Sucker Rod Connections

Table 4.1

Full Size Couplings and Subcouplings

(All dimensions in inches.)

1	2	3	4	5	6
Nomial Coupling Size*	Outside Diameter	Length Min.	Length of Wrench Flat **	Dist. between Wrench Flats 0 - 1/32	Used with Min. Tubing Size
5/8	1 1/2	4	1 1/4	1 3/8	2 1/16 OD
3/4	1 5/8	4	1 1/4	1 1/2	2 3/8 OD
7/8	1 13/16	4	1 1/4	1 5/8	2 7/8 OD
1	2 3/16	4	1 1/2	1 7/8	3 1/2 OD
1 1/8	2 3/8	4 1/2	1 5/8	2 1/8	3 1/2 OD

*Also size of rod with which coupling is to be used.

** Minimum length exclusive of fillets.

Table 4.2

Slimhole Couplings and Subcouplings

(All dimensions in inches.)

1	2	3	4
Nomial Coupling Size*	Outside Diameter .005 - .010	Length Min.	Used With Min. Tubing Size
1/2	1	2 3/4	1.660 OD
5/8	1 1/4	4	1.990 OD
3/4	1 1/2	4	2 1/16 OD
7/8	1 5/8	4	2 3/8 OD
1	2	4	2 7/8 OD

*Also size of rod with which coupling is to be used.

TUBING SIZES
THREADED AND COUPLED TYPE

NON UPSET

A.P.I. SIZE	NOM. SIZE	O.D. IN.	O.D. MM.	I.D.	WEIGHT PER FT.		THDS. PER INCH	TAPER PER FT.	MALE THD. LENGTH	COU-PLING LENGTH	COU-PLING DIAMETER
					Plain End	Thd. & Coupled					
1.050	3/4"	1.050	26,7	.824	1.13	1.14	10	3/4"	1.094	3 3/16"	1.313
1.315	1"	1.315	33,4	1.049	1.68	1.70	10	3/4"	1.125	3 1/4"	1.660
1.660	1 1/4"	1.660	42,2	1.380	2.27	2.30	10	3/4"	1.250	3 1/2"	2.054
1.900	1 1/2"	1.900	48,3	1.610	2.72	2.75	10	3/4"	1.375	3 3/4"	2.200
2 3/8"	2"	2.375	60,3	2.041	3.94	4.00	10	3/4"	1.625	4 1/4"	2.875
2 3/8"	2"	2.375	60,3	1.995	4.43	4.60	10	3/4"	1.625	4 1/4"	2.875
2 3/8"	2"	2.375	60,3	1.867	5.75	5.80	10	3/4"	1.625	4 1/4"	2.875
2 7/8"	2 1/2"	2.875	73,0	2.441	6.16	6.40	10	3/4"	2.063	5 1/8"	3.500
2 7/8"	2 1/2"	2.875	73,0	2.259	8.44	8.60	10	3/4"	2.063	5 1/8"	3.500
3 1/2"	3"	3.500	88,9	3.068	7.58	7.70	10	3/4"	2.313	5 5/8"	4.250
3 1/2"	3"	3.500	88,9	2.992	8.81	9.20	10	3/4"	2.313	5 5/8"	4.250
3 1/2"	3"	3.500	88,9	2.922	9.91	10.20	10	3/4"	2.313	5 5/8"	4.250
3 1/2"	3"	3.500	88,9	2.750	12.52	12.70	10	3/4"	2.313	5 5/8"	4.250
4"	3 1/2"	4.000	101,6	3.548	9.11	9.50	8	3/4"	2.375	5 3/4"	4.750
4 1/2"	4"	4.500	114,3	3.958	12.24	12.60	8	3/4"	2.563	6 1/8"	5.200

TUBING SIZES

EXTERNAL UPSET

A.P.I. SIZE	NOM. SIZE	O.D. IN.	O.D. MM.	I.D.	UPSET DIA.	WEIGHT PER FT.		THDS. PER INCH	TAPER PER FT.	MALE THD. LENGTH	COU-PLING LENGTH	COU-PLING DIA.
						Plain End	Thd. & Coupled					
1.050	3/4"	1.050	26,7	.824	1.315	1.13	1.20	10	3/4"	1.125	3 1/4"	1.660
1.315	1"	1.315	33,4	1.049	1.469	1.68	1.80	10	3/4"	1.250	3 1/2"	1.900
1.660	1 1/4"	1.660	42,2	1.380	1.812	2.27	2.40	10	3/4"	1.375	3 3/4"	2.200
1.900	1 1/2"	1.900	48,3	1.610	2.093	2.72	2.90	10	3/4"	1.438	3 7/8"	2.500
2 3/8"	2"	2.375	60,3	1.995	2.593	4.43	4.70	8	3/4"	1.938	4 7/8"	3.063
2 3/8"	2"	2.375	60,3	1.867	2.593	5.75	5.95	8	3/4"	1.938	4 7/8"	3.063
2 7/8"	2 1/2"	2.875	73,0	2.441	3.093	6.16	6.50	8	3/4"	2.125	5 1/4"	3.668
2 7/8"	2 1/2"	2.875	73,0	2.259	3.093	8.44	8.70	8	3/4"	2.125	5 1/4"	3.668
3 1/2"	3"	3.500	88,9	2.992	3.750	8.81	9.30	8	3/4"	2.375	5 3/4"	4.500
3 1/2"	3"	3.500	88,9	2.750	3.750	12.52	12.95	8	3/4"	2.375	5 3/4"	4.500
4"	3 1/2"	4.000	101,6	3.476	4.250	10.46	11.00	8	3/4"	2.500	6"	5.000
4 1/2"	4"	4.500	114,3	3.958	4.750	12.24	12.75	8	3/4"	2.625	6 1/4"	5.563

