200	41500 56250
32.00		0.453 11.51	20850 28300	23150 31400	25450 34500	43400 58850	43400 58850	47750 64750
35.00		0.498 12.65	20850 28300	23150 31400	25450 34500	52350 71000	52350 71000	57550 78050
38.00		0.540 13.72	20850 28300	23150 31400	25450 34500	59250 80350	59250 80350	65200 88400
41.00		0.590 14.99	20850 28300	23150 31400	25450 34500	67400 91400	67400 91400	74150 100550

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- -NESS	145-150-155 ksi						
			Field			Mill & licensee			
			Tubing + Liner min.	opti	Tunbing max.	Liner Max.	min.	max.	
in. mm	lb/ft	in. mm	ft.lb. N.m.						
4 1/2" 114.30	10.50	0.224 5.69	3970 5400	4410 6000	4850 6600	6440 8700	6440 8700	7080 9600	
	11.60	0.250 6.35	5220 7000	5790 7800	6360 8600	8400 11400	8400 11400	9240 12500	
	12.60	0.271 6.88	5800 7800	6440 8700	7080 9600	10000 13500	10000 13500	11000 14900	
	13.50	0.290 7.37	6510 8800	7230 9800	7950 10800	11350 15400	11350 15400	12450 16900	
	15.10	0.337 8.56	8150 11100	9050 12300	9950 13500	14200 19200	14200 19200	15600 21100	
	17.00	0.380 9.65	10100 13700	11200 15200	12300 16700	17300 23400	17300 23400	19000 25700	
	17.70	0.402 10.21	10850 14600	11950 16200	13050 17800	18900 25600	18900 25600	20700 28200	
	18.90	0.430 10.92	12100 16300	13400 18100	14700 19900	20900 28300	20900 28300	22900 31100	
	21.50	0.500 12.70	15050 20300	16650 22600	18250 24900	25800 35000	25800 35000	28300 38500	
	23.70	0.560 14.22	15650 21100	17350 23500	19050 25900	29850 40500	29850 40500	32750 44600	
	5" 127.00	15.00	0.296 7.52	7470 10200	8300 11300	9130 12400	13000 17650	13000 17650	14300 19400
		18.00	0.362 9.19	11100 15000	12300 16700	13500 18400	18800 25500	18800 25500	20700 28050
20.30		0.408 10.36	13450 18100	14850 20100	16250 22100	23150 31400	23150 31400	25400 34450	
20.80		0.422 10.72	14050 19000	15550 21100	17050 23200	24400 33100	24400 33100	26850 36400	
21.40		0.437 11.10	15050 20300	16650 22600	18250 24900	25800 35000	25800 35000	28350 38450	
23.20		0.478 12.14	16000 21600	17700 24000	19400 26400	29400 39850	29400 39850	32350 43850	
5 1/2" 139.70	17.00	0.304 7.72	9500 12800	10500 14200	11500 15600	16650 22550	16650 22550	18300 24800	
	20.00	0.361 9.17	12450 16700	13750 18600	15050 20500	21700 29400	21700 29400	23850 32350	
	23.00	0.415 10.54	15050 20300	16650 22600	18250 24900	27900 37850	27900 37850	30650 41550	
	26.00	0.476 12.09	17000 22900	18800 25500	20600 28100	34600 46900	34600 46900	38050 51600	

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- NESS	145-150-155 ksi					
			Field				Mill & licensee	
			Tubing + Liner		Tubing	Liner	min. max.	
in. mm	lb/ft	in. mm	min.	opti	max.	Max.	min.	max.
			ft.lb. N.m.					
6 5/8" 168.28	23.20	0.330 8.38	15050	16650	18250	27600	27600	30400
			20300	22600	24900	37400	37400	41200
	24.00	0.352 8.94	15650	17350	19050	31250	31250	34350
			21100	23500	25900	42350	42350	46500
	28.00	0.417 10.59	18600	20600	22600	40550	40550	44650
		25100	27900	30700	55000	55000	60550	
	32.00	0.475 12.07	20850	23150	25450	50750	50750	55850
			28300	31400	34500	68800	68800	75700
	36.70	0.562 14.27	20850	23150	25450	62900	62900	69800
			28300	31400	34500	85300	85300	94600
7" 177.80	26.00	0.362 9.19	16300	18100	19900	32850	32850	36150
			22000	24500	27000	44550	44550	49000
	29.00	0.408 10.36	18900	21000	23100	41250	41250	45350
			25600	28400	31200	55950	55950	61500
	32.00	0.453 11.51	20850	23150	25450	47500	47500	52200
			28300	31400	34500	64400	64400	70750
	35.00	0.498 12.65	20850	23150	25450	57200	57200	62950
		28300	31400	34500	77550	77550	85350	
	38.00	0.540 13.72	20850	23150	25450	64700	64700	71150
			28300	31400	34500	87700	87700	96450
	41.00	0.590 14.99	20850	23150	25450	73500	73500	80850
			28300	31400	34500	99650	99650	109600

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- NESS	65 ksi						
			Field				Mill& licensee		
			Tubing + Liner min. opti		Tunbing max.	Liner Max.	min.	max.	
in. mm	lb/ft	in. mm	ft.lb. N.m.						
4 1/2" 114.30	10.50	0.224 5.69	2220 3000	2460 3330	2700 3660	2750 3730	2750 3730	3020 4100	
	11.60	0.250 6.35	2800 3800	3110 4220	3420 4640	3470 4710	3470 4710	3810 5180	
	12.60	0.271 6.88	3060 4150	3400 4610	3740 5070	3830 5200	3830 5200	4210 5700	
	13.50	0.290 7.37	3450 4700	3830 5200	4210 5700	4410 6000	4410 6000	4850 6600	
	15.10	0.337 8.56	4300 5800	4770 6500	5240 7200	5500 7500	5500 7500	6050 8300	
	17.00	0.380 9.65	5220 7000	5790 7800	6360 8600	6650 9000	6650 9000	7310 9900	
	17.70	0.402 10.21	5670 7600	6290 8500	6910 9400	7230 9800	7230 9800	7950 10800	
	18.90	0.430 10.92	6320 8500	7020 9500	7720 10500	7960 10800	7960 10800	8750 11900	
	21.50	0.500 12.70	7470 10200	8300 11300	9130 12400	9250 12600	9250 12600	10170 13900	
	23.70	0.560 14.22	8460 11400	9400 12700	10340 14000	10350 14000	10350 14000	11350 15400	
	5" 127.00	15.00	0.296 7.52	4230 5800	4700 6400	5170 7000	5210 7060	5210 7060	5730 7760
		18.00	0.362 9.19	5340 7200	5930 8000	6520 8800	7160 9710	7160 9710	7870 10680
20.30		0.408 10.36	6450 8700	7160 9700	7870 10700	8600 11650	8600 11650	9460 12750	
20.80		0.422 10.72	6840 9300	7590 10300	8340 11300	9050 12250	9050 12250	9900 13400	
21.40		0.437 11.10	7170 9700	7960 10800	8750 11900	9500 12900	9500 12900	10400 14100	
23.20		0.478 12.14	8460 11400	9400 12700	10340 14000	10500 14250	10500 14250	11500 15600	
5 1/2" 139.70		17.00	0.304 7.72	4820 6600	5350 7300	5880 8000	6220 8430	6220 8430	6870 9310
	20.00	0.361 9.17	6250 8500	6940 9400	7630 10300	8000 10850	8000 10850	8800 11950	
	23.00	0.415 10.54	7830 10600	8700 11800	9570 13000	9900 13400	9900 13400	10800 14700	
	26.00	0.476 12.09	9150 12300	10150 13700	11150 15100	11850 16100	11850 16100	12950 17550	

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- NESS	65 ksi					
			Field				Mill & licensee	
			Tubing + Liner		Tunbing	Liner	min. max.	
in. mm	lb/ft	in. mm	min.	opti	max.	Max.	min.	max.
			ft.lb. N.m.					
6 5/8" 168.28	23.20	0.330 8.38	6840 9300	7590 10300	8340 11300	9500 12900	9500 12900	10450 14100
	24.00	0.352 8.94	7830 10600	8700 11800	9570 13000	10500 14250	10500 14250	11500 15650
	28.00	0.417 10.59	9150 12300	10150 13700	11150 15100	13100 17750	13100 17750	14400 19450
	32.00	0.475 12.07	11100 15000	12300 16700	13500 18400	15500 21000	15500 21000	17000 23100
	36.70	0.562 14.27	14050 19000	15550 21100	17050 23200	17850 24200	17850 24200	19650 26600
	7" 177.80	26.00	0.362 9.19	8460 11400	9400 12700	10340 14000	11100 15050	11100 15050
29.00		0.408 10.36	10450 14100	11550 15700	12650 17300	13400 18150	13400 18150	14700 19950
32.00		0.453 11.51	10850 14600	11950 16200	13050 17800	14900 20200	14900 20200	16400 22250
35.00		0.498 12.65	12700 17200	14100 19100	15500 21000	17200 23300	17200 23300	18900 25600
38.00		0.540 13.72	14400 19400	15900 21600	17400 23800	18600 25200	18600 25200	20400 27650
41.00		0.590 14.99	15650 21100	17350 23500	19050 25900	19800 26850	19800 26850	21800 29550