TUBING MADE TO API SPECS; API COUPLINGS

Tubing Size		Nominal Weight						Threaded and Coupled				Integral Joint				Joint Yield Strength			
									Coup. Outside Dia.										
Nom. in.	O.D. in.	T & C Non-Up. lb/ft	T & C Upset lb/ft	Int. Jt. lb/ft	Grade	Wall Thickness in.	Inside Dia. in.	Drift Dia. in.	Non-Up. in.	Upset Reg. in.	Upset Spec. in.	Drift Dia. in.	Box O.D. in.	Collapse Resistance psi	Internal Yield Pressure psi	T & C Non-Up. lb	T & C Upset lb	Int. Jt. lb	Fill-Up Volume bbl/100 ft
3/4	1.050	1.14	1.20		H-40	.113	.824	.730	1.313	1.660				7,200	7,530	6,360	13,300		.066
	1.050	1.14	1.20		J-55	.113	.824	.730	1.313	1.660				9,370	10,360	8,740	18,290		.066
	1.050	1.14	1.20		C-75	.113	.824	.730	1.313	1.660				12,250	14,120	11,920	24,940		.066
	1.050	1.14	1.20		N-80	.113	.824	.730	1.313	1.660				12,970	15,070	12,710	26,610		.066
1	1.315	1.70	1.80	1.72	H-40	.133	1.049	.955	1.660	1.900		.955	1.550	6,820	7,080	10,960	19,760	15,970	.107
	1.315	1.70	1.80	1.72	J-55	.133	1.049	.955	1.660	1.900		.955	1.550	8,860	9,730	15,060	27,160	21,960	.107
	1.315	1.70	1.80	1.72	C-75	.133	1.049	.955	1.660	1.900		.955	1.550	11,590	13,270	20,540	37,040	29,940	.107
	1.315	1.70	1.80	1.72	N-80	.133	1.049	.955	1.660	1.900		.955	1.550	12,270	14,160	21,910	39,510	31,940	.107
1 1/4	1.660			2.10	H-40	.125	1.410											22,180	.193
	1.660	2.30	2.40	2.33	H-40	.140	1.380	1.286	2.054	2.200		1.286	1.880	5,220	5,270			22,180	.185
	1.660			2.10	J-55	.125	1.410					1.286	1.880	5,790	5,900	15,530	26,740	30,500	.193
	1.660	2.30	2.40	2.33	J-55	.140	1.380	1.286	2.054	2.200		1.286	1.880	6,790	7,250			30,500	.185
	1.660	2.30	2.40	2.33	C-75	.140	1.380	1.286	2.054	2.200		1.286	1.880	7,530	8,120	21,360	36,770	30,500	.185
	1.660	2.30	2.40	2.33	N-80	.140	1.380	1.286	2.054	2.200		1.286	1.880	9,840	11,070	29,120	50,140	41,600	.185
														10,420	11,810	31,060	53,480	44,370	.185
1 1/2	1.900			2.40	H-40	.125	1.650											26,890	.264
	1.900	2.75	2.90	2.76	H-40	.145	1.610	1.516	2.200	2.500		1.516	2.110	4,450	4,610			26,890	.252
	1.900			2.40	J-55	.125	1.650					1.516	2.110	5,290	5,340	19,090	31,980	36,970	.264
	1.900	2.75	2.90	2.76	J-55	.145	1.610	1.516	2.200	2.500		1.516	2.110	5,790	6,330			36,970	.252
	1.900	2.75	2.90	2.76	C-75	.145	1.610	1.516	2.200	2.500		1.516	2.110	6,870	7,350	26,250	43,970	36,970	.252
	1.900	2.75	2.90	2.76	N-80	.145	1.610	1.516	2.200	2.500		1.516	2.110	8,990	10,020	35,800	59,960	50,420	.252
														9,520	10,680	38,180	63,960	53,780	.252
2 1/16	2.063			3.25	H-40	.156	1.751					1.657	2.325	5,240	5,290			35,690	.298
	2.063			3.25	J-55	.156	1.751					1.657	2.325	6,820	7,280			49,070	.298
	2.063			3.25	C-75	.156	1.751					1.657	2.325	8,910	9,920			66,910	.298
	2.063			3.25	N-80	.156	1.751					1.657	2.325	9,440	10,590			71,370	.298
2 3/8	2.375	4.00			H-40	.167	2.041	1.947	2.875					4,880	4,920	30,130			.405
	2.375	4.60	4.70		H-40	.190	1.995	1.901	2.875	3.063	2.910			5,520	5,600	35,960	52,170		.387
	2.375	4.00			J-55	.167	2.041	1.947	2.873					6,340	6,770	41,430			.405
	2.375	4.60	4.70		J-55	.190	1.995	1.901	2.875	3.063	2.910			7,180	7,700	49,450	71,730		.387
	2.375	4.00			C-75	.167	2.041	1.947	2.875					8,150	9,230	56,500			.405
	2.375	4.60	4.70		C-75	.190	1.995	1.901	2.875	3.063	2.910			9,380	10,500	67,430	97,820		.387
	2.375	5.80	5.95		C-75	.254	1.867	1.773	2.875	3.063	2.910			12,180	14,040	96,560	126,940		.339
	2.375	4.00			N-80	.167	2.041	1.947	2.875					8,660	9,840	60,260			.405
	2.375	4.60	4.70		N-80	.190	1.995	1.901	2.875	3.063	2.910			9,940	11,200	71,930	104,340		.387
	2.375	5.80	5.95		N-80	.254	1.867	1.773	2.875	3.063	2.910			12,890	14,970	102,990	135,400		.339
	2.375	4.60	4.70		P-105	.190	1.995	1.901	2.875	3.063	2.910			13,250	14,700	94,410	136,940		.387
	2.375	5.80	5.95		P-105	.254	1.867	1.773	2.875	3.063	2.910			17,190	19,650	135,180	177,710		.339
2 7/8	2.875	6.40	6.50		H-40	.217	2.441	2.347	3.500	3.668	3.460			5,230	5,280	52,780	72,480		.579
	2.875	6.40	6.50		J-55	.217	2.441	2.347	3.500	3.668	3.460			6,800	7,260	72,580	99,660		.579
	2.875	6.40	6.50		C-75	.217	2.441	2.347	3.500	3.668	3.460			8,900	9,910	98,970	135,900		.579
	2.875	8.60	8.70		C-75	.308	2.259	2.165	3.500	3.668	3.460			12,200	14,060	149,360	185,290		.496
	2.875	6.40	6.50		N-80	.217	2.441	2.347	3.500	3.668	3.460			9,420	10,570	105,570	144,960		.579
	2.875	8.60	8.70		N-80	.308	2.259	2.165	3.500	3.668	3.460			12,920	15,000	159,310	198,710		.496
	2.875	6.40	6.50		P-105	.217	2.441	2.347	3.500	3.668	3.460			12,560	13,870	138,560	190,260		.579
	2.875	8.60	8.70		P-105	.308	2.259	2.165	3.500	3.668	3.460			17,220	19,690	209,100	260,810		.496
3 1/2	3.500	7.70			H-40	.216	3.068	2.943	4.250					4,070	4,320	65,070			.914
	3.500	9.20	9.30		H-40	.254	2.992	2.867	4.250	4.500	4.180			5,050	5,080	79,540	103,610		.870
	3.500	10.20			H-40	.289	2.922	2.797	4.250					5,680	5,780	92,550			.829
	3.500	7.70			J-55	.216	3.068	2.943	4.250					5.290	5,940	89,470			.914
	3.500	9.20	9.30		J-55	.254	2.992	2.867	4.250	4.500	4.180			6,560	6,980	109,370	142,460		.870
	3.500	10.20			J-55	.289	2.922	2.797	4.250					7,390	7,950	127,250			.829
	3.500	7.70			C-75	.216	3.068	2.943	4.250					6,690	8,100	122,010			.914
	3.500	9.20	9.30		C-75	.254	2.992	2.867	4.250	4.500	4.180			8,530	9,520	149,140	194,260		.870
	3.500	10.20			C-75	.289	2.922	2.797	4.250					9,660	10,840	173,530			.829
	3.500	12.70	12.95		C-75	.375	2.750	2.625	4.250	4.500	4.180			12,200	14,060	230,990	276,120		.735
	3.500	7.70			N-80	.216	3.068	2.943	4.250					7,080	8,640	130,140			.914
	3.500	9.20	9.30		N-80	.254	2.992	2.867	4.250	4.500	4.180			9,080	10,160	159,090	207,220		.870
	3.500	10.20			N-80	.289	2.922	2.797	4.250					10,230	11,560	185,100			.829
	3.500	12.70	12.95		N-80	.375	2.750	2.625	4.250	4.500	4.180			12,920	15,000	246,390	294,530		.735
	3.500	9.20	9.30		P-105	.254	2.992	2.867	4.250	4.500	4.180			12,110	13,330	208,800	271,970		.870
	3.500	12.70	12.95		P-105	.375	2.750	2.625	4.250	4.500	4.180			17,220	19,690	323,390	386,570		.735
4	4.000	9.50			H-40	.226	3.548	3.423	4.750					3,580	3,960	72,000			1.223
	4.000		11.00		H-40	.262	3.476	3.351		5.000				4,420	4,580		123,070		1.174
	4.000	9.50			J-55	.226	3.548	3.423	4.750					4,650	5,440	99,010			1.223
	4.000		11.00		J-55	.262	3.476	3.351		5.000				5,750	6,300		169,220		1.174
	4.000	9.50			C-75	.226	3.548	3.423	4.750					5,800	7,420	135,010			1.223
	4.000		11.00		C-75	.262	3.476	3.351		5.000				7,330	8,600		230,750		1.174
	4.000	9.50			N-80	.226	3.548	3.423	4.750					6,120	7,910	144,010			1.223
	4.000		11.00		N-80	.262	3.476	3.351		5.000				7,780	9,170		246,140		1.174
4 1/2	4.500	12.60	12.75		H-40	.271	3.958	3.833	5.200	5.563				3,930	4,220	104,360	144,020		1.522
	4.500	12.60	12.75		J-55	.271	3.958	3.833	5.200	5.563				5,100	5,800	143,500	198,030		1.522
	4.500	12.60	12.75		C-75	.271	3.958	3.833	5.200	5.563				6,430	7,900	195,680	270,040		1.522
	4.500	12.60	12.75		N-80	.271	3.958	3.833	5.200	5.563				6,810	8,430	208,730	288,040		1.522