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- NESS	75-80-85 ksi						
			Field				Mill& licensee		
			Tubing + Liner min. opti		Tunbing max.	Liner Max.	min.	max.	
in. mm	lb/ft	in. mm	ft.lb. N.m.						
4 1/2" 114.30	10.50	0.224 5.69	2540 3440	2820 3820	3100 4200	3110 4220	3110 4220	3420 4640	
	11.60	0.250 6.35	3260 4400	3620 4900	3980 5400	3980 5400	3980 5400	4370 5900	
	12.60	0.271 6.88	3590 4900	3980 5400	4370 5900	4630 6300	4630 6300	5090 6900	
	13.50	0.290 7.37	3850 5200	4270 5800	4690 6400	5280 7200	5280 7200	5800 7900	
	15.10	0.337 8.56	4760 6500	5280 7200	5800 7900	6650 9000	6650 9000	7310 9900	
	17.00	0.380 9.65	5800 7800	6440 8700	7080 9600	7960 10800	7960 10800	8750 11900	
	17.70	0.402 10.21	6390 8600	7090 9600	7790 10600	8700 11800	8700 11800	9570 13000	
	18.90	0.430 10.92	7170 9700	7960 10800	8750 11900	9500 12800	9500 12800	10450 14100	
	21.50	0.500 12.70	8780 11900	9750 13200	10720 14500	11200 15200	11200 15200	12300 16700	
	23.70	0.560 14.22	9850 13200	10850 14700	11850 16200	12450 16900	12450 16900	13650 18600	
	5" 127.00	15.00	0.296 7.52	4560 6200	5060 6900	5560 7600	6050 8200	6050 8200	6650 9000
		18.00	0.362 9.19	6450 8700	7160 9700	7870 10700	8500 11500	8500 11500	9350 12600
20.30		0.408 10.36	7830 10600	8700 11800	9570 13000	10200 13850	10200 13850	11200 15150	
20.80		0.422 10.72	8150 11100	9050 12300	9950 13500	10700 14500	10700 14500	11700 15900	
21.40		0.437 11.10	8780 11900	9750 13200	10720 14500	11200 15200	11200 15200	12300 16700	
23.20		0.478 12.14	9850 13200	10850 14700	11850 16200	12600 17100	12600 17100	13800 18800	
5 1/2" 139.70		17.00	0.304 7.72	5340 7200	5930 8000	6520 8800	7450 10100	7450 10100	8190 11100
	20.00	0.361 9.17	7170 9700	7960 10800	8750 11900	9600 13000	9600 13000	10500 14300	
	23.00	0.415 10.54	8780 11900	9750 13200	10720 14500	11800 16000	11800 16000	12900 17600	
	26.00	0.476 12.09	11100 15000	12300 16700	13500 18400	14100 19100	14100 19100	15500 21000	

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- NESS	75-80-85 ksi						
			Field				Mill & licensee		
			Tubing + Liner		Tunbing	Liner	min. max.		
in. mm	lb/ft	in. mm	min.	opti	max.	Max.	min.	max.	
			ft.lb. N.m.						
6 5/8" 168.28	23.20	0.330	7830	8700	9570	11400	11400	12500	
		8.38	10600	11800	13000	15450	15450	16950	
	24.00	0.352	8780	9750	10720	12700	12700	13900	
		8.94	11900	13200	14500	17200	17200	18900	
	28.00	0.417	11700	13000	14300	15800	15800	17300	
		10.59	15900	17700	19500	21400	21400	23450	
32.00	32.00	0.475	14400	15900	17400	18600	18600	20400	
		12.07	19400	21600	23800	25200	25200	27650	
	36.70	0.562	16000	17700	19400	21600	21600	23750	
		14.27	21600	24000	26400	29300	29300	32200	
	7" 177.80	26.00	0.362	9500	10500	11500	13400	13400	14700
			9.19	12800	14200	15600	18150	18150	19950
29.00		0.408	11700	13000	14300	16100	16100	17700	
		10.36	15900	17700	19500	21800	21800	24000	
32.00		0.453	14050	15550	17050	17900	17900	19600	
		11.51	19000	21100	23200	24250	24250	26650	
35.00	35.00	0.498	15650	17350	19050	20600	20600	22600	
		12.65	21100	23500	25900	27950	27950	30650	
	38.00	0.540	16300	18100	19900	22400	22400	24600	
41.00	41.00	0.590	18600	20600	22600	23850	23850	26150	
		14.99	25100	27900	30700	32350	32350	35550	