TUBING MAKE-UP TORQUE GUIDE

THREADED AND COUPLED JOINTS

Joint Name	Tubing Grade	3/4 1.050" OD Min.	Opt.	Max.	1 1.315" OD Min.	Opt.	Max.	1 1/4 1.660" OD Min.	Opt.	Max.	1 1/2 1.900" OD Min.	Opt.	Max.
API Non-Upset	H-40	110	140	180	160	210	260	200	270	340	240	320	400
	J-55	140	180	230	200	270	340	260	350	440	310	410	500
	C-75	170	230	290	270	360	450	350	460	580	410	540	680
	N-80	190	250	310	290	380	480	370	490	610	430	570	700
	P-105												
API External Upset	H-40	350	460	580	330	440	550	400	530	660	500	670	840
	J-55	450	600	750	430	570	710	520	690	860	660	880	1100
	C-75	590	780	980	560	740	930	680	910	1140	860	1150	1440
	N-80	620	830	1040	590	790	990	720	960	1200	920	1220	1530
	P-105												
Armco Seal-Lock													
Armco Nu-Lock	Make-up to the shoulder: ft lb torque ratings in API range.												
Jones & Laughlin 8-Acme	Power-tight position indicated by make-up to base of J-L stamped on tubing.												
Wheeling-Pittsburg 8-Acme	Power-tight position indicated by make-up to base of P stamped on tubing: ft lb torque ratings in API												
Republic 8-Acme	Power-tight position indicated by make-up to base of R stamped on tubing: ft lb torque ratings in API												
Rucker Atlas Bradford Modified Coup	Same as recommended API minimum torque.												
Rucker Atlas Bradford TC-4S*	J-55 C-75, N-80 P-105												
U.S. Steel Imp. Buttress	Minimum power make-up should be to the leading edge of the first knurl on the tubing: torque ratings												
Mannesmannrochren-Werke AG. TDS, also avail. in I.J.*	J-55 C-75, N-80 P-105												
Vallourec VAM*	K-55 C-75, N-80 P-105												
Hydril CTS	J-55, C-75 N-80, P-105 Not yet established												

TUBING MAKE-UP TORQUE GUIDE

THREADED AND COUPLED JOINTS

2 1/16	2 3/8			2 7/8			3 1/2			4			4 1/2				
2.063" OD	2.375" OD			2.875" OD			3.500" OD			4.000" OD			4.500" OD			TUBING	
Min.	Opt.	Max.	Min.	Opt.	Max.	Min.	Opt.	Max.	Min.	Opt.	Max.	Min.	Opt.	Max.	GRADE	JOINT NAME	
	350	470	590	600	800	1000	840	1120	1400	710	940	1180	990	1320	1650	H-40	API Non-Upset
	460	610	760	790	1050	1310	910	1210	1510	930	1240	1550	1310	1740	2180	J-55	
	600	800	1000	1200	1600	2000	1200	1600	2000	1230	1640	2050	1730	2300	2880	C-75	
	640	850	1060	1100	1470	1840	1280	1700	2130	1310	1740	2180	1830	2440	3050	N-80	
	960	1280	1600	1390	1850	1390	1970	2620	3280							P-105	
	740	990	1240	940	1250	1560	1300	1730	2160	1460	1940	2430	1620	2160	2700	H-40	API External Upset
	970	1290	1610	1240	1650	2060	1710	2280	2850	1920	2560	3200	2150	2860	3180	J-55	
	1280	1700	2130	1630	2170	2710	2260	3010	3760	2540	3390	4240	2840	3780	4730	C-75	
	1350	1800	2250	1730	2300	2880	2400	3200	4000	3400	4560	5700	3020	4020	5030	N-80	
	1700	2270	2840	2180	2910	3640	3040	4050	5060							P-105	
	800	1000	1200	1000	1200	1400	1600	1800	2000								Armco Seal-Lock
	1000		2000	1500		2500	2000		3000								Armco Nu-Lock
																	Jones & Laughlin 8-Acme
range.																	Wheeling-Pittsburg 8-Acme
range.																	Republic 8-Acme
																	Rucker Atlas Bradford Modified Coup
		1300			1700			2300			3000			2900		J-55	Rucker Atlas Bradford TC-4S*
		2000			2600			3200			4000			4000		C-75, N-80	
		2400			3000			4100			4500			5000		P-105	
in the API range.																	U.S. Steel Imp. Buttress
	950		1100	1400		1500	2200		2500	2300		2900	2300		3500	J-55	Mannesmannrohren-Werke AG,TDS.
	950		1250	1400		1800	2200		3000	2300		3600	2300		4300	C-75, N-80	Also avail. in I.J.*
	950		1400	1400		2200	2200		3600	2300		4300	2300		5200	P-105	
	1350	1400	1600	2200	2400	2500	2500	2900	3300	2500	3300	4000	4000	4300	4700	K-55	Vallourec VAM*
	1800	2000	2400	2500	2700	2900	3300	3600	4000	3300	4000	4700	4000	4300	4700	C-75, N-80	
	2000	2200	2500	2500	2700	2900	4300	4700	5400	3300	4000	4700	4300	4700	5100	P-105	
Vallourec VAM AF				Data on request from manufacturer for each grade.													
															J-55, C-75 N-80, P-105		Hydril CTS

TUBING MAKE-UP TORQUE GUIDE

INTEGRAL JOINTS

Joint Name	Tubing Grade	3/4 1.050" OD Min.	Opt.	Max.	1 1.315" OD Min.	Opt.	Max.	1 1/4 1.660" OD Min.	Opt.	Max.	1 1/2 1.900" OD Min.	Opt.	Max.
API Integral Joint	H-40				230	310	390	280	380	480	340	450	560
	J-55				300	400	500	380	500	630	440	580	730
	C-75				390	520	650	490	650	810	570	760	950
	N-80				410	550	690	690	520	860	610	810	1010
Armco Extreme-Line	J-55												
	N-80												
	P-105												
Aztec IJ						350			357			425	
Gulf States Tubs GST Streamline	No torque recommendation; power-tight position indicated by make-up to cross-bar of "A" stamped on												
Hydril A-95	J-55								400			600	
	N-80								600			800	
Hydril CS	J-55		200			300			400			600	
	C-75, N-80		300			400			600			800	
	P-105		300			400			600			800	
Hydril PH-6*	J-55												
	C-75, N-80												
	P-105												
Hydril PH-4*	J-55												
	C-75, N-80												
	P-105												
Hydril CFJ-P	J-55												
	C-75, N-80												
	P-105												
Hydril Super FJ	J-55, N-80												
Hydril FJ	J-55, N-80												
Jones & Laughlin IJ	Recommended torque same as API T & C joints of same size and grade.												
NL Atlas Bradford DSS-HT*	J					200			400			500	
	C & N					300			500			600	
	P					400			600			800	
NL Atlas Bradford IJ-3SS	J, C, N, P		Same as DSS-HT										
NL Atlas Bradford IJ-4S*	J												
	C & N												
	P												
NL Atlas Bradford FL-4S*	J & K												
	C & N & P												
Standard Tube IJ									375			425	
Vallourec Mini VAM	Data on request from manufacturer.												

*Torque values shown only for lighter weights in indicated grade. Get additional data from manufacturer.

TUBING MAKE-UP TORQUE GUIDE

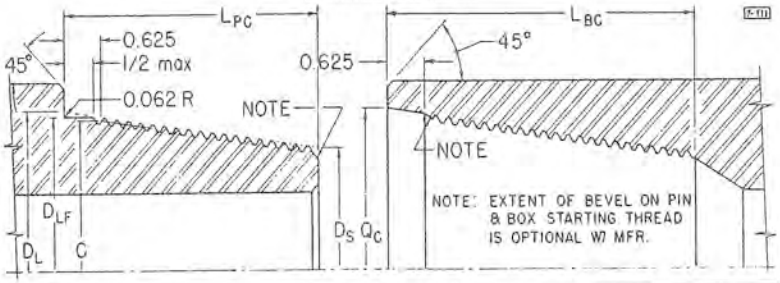
INTEGRAL JOINTS

2 1/16			2 3/8			2 7/8			3 1/2			4			4 1/2				
2.063" OD			2.375" OD			2.875" OD			3.500" OD			4.000" OD			4.500" OD			TUBING	
Min.	Opt.	Max.	Min.	Opt.	Max.	Min.	Opt.	Max.	Min.	Opt.	Max.	Min.	Opt.	Max.	Min.	Opt.	Max.	GRADE	JOINT NAME
430	570	710																H-40	API Integral Joint
560	740	920																J-55	
730	970	1210																C-75	
770	1030	1290																N-80	
			1700	2300		2100	2600		2400	3000								J-55	Armco Extreme-Line
			1700	2800		2100	3100		2400	3500								N-80	
			1700	3300		2100	3600		2400	4000								P-105	
	450			525			625												Aztec IJ
tubing.																			Gulf States Tube GST Streamline
	700			1100			1500			2500			3000			3500		J-55	Hydril A-95
	900			1500			2100			3000			3500			4500		N-80	
	700			1100			1500			2500			3000			3500		J-55	Hydril CS
	900			1500			2100			3000			3500			4500		N-80	
	900			1500			2100			3000			3500			4500		P-105	
				1600			2200			4000			4000			4500		J-55	Hydril PH-6*
				2200			3000			5500			5500			6000		C-75, N-80	
				2700			3500			7000			7000			7500		P-105	
							4000			5500			6000			7000		J-55	Hydril PH-4*
							5000			7500			8500			9500		C-75-N-80	
							6500			9500			10500			12000		P-105	
				800			1100			1500			2000			3000		J-55	Hydril CFJ-P
				1100			1500			1900			2700			4000		C-75-, N-80	
																		P-105	
				700			1000			1300			1800			2500		J-55, N-80	Hydril Super FJ
				400			600			800			1100			1500		J-55, N-80	Hydril FJ
																			Jones & Laughlin IJ
	600			1100			1600			2200			2400			2500		J	NL Atlas Bradford DSS-HT*
	800			1300			1800			2600			2800			3000		C & N	
	1000			1500			2200			3000			3200			3500		P	
																		J, C, N, P	NL Atlas Bradford IJ-3SS
				1300			1700			2300			3000			2900		J	NL Atlas Bradford IJ-4S*
				2000			2600			3200			4000			4000		C & N	
				2400			3000			4100			4500			5000		P	
				400			600			1400			2000			2500		J & K	NL Atlas Bradford FL-4S*
				500			800			1600			2300			3200		C & N & P	
	450			525			625												Standard Tube IJ
																			Vallourec Mini VAM

TABLE I1

API NUMBERED ROTARY SHOULDERED CONNECTIONS

All dimensions in inches.