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- NESS	90-95-100 ksi						
			Field				Mill& licensee		
			Tubing + Liner min. opti		Tunbing max.	Liner Max.	min.	max.	
in. mm	lb/ft	in. mm	ft.lb. N.m.						
4 1/2" 114.30	10.50	0.224 5.69	2800 3800	3110 4220	3420 4640	3620 4900	3620 4900	3980 5400	
	11.60	0.250 6.35	3650 4900	4050 5500	4450 6100	4560 6200	4560 6200	5010 6800	
	12.60	0.271 6.88	3910 5300	4340 5900	4770 6500	5420 7400	5420 7400	5960 8100	
	13.50	0.290 7.37	4690 6400	5210 7100	5730 7800	6220 8400	6220 8400	6840 9200	
	15.10	0.337 8.56	5860 7900	6510 8800	7160 9700	7740 10500	7740 10500	8510 11600	
	17.00	0.380 9.65	6390 8600	7090 9600	7790 10600	9350 12700	9350 12700	10280 14000	
	17.70	0.402 10.21	6840 9300	7590 10300	8340 11300	10050 13600	10050 13600	11050 15000	
	18.90	0.430 10.92	7830 10600	8700 11800	9570 13000	11050 15000	11050 15000	12150 16500	
	21.50	0.500 12.70	9500 12800	10500 14200	11500 15600	13250 17900	13250 17900	14550 19700	
	23.70	0.560 14.22	11100 15000	12300 16700	13500 18400	14600 19800	14600 19800	16000 21800	
	5" 127.00	15.00	0.296 7.52	5220 7000	5790 7800	6360 8600	7020 9520	7020 9520	7720 10470
		18.00	0.362 9.19	7170 9700	7960 10800	8750 11900	9900 13400	9900 13400	10800 14700
20.30		0.408 10.36	8460 11400	9400 12700	10340 14000	11850 16050	11850 16050	12950 17550	
20.80		0.422 10.72	9150 12300	10150 13700	11150 15100	12300 16700	12300 16700	13500 18300	
21.40		0.437 11.10	9500 12800	10500 14200	11500 15600	12900 17500	12900 17500	14100 19200	
23.20		0.478 12.14	11100 15000	12300 16700	13500 18400	14550 19750	14550 19750	16000 21700	
5 1/2" 139.70		17.00	0.304 7.72	5930 8000	6580 8900	7230 9800	8700 11800	8700 11800	9570 12900
	20.00	0.361 9.17	7830 10600	8700 11800	9570 13000	11200 15200	11200 15200	12300 16700	
	23.00	0.415 10.54	9850 13200	10850 14700	11850 16200	13750 18650	13750 18650	15050 20450	
	26.00	0.476 12.09	12100 16300	13400 18100	14700 19900	16300 22100	16300 22100	17900 24300	

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- NESS	90-95-100 ksi					
			Field				Mill & licensee	
			Tubing + Liner		Tunbing	Liner	min. max.	
in. mm	lb/ft	in. mm	min.	opti	max.	Max.	min.	max.
			ft.lb. N.m.					
6 5/8" 168.28	23.20	0.330 8.38	8780 11900	9750 13200	10720 14500	13500 18300	13500 18300	14800 20100
	24.00	0.352 8.94	10100 13700	11200 15200	12300 16700	14900 20200	14900 20200	16300 22200
	28.00	0.417 10.59	13050 17600	14450 19600	15850 21600	18450 25000	18450 25000	20250 27500
	32.00	0.475 12.07	16300 22000	18100 24500	19900 27000	21700 29400	21700 29400	23800 32300
	36.70	0.562 14.27	18000 24300	19900 27000	21800 29700	25350 34400	25350 34400	27900 37800
	7" 177.80	26.00	0.362 9.19	10850 14600	11950 16200	13050 17800	15700 21300	15700 21300
29.00		0.408 10.36	13450 18100	14850 20100	16250 22100	18800 25500	18800 25500	20600 28000
32.00		0.453 11.51	16000 21600	17700 24000	19400 26400	20900 28350	20900 28350	22900 31150
35.00		0.498 12.65	18250 24700	20250 27500	22250 30300	24000 32550	24000 32550	26400 35800
38.00		0.540 13.72	18900 25600	21000 28400	23100 31200	26050 35300	26050 35300	28650 38800
41.00		0.590 14.99	20850 28300	23150 31400	25450 34500	28000 37950	28000 37950	30800 41750