1	2	3	4	5	6	7	8	9	10	11
Conn* No	Thread Form, inch radius	Threads Per Inch	Taper, Inches Per Foot on Dia	Pitch Dia of Thread at Gage Point, C	Large Dia of Pin, Reference D_L	Flat on Pin, D_{LF} ±1/64	Small Dia of Pin, D_S	Depth of Box, L_{BC} +⅛ −⅜	Length of Pin, L_{PC} +0 −⅛	Box Counterbore, Q_C +1/32, −0
23	0.038R	4	2	2.355	2.563	2.437	2.063	3⅝	3	2⅝
26**	0.038R	4	2	2.668	2.876	2.750	2.376	3⅝	3	2⅝
31**	0.038R	4	2	3.183	3.391	3.266	2.808	4⅛	3⅛	3⅛
35	0.038R	4	2	3.531	3.739	3.625	3.114	4⅜	3¾	3⅛
38**	0.038R	4	2	3.808	4.016	3.891	3.349	4⅜	4	4⅛
40**	0.038R	4	2	4.072	4.280	4.156	3.530	5⅛	4⅛	4⅛
44	0.038R	4	2	4.417	4.625	4.499	3.875	5⅛	4⅛	4⅛
46**	0.038R	4	2	4.626	4.834	4.709	4.084	5⅛	4⅛	4⅛
50**	0.038R	4	2	5.0417	5.250	5.125	4.500	5⅛	4⅛	5⅛
56	0.038R	4	3	5.616	5.876	5.703	4.626	5⅝	5	5⅛
61	0.038R	4	3	6.178	6.438	6.266	5.063	6⅛	5⅛	6⅛
70	0.038R	4	3	7.053	7.313	7.141	5.813	6⅝	6	7⅜
77	0.038R	4	3	7.741	8.000	7.828	6.376	7⅛	6⅛	8⅛

*The connection number is the diameter of the connection at the gage point rounded to units and tenths of inches.

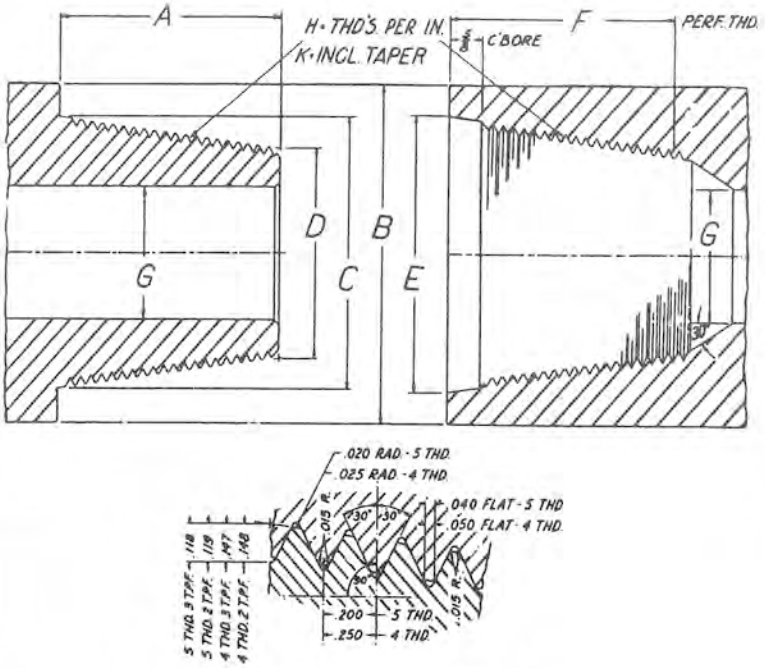
**See Table I2 for interchangeability of *numbered* rotary shouldered connections with rotary shouldered connections of Table 9.1.

TABLE I2

INTERCHANGEABILITY OF NUMBERED ROTARY SHOULDERED CONNECTIONS WITH ROTARY SHOULDERED CONNECTIONS OF TABLE 9.1

1	2
Numbered Connection	Equivalent Connection of Table 9.1
26	2⅜ IF
31	2⅞ IF
38	3½ IF
40	4 FH
46	4 IF
50	4½ IF

taken from API Std. 7

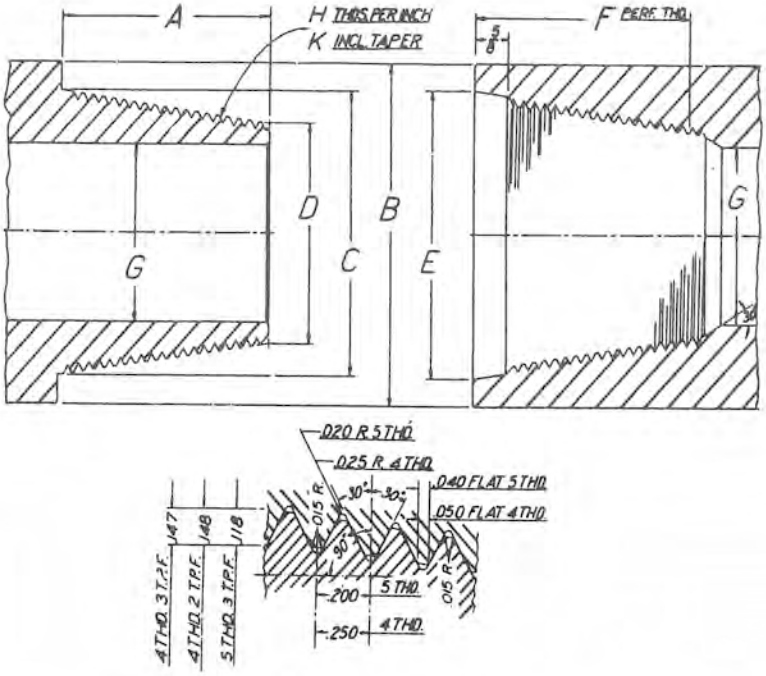


A.P.I. REGULAR

SIZE	A	B	C	D	E	F	G	H	K
2 3/8	3	3 1/8	2 5/8	1 7/8	2 11/16	3 3/8	1	5	3
2 7/8	3 1/2	3 3/4	3	2 1/8	3 1/16	3 7/8	1 1/4	5	3
3 1/2	3 3/4	4 1/4	3 1/2	2 9/16	3 5/16	4 1/8	1 1/2	5	3
4 1/2	4 1/4	* 5 1/2	4 5/8	3 9/16	4 11/16	4 5/8	2 1/4	5	3
5 1/2	4 3/4	6 3/4	5 33/64	4 21/64	5 37/64	5 1/8	2 3/4	4	3
① 6 5/8	5	7 3/4	6	5 5/32	6 1/16	5 3/8	3 1/2	4	2
7 5/8	5 1/4	8 7/8	7	5 11/16	7 1/16	5 5/8	4	4	3
8 5/8	5 5/8	10	7 61/64	6 53/64	8 1/64	5 3/4	4 3/4	4	3

* 5 3/8 O.D. IS OPTIONAL

① THREADED PORTION SAME AS 5 1/2 UNION TOOL FULL HOLE

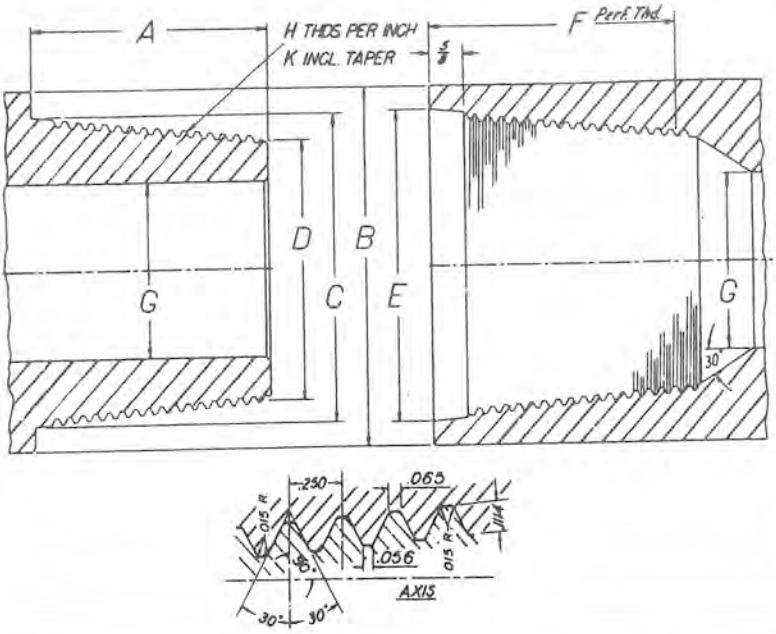


A.P.I. FULL HOLE

SIZE	A	B	C	D	E	F	G	H	K
* 2 7/8	3 1/2	4 1/4	3 5/8	2 3/4	3 11/16	3 7/8	2 1/8	5	3
3 1/2	3 3/4	4 5/8	4	3 1/16	4 3/64	4 1/8	2 7/16	5	3
© 4	4 1/2	5 1/4	4 3/32	3 17/32	4 11/32	4 3/8	2 13/16	† 4	2
4 1/2	4	5 3/4	4 51/64	3 51/64	4 7/8	4 3/8	3	5	3
5 1/2	5	7	5 53/64	5	5 29/32	5 3/8	4	4	2
6 5/8	5	8	6 3/4	5 59/64	6 27/32	5 3/8	5	4	2

* NOT A.P.I. STANDARD

† THREAD FORM SAME AS API-IF JOINT



A.P.I. INTERNAL FLUSH

HUGHES & REED I.F.

SIZE	A	B	C	D	E	F	G	H	K
② 2 3/8	3	3 3/8	2 7/8	2 5/8	2 15/16	3 3/8	1 3/4	4	2
④ 2 7/8	3 1/2	4 1/8	3 25/64	2 13/16	3 29/64	3 7/8	2 1/8	4	2
⑤ 3 1/2	4	4 3/4	4 1/64	3 11/32	4 5/64	4 3/8	2 11/16	4	2
① 4	4 1/2	5 5/4	4 53/64	4 5/64	4 33/32	4 7/8	3 1/4	4	2
③ 4 1/2	4 1/2	6 1/8	5 1/4	4 1/2	5 5/16	4 7/8	3 3/4	4	2
5 1/2	5	7 3/8	6 25/64	5 9/16	6 29/64	5 3/8	4 13/16	4	2

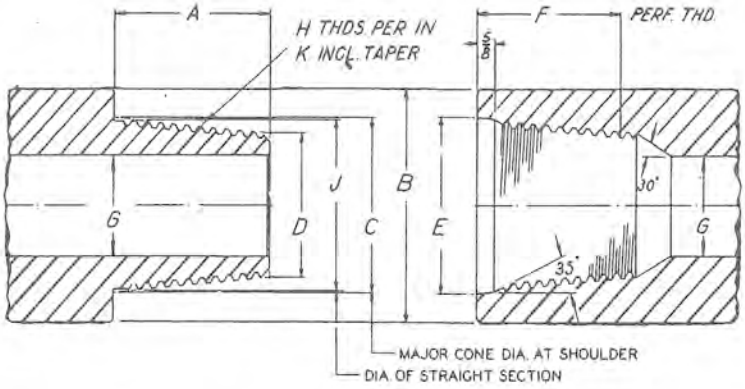
① THREADED PORTION SAME AS 4½" HUGHES XTRA HOLE & 5" REED DBL. STREAMLINE & 4½" REED XTRA HOLE

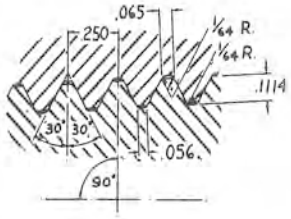
⑤ " " " " 5½" REED DBL. STREAMLINE & 5" HUGHES XTRA HOLE & 5" REED XTRA HOLE

③ " " " " 2⅞" HUGHES SLIM HOLE

④ " " " " 3½" " " "

⑤ " " " " 4½" " " "





HUGHES XTRA HOLE & REED EXTRA HOLE

SIZE	A	B	C	D	E	F	G	H	J	K
① 2 7/8	3 7/8	4 1/4	3 21/64	2 11/16	3 23/64	4 1/2	1 7/8	4	3 15/64	2
③ 3 1/2	3 3/8	4 3/4	3 13/16	3 1/4	3 7/8	3 15/16	2 7/16	4	—	2
③ 4 1/2	4 3/8	6	4 53/64	4 7/64	4 29/32	4 15/16	3 1/4	4	—	2
④ 5	4 1/2	6 1/4	5 1/4	4 1/2	5 5/16	4 7/8	3 3/4	4	—	2

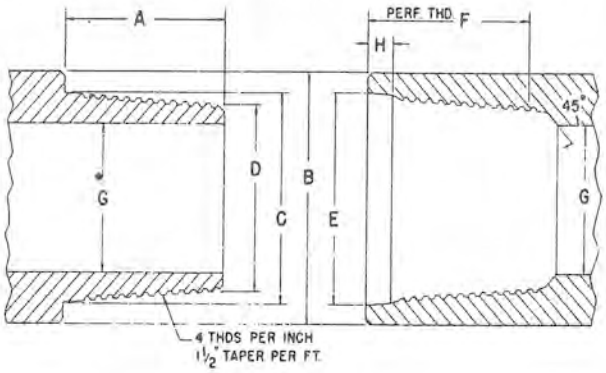
① THREADED PORTION SAME AS 3 1/2" REED DBL. STREAMLINE AND 2 7/8" REED XTRA HOLE AND 3 1/2" HUGHES DBL. STREAMLINE