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- NESS	105-110-115 ksi						
			Field				Mill& licensee		
			Tubing + Liner min. opti		Tunbing max.	Liner Max.	min.	max.	
in. mm	lb/ft	in. mm	ft.lb. N.m.						
4 1/2" 114.30	10.50	0.224 5.69	3130 4240	3470 4710	3810 5180	4120 5600	4120 5600	4530 6200	
	11.60	0.250 6.35	4040 5500	4480 6100	4920 6700	5280 7200	5280 7200	5800 7900	
	12.60	0.271 6.88	4560 6200	5060 6900	5560 7600	6220 8400	6220 8400	6840 9200	
	13.50	0.290 7.37	5220 7000	5790 7800	6360 8600	7090 9600	7090 9600	7790 10600	
	15.10	0.337 8.56	6450 8700	7160 9700	7870 10700	8900 12100	8900 12100	9790 13300	
	17.00	0.380 9.65	7830 10600	8700 11800	9570 13000	10650 14400	10650 14400	11650 15800	
	17.70	0.402 10.21	8460 11400	9400 12700	10340 14000	11550 15700	11550 15700	12650 17300	
	18.90	0.430 10.92	9500 12800	10500 14200	11500 15600	12650 17200	12650 17200	13850 18900	
	21.50	0.500 12.70	10450 14100	11550 15700	12650 17300	15200 20600	15200 20600	16700 22700	
	23.70	0.560 14.22	12450 16700	13750 18600	15050 20500	16800 22800	16800 22800	18400 25100	
	5" 127.00	15.00	0.296 7.52	6060 8200	6730 9100	7400 10000	7960 10800	7960 10800	8750 11800
		18.00	0.362 9.19	7830 10600	8700 11800	9570 13000	11300 15300	11300 15300	12400 16800
20.30		0.408 10.36	9500 12800	10500 14200	11500 15600	13500 18300	13500 18300	14800 20100	
20.80		0.422 10.72	9850 13200	10850 14700	11850 16200	14100 19100	14100 19100	15500 21000	
21.40		0.437 11.10	10450 14100	11550 15700	12650 17300	14800 20050	14800 20050	16200 22050	
23.20		0.478 12.14	12100 16300	13400 18100	14700 19900	16500 22350	16500 22350	18100 24550	
5 1/2" 139.70		17.00	0.304 7.72	7470 10200	8300 11300	9130 12400	10000 13550	10000 13550	11000 14850
	20.00	0.361 9.17	8460 11400	9400 12700	10340 14000	12800 17350	12800 17350	14000 19050	
	23.00	0.415 10.54	10850 14600	11950 16200	13050 17800	15700 21300	15700 21300	17200 23300	
	26.00	0.476 12.09	13050 17600	14450 19600	15850 21600	18700 25350	18700 25350	20500 27850	

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- NESS	105-110-115 ksi					
			Field				Mill & licensee	
			Tubing + Liner		Tunbing	Liner	min. max.	
in. mm	lb/ft	in. mm	min.	opti	max.	Max.	min.	max.
			ft.lb. N.m.					
6 5/8" 168.28	23.20	0.330 8.38	11450 15500	12650 17200	13850 18900	15500 21000	15500 21000	17000 23100
	24.00	0.352 8.94	13050 17600	14450 19600	15850 21600	17100 23200	17100 23200	18800 25500
	28.00	0.417 10.59	14650 19900	16250 22100	17850 24300	21200 28750	21200 28750	23300 31550
	32.00	0.475 12.07	18000 24300	19900 27000	21800 29700	24900 33750	24900 33750	23300 37000
	36.70	0.562 14.27	19600 26500	21700 29400	23800 32300	28950 39300	28950 39300	31850 43200
	7" 177.80	26.00	0.362 9.19	11700 15900	13000 17700	14300 19500	18000 24400	18000 24400
29.00		0.408 10.36	14650 19900	16250 22100	17850 24300	21600 29300	21600 29300	23700 32200
32.00		0.453 11.51	17650 23800	19550 26500	21450 29200	23950 32450	23950 32450	26250 35600
35.00		0.498 12.65	20600 27800	22800 30900	25000 34000	27500 37300	27500 37300	30200 41000
38.00		0.540 13.72	20850 28300	23150 31400	25450 34500	29800 40400	29800 40400	32700 44350
41.00		0.590 14.99	20850 28300	23150 31400	25450 34500	32100 43500	32100 43500	35300 47850