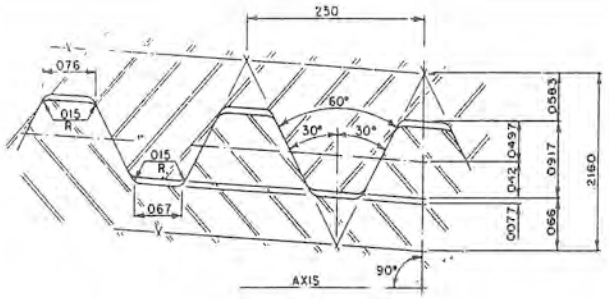
③ THREADED PORTION SAME AS 4 1/2" HUGHES EXT. FLUSH AND 4 1/2" F.H. REED EXT. FLUSH AND 4" HUGHES SLIM HOLE AND 3 1/2" REED XTRA HOLE

② " " " " 4" API-IF AND 5" REED DOUBLE STREAMLINE AND 4 1/2" REED XTRA HOLE

④ " " " " 4 1/2" API-IF AND 5 _" REED DOUBLE STREAMLINE AND 5" REED XTRA HOLE

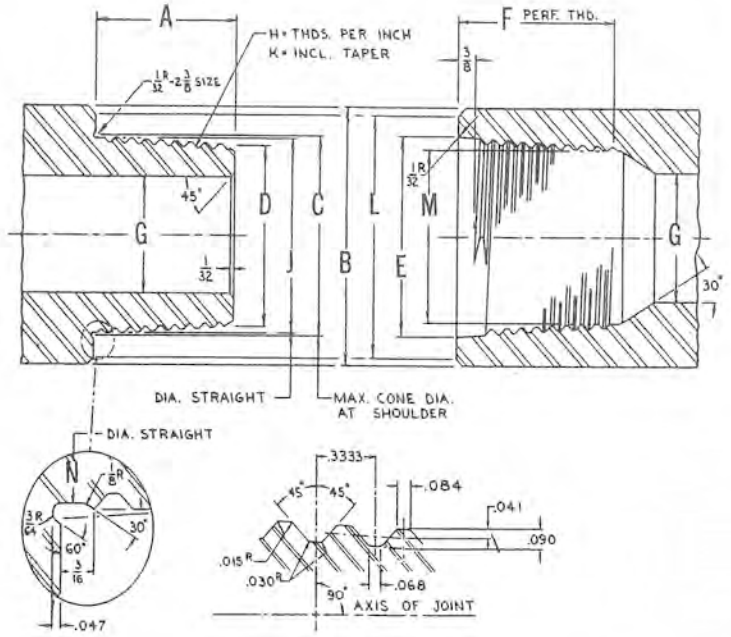
AMERICAN IRON OPEN HOLE





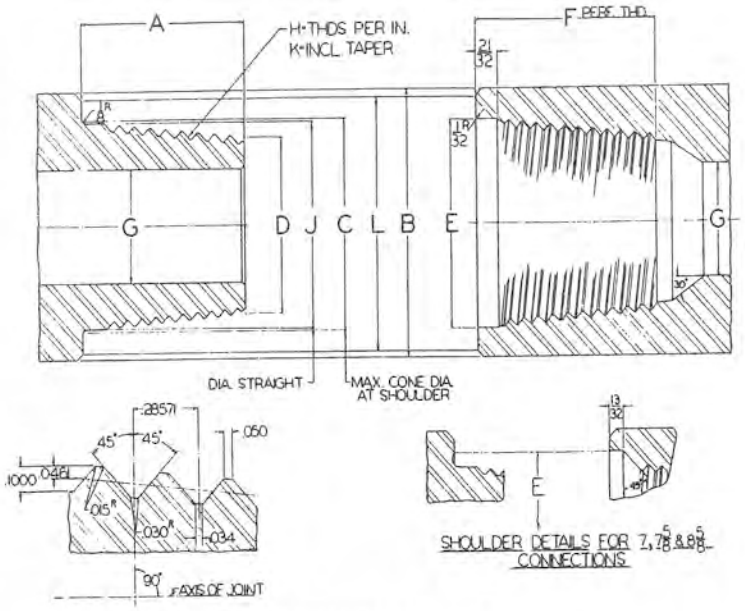
SIZE	A	B	C	D	E	F	G	H	FT. LBS. TORQUE *
DRILL PIPE TOOL JOINTS									
$2\frac{7}{8}$	$2\frac{7}{8}$	$3\frac{7}{8}$	$3\frac{9}{64}$	$2\frac{25}{32}$	$3\frac{3}{16}$	$2\frac{7}{8}$	$2\frac{5}{32}$	$\frac{3}{8}$	3000–4000
4	4	$5\frac{1}{2}$	$4\frac{37}{64}$	$4\frac{3}{64}$	$4\frac{41}{64}$	4	$3\frac{1}{4}$	$\frac{5}{8}$	8500–11,500
TUBING TOOL JOINTS									
$2\frac{3}{8}$	$2\frac{3}{8}$	$3\frac{1}{16}$	$2\frac{3}{4}$	$2\frac{29}{64}$	$2\frac{29}{32}$	$2\frac{1}{2}$	2	$\frac{3}{8}$	1700–1800
$2\frac{7}{8}$	$2\frac{1}{2}$	$3\frac{11}{16}$	$3\frac{9}{64}$	$2\frac{27}{32}$	$3\frac{3}{16}$	$2\frac{1}{2}$	$2\frac{27}{64}$	$\frac{3}{8}$	1800–2000
$3\frac{1}{2}$	$3\frac{1}{4}$	$4\frac{1}{2}$	$3\frac{57}{64}$	$3\frac{31}{64}$	$3\frac{61}{64}$	$3\frac{1}{4}$	$2\frac{29}{32}$	$\frac{5}{8}$	5000–7000