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- NESS	120-125-130 ksi						
			Field				Mill& licensee		
			Tubing + Liner min. opti		Tunbing max.	Liner Max.	min.	max.	
in. mm	lb/ft	in. mm	ft.lb. N.m.						
4 1/2" 114.30	10.50	0.224 5.69	3450 4700	3830 5200	4210 5700	4630 6300	4630 6300	5090 6900	
	11.60	0.250 6.35	4500 6100	4990 6800	5480 7500	5930 8000	5930 8000	6520 8800	
	12.60	0.271 6.88	5020 6800	5570 7600	6120 8400	7020 9500	7020 9500	7720 10500	
	13.50	0.290 7.37	5740 7700	6370 8600	7000 9500	8030 10900	8030 10900	8830 12000	
	15.10	0.337 8.56	7170 9700	7960 10800	8750 11900	10050 13600	10050 13600	11050 15000	
	17.00	0.380 9.65	8780 11900	9750 13200	10720 14500	12000 16300	12000 16300	13200 17900	
	17.70	0.402 10.21	9500 12800	10500 14200	11500 15600	13000 17700	13000 17700	14300 19500	
	18.90	0.430 10.92	10450 14100	11550 15700	12650 17300	14250 19300	14250 19300	15650 21200	
	21.50	0.500 12.70	11450 15500	12650 17200	13850 18900	17050 23100	17050 23100	18750 25400	
	23.70	0.560 14.22	13700 18500	15200 20600	16700 22700	19000 25800	19000 25800	20900 28400	
	5" 127.00	15.00	0.296 7.52	6510 8800	7230 9800	7950 10800	9050 11250	9050 11250	9950 12350
		18.00	0.362 9.19	9500 12800	10500 14200	11500 15600	13000 17650	13000 17650	14300 19350
		20.30	0.408 10.36	10100 13700	11200 15200	12300 16700	15100 20450	15100 20450	16600 22450
		20.80	0.422 10.72	10850 14600	11950 16200	13050 17800	15800 21400	15800 21400	17300 23500
21.40		0.437 11.10	11450 15500	12650 17200	13850 18900	16600 22500	16600 22500	18200 24700	
23.20		0.478 12.14	13050 17600	14450 19600	15850 21600	18500 25100	18500 25100	20300 27600	
5 1/2" 139.70		17.00	0.304 7.72	8150 11100	9050 12300	9950 13500	11300 15300	11300 15300	12400 16800
	20.00	0.361 9.17	10850 14600	11950 16200	13050 17800	14400 19500	14400 19500	15800 21400	
	23.00	0.415 10.54	11700 15900	13000 17700	14300 19500	17600 23850	17600 23850	19300 26150	
	26.00	0.476 12.09	13700 18500	15200 20600	16700 22700	21000 28450	21000 28450	23100 31250	

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- NESS	120-125-130 ksi					
			Field				Mill & licensee	
			Tubing + Liner		Tunbing	Liner	min. max.	
			min.	opti	max.	Max.	min.	max.
in. mm	lb/ft	in. mm	ft.lb. N.m.					
6 5/8" 168.28	23.20	0.330 8.38	12700 17200	14100 19100	15500 21000	17500 23750	17500 23750	19200 26050
	24.00	0.352 8.94	14400 19400	15900 21600	17400 23800	19400 26300	19400 26300	21300 28900
	28.00	0.417 10.59	16000 21600	17700 24000	19400 26400	23900 32400	23900 32400	26300 35650
	32.00	0.475 12.07	19850 26900	22050 29900	24250 32900	28100 38100	28100 38100	30900 41900
	36.70	0.562 14.27	20850 28300	23150 31400	25450 34500	32600 44200	32600 44200	35900 48600
	7" 177.80	26.00	0.362 9.19	13050 17600	14450 19600	15850 21600	20400 27650	20400 27650
29.00		0.408 10.36	16300 22000	18100 24500	19900 27000	24400 33100	24400 33100	26800 36350
32.00		0.453 11.51	19600 26500	21700 29400	23800 32300	27100 36750	27100 36750	29800 40400
35.00		0.498 12.65	20850 28300	23150 31400	25450 34500	31000 42050	31000 42050	34100 46250
38.00		0.540 13.72	20850 28300	23150 31400	25450 34500	33600 45550	33600 45550	36900 50050
41.00		0.590 14.99	20850 28300	23150 31400	25450 34500	36200 49100	36200 49100	39800 53950

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- NESS	135-140 ksi					
			Field				Mill& licensee	
			Tubing + Liner		Tunbing	Liner		
			min.	opti	max.	Max.	min.	max.
in. mm	lb/ft	in. mm	ft.lb. N.m.					
4 1/2" 114.30	10.50	0.224 5.69	3710	4120	4530	5140	5140	5650
	11.60	0.250 6.35	5000	5600	6200	7000	7000	7700
	12.60	0.271 6.88	4820	5350	5880	6510	6510	7160
	13.50	0.290 7.37	6600	7300	8000	8800	8800	9700
	15.10	0.337 8.56	5400	6000	6600	7740	7740	8510
	17.00	0.380 9.65	7300	8100	8900	10500	10500	11600
	17.70	0.402 10.21	6120	6800	7480	8800	8800	9680
	18.90	0.430 10.92	8300	9200	10100	12000	12000	13200
	21.50	0.500 12.70	7830	8700	9570	11000	11000	12100
	23.70	0.560 14.22	10600	11800	13000	14900	14900	16400
			9500	10500	11500	13150	13150	14450
			12800	14200	15600	17800	17800	19600
			10100	11200	12300	14250	14250	15650
			13700	15200	16700	19300	19300	21200
		11450	12650	13850	15600	15600	17100	
		15500	17200	18900	21200	21200	23300	
		14050	15550	17050	18650	18650	20450	
		19000	21100	23200	25300	25300	27800	
		14650	16250	17850	20900	20900	22900	
		19900	22100	24300	28300	28300	31100	
5" 127.00	15.00	0.296 7.52	7170	7960	8750	9800	9800	10700
	18.00	0.362 9.19	9700	10800	11900	13300	13300	14600
	20.30	0.408 10.36	10450	11550	12650	13900	13900	15200
	20.80	0.422 10.72	14100	15700	17300	18850	18850	20650
	21.40	0.437 11.10	11100	12300	13500	16600	16600	18200
	23.20	0.478 12.14	15000	16700	18400	22500	22500	24700
			11450	12650	13850	17300	17300	19000
			15500	17200	18900	23450	23450	25750
		12100	13400	14700	18100	18100	19900	
		16300	18100	19900	24550	24550	26950	
		14050	15550	17050	20200	20200	22200	
		19000	21100	23200	27400	27400	30100	
5 1/2" 139.70	17.00	0.304 7.72	8780	9750	10720	12300	12300	13500
	20.00	0.361 9.17	11900	13200	14500	16700	16700	18300
	23.00	0.415 10.54	11450	12650	13850	15800	15800	17300
	26.00	0.476 12.09	15500	17200	18900	21400	21400	23500
			12700	14100	15500	19400	19400	21300
		17200	19100	21000	26300	26300	28900	
		15300	17000	18700	23000	23000	25300	
		20700	23000	25300	31200	31200	34300	

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- -NESS	135-140 ksi					
			Field				Mill & licensee	
			Tubing + Liner		Tunbing	Liner	min. max.	
in. mm	lb/ft	in. mm	min.	opti	max.	Max.	min.	max.
			ft.lb. N.m.					
6 5/8" 168.28	23.20	0.330 8.38	13700 18500	15200 20600	16700 22700	19200 26050	19200 26050	21100 28650
	24.00	0.352 8.94	15050 20300	16650 22600	18250 24900	21350 28950	21350 28950	23450 31750
	28.00	0.417 10.59	17250 23400	19150 26000	21050 28600	26250 35600	26250 35600	28850 39100
	32.00	0.475 12.07	20850 28300	23150 31400	25450 34500	30800 41750	30800 41750	33800 45850
	36.70	0.562 14.27	20850 28300	23150 31400	25450 34500	35700 48400	35700 48400	39200 53200
	7" 177.80	26.00	0.362 9.19	14050 19000	15550 21100	17050 23200	22300 30250	22300 30250
29.00		0.408 10.36	17650 23800	19550 26500	21450 29200	26750 36250	26750 36250	29350 39850
32.00		0.453 11.51	20850 28300	23150 31400	25450 34500	29650 40200	29650 40200	32550 44200
35.00		0.498 12.65	20850 28300	23150 31400	25450 34500	34000 46100	34000 46100	37400 50700
38.00		0.540 13.72	20850 28300	23150 31400	25450 34500	36750 49850	36750 49850	40350 54700
41.00		0.590 14.99	20850 28300	23150 31400	25450 34500	39550 53600	39550 53600	43450 58900

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- NESS	145-150-155 ksi						
			Field				Mill& licensee		
			Tubing + Liner min. opti		Tunbing max.	Liner Max.	min.	max.	
in. mm	lb/ft	in. mm	ft.lb. N.m.						
4 1/2" 114.30	10.50	0.224 5.69	3970 5400	4410 6000	4850 6600	5570 7600	5570 7600	6120 8400	
	11.60	0.250 6.35	5220 7000	5790 7800	6360 8600	7090 9600	7090 9600	7790 10600	
	12.60	0.271 6.88	5800 7800	6440 8700	7080 9600	8400 11400	8400 11400	9240 12500	
	13.50	0.290 7.37	6510 8800	7230 9800	7950 10800	9600 13000	9600 13000	10560 14300	
	15.10	0.337 8.56	8150 11100	9050 12300	9950 13500	12000 16300	12000 16300	13200 17900	
	17.00	0.380 9.65	10100 13700	11200 15200	12300 16700	14300 19400	14300 19400	15700 21300	
	17.70	0.402 10.21	10850 14600	11950 16200	13050 17800	15500 21000	15500 21000	17000 23100	
	18.90	0.430 10.92	12100 16300	13400 18100	14700 19900	16950 22900	16950 22900	18550 25200	
	21.50	0.500 12.70	15050 20300	16650 22600	18250 24900	20300 27600	20300 27600	22300 30400	
	23.70	0.560 14.22	15650 21100	17350 23500	19050 25900	22800 30900	22800 30900	25000 34000	
	5" 127.00	15.00	0.296 7.52	7470 10200	8300 11300	9130 12400	10700 14500	10700 14500	11700 15900
		18.00	0.362 9.19	11100 15000	12300 16700	13500 18400	15100 20450	15100 20450	16600 22450
20.30		0.408 10.36	13450 18100	14850 20100	16250 22100	17900 24250	17900 24250	19600 26650	
20.80		0.422 10.72	14050 19000	15550 21100	17050 23200	18800 25500	18800 25500	20600 28000	
21.40		0.437 11.10	14650 19900	16250 22100	17850 24300	19700 26700	19700 26700	21600 29300	
23.20		0.478 12.14	15050 20300	16650 22600	18250 24900	21900 29700	21900 29700	24000 32600	
5 1/2" 139.70		17.00	0.304 7.72	9500 12800	10500 14200	11500 15600	13400 18150	13400 18150	14700 19950
	20.00	0.361 9.17	12450 16700	13750 18600	15050 20500	17100 23200	17100 23200	18800 25500	
	23.00	0.415 10.54	13700 18500	15200 20600	16700 22700	21000 28450	21000 28450	23100 31250	
	26.00	0.476 12.09	16650 22500	18450 25000	20250 27500	24950 33850	24950 33850	27350 37150	

SIZE (OD)	NOMI- NAL WEIGHT	WALL THICK- -NESS	145-150-155 ksi					
			Field				Mill& licensee	
			Tubing + Liner		Tunbing	Liner	min.	max.
min.	opti	max.	Max.					
in. mm	lb/ft	in. mm	ft.lb. N.m.					
6 5/8" 168.28	23.20	0.330 8.38	15050 20300	16650 22600	18250 24900	20950 28400	20950 28400	22950 31200
	24.00	0.352 8.94	15650 21100	17350 23500	19050 25900	23200 31450	23200 31450	25500 34550
	28.00	0.417 10.59	18600 25100	20600 27900	22600 30700	28650 38850	28650 38850	31450 42650
	32.00	0.475 12.07	20850 28300	23150 31400	25450 34500	33500 45400	33500 45400	36800 49900
	36.70	0.562 14.27	20850 28300	23150 31400	25450 34500	38800 52600	38800 52600	42600 57800
7" 177.80	26.00	0.362 9.19	15050 20300	16650 22600	18250 24900	24400 33100	24400 33100	26800 36350
	29.00	0.408 10.36	18900 25600	21000 28400	23100 31200	29150 39500	29150 39500	32050 43450
	32.00	0.453 11.51	20850 28300	23150 31400	25450 34500	33250 45100	33250 45100	36550 49550
	35.00	0.498 12.65	20850 28300	23150 31400	25450 34500	36900 50050	36900 50050	40500 54900
	38.00	0.540 13.72	20850 28300	23150 31400	25450 34500	39900 54100	39900 54100	43800 59400
	41.00	0.590 14.99	20850 28300	23150 31400	25450 34500	42950 58250	42950 58250	47150 63900