* RECOMMENDED MAKE UP TORQUE IN FOOT POUNDS



HUGHES SLIMLINE H-90

SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N
2 3/8	2 1/4	3 1/8 3 1/4	2.725	2.439	2 47/64	3 1/16	1 1/2	3	2 43/64	1 1/4	3 1/16 3 3/16	2 1/4	2 5/8
2 7/8	2 3/4	3 3/4 3 7/8 4 4 4 1/8 4 1/4	3.196	2.897	3 13/64	3 3/8	2 1/8-2 1/4 2 1/4-2 1/4 2 1/4-2 1/4 2 1 3/4-2 1 1/2-1 3/4	3	3 5/32	1 1/4	3 5/8 3 23/32 3 13/16 3 13/16 3 29/32 4	2 45/64	3 3/32
3 1/2	3 3/8	4 3/8 4 3/4 4 7/8 4 7/8 5 5 1/8	3.835	3.509	3 7/8	3 3/8	2 3/8-2 3/4 2 1/2-2 3/4 2 3/8 2 3/8-2 1/2 2-2 3/8 1 3/4-2 1/8	3	3 25/32	1 1/4	4 1/16 4 17/32 4 5/8 4 5/8 4 23/32 4 13/16	3 11/32	3 47/64



HUGHES H-90

SIZE	A	B	C	D	E	F	G	H	J	K	L
3-1/2	3-7/8	5	4-1/8	3-31/64	4-3/16	4-7/16	2-5/8 – 2-3/4	3-1/2	3-15/16	2	4-13/16
		5-1/8					2-1/2 – 2-3/4				4-13/16
		5-1/4					2 – 2-5/8				5
		5-3/8					2 – 2-1/4				5
		5-1/2					2 – 2-1/8				5
4	4-1/8	5-1/2	4-1/2	3-13/16	4-9/16	4-11/16	2-7/8 – 3	3-1/2	4-5/16	2	5-5/16
		5-5/8					2-1/2 – 2-7/8				5-5/16
		5-3/4					2-1/4 – 2-7/8				5-1/2
		5-7/8					2 – 2-3/4				5-1/2
		6					2 – 2-1/2				5-1/2
4-1/2	4-3/8	6	4-53/64	4-7/64	4-29/32	4-15/16	3 – 3-1/4	3-1/2	4-41/64	2	5-3/4
		6-1/8					2-3/4 – 3				5-3/4
		6-1/4					2-1/2 – 3				6
		6-3/8					2 – 3				6
		6-1/2					2 – 2-3/4				6

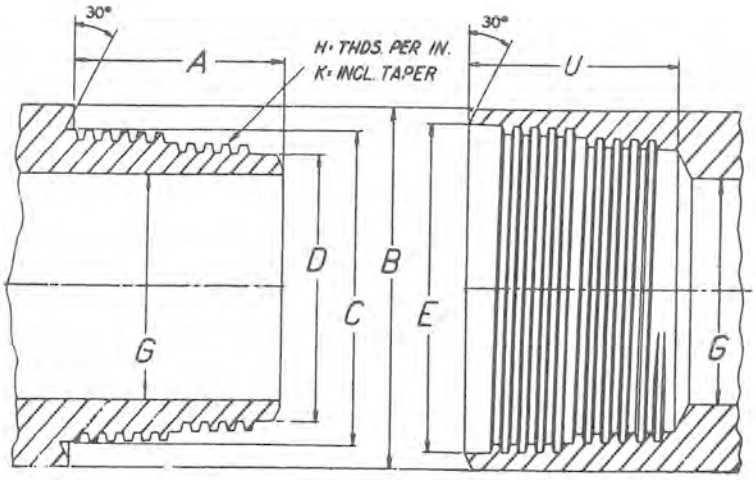
HUGHES H-90 (cont.)

SIZE	A	B	C	D	E	F	G	H	J	K	L
5	4-5/8	6-1/2	5-7/64	4-21/64	5-11/64	5-3/16	2-7/8 – 3-1/4	3-1/2	4-59/64	2	6-1/8
		6-5/8					2-1/2 – 3				6-1/8
		6-3/4					2-1/4 – 3				6-3/8
		6-7/8					2-1/4 – 2-3/4				6-3/8
		7					2-1/2				6-3/8
5-1/2	4-5/8	6-3/4	5-3/8	4-29/64	5-7/16	5-3/16	3-1/8 – 3-3/8	3-1/2	5-3/16	2	6-3/8
		6-7/8					3 – 3-1/4				6-5/8
		7					2-3/4 – 3-1/4				6-5/8
		7-1/8					2-1/4 – 3-1/4				6-5/8
		7-1/4					2-1/4 – 3				6-5/8
		7-3/8					2-1/4 – 2-3/4				6-5/8
		7-1/2					2-1/4 – 2-1/2				6-5/8
6-5/8	4-7/8	7-5/8	6	5-3/16	5-1/16	5-11/16	3-3/8 – 3-5/8	3-1/2	5-13/16	2	7-1/4
		7-3/4					3-1/4 – 3-1/2				7-1/2
		7-7/8					3 – 3-1/2				7-1/2
		8					2-1/2 – 3-1/2				7-1/2
		8-1/8					2-1/2 – 3-1/4				7-1/2
		8-1/4					2-1/2 – 3				7-1/2
7	5-3/8	8-1/4	6-1/2	5-5/32	①	5-15/16	3-1/2 – 3-3/4	3-1/2	6-3/8	3	8
		8-3/8					2-3/4 – 3-3/4				8
		8-1/2					2-3/4 – 3-3/4				8-1/4
		8-5/8					2-3/4 – 3-1/2				8-1/4
		8-3/4					2-3/4 – 3-1/4				8-1/4
		9					2-3/4 – 3				8-5/8
7-5/8	6	9-1/2	7-25/64	5-57/64	②	6-9/16	3-1/2 – 4	3-1/2	7-17/64	3	9-1/4
		9-5/8					3 – 4				9-1/4
		9-3/4					3 – 4				9-1/4
		9-7/8					3 – 4				9-5/8
		10					3 – 3-3/4				9-5/8
		10-1/4					3 – 3-1/4				9-5/8
8-5/8	6-1/2	10-3/4	8-17/64	6-41/64	③	7-1/16	3-1/2 – 4	3-1/2	8-9/64	3	10-1/2
		11					3 – 4				10-1/2
		11 1/4					3 – 4				10-3/4
		11-1/2					3 – 3-1/4				10-3/4

① For Drill Collar OD's Less Than 8-5/8", E = 6.563
For Drill Collar OD's 8-5/8" or more, E = 7.125

② For Drill Collar OD's Less Than 9-3/4", E = 7.453
For Drill Collar OD's 9-3/4" or more, E = 8.000

③ For Drill Collar OD's Less than 10-3/4", E = 8.343
For Drill Collar OD's 10-3/4" or more, E = 9.375



HYDRIL JOINTS

TYPE	SIZE	A	B	C	D	E	G	H	K	U
IF	2 3/8 - 6.65#	3 15/16	3 3/8	2 13/16	2 21/64	2 13/16	1 3/4	3	1/2	3 59/64
	2 7/8 - 10.4#	3 57/64	3 7/8	3 3/16	2 45/64	3 3/16	2 7/64	3	1/2	3 59/64
	2 7/8 - 11.8#	3 57/64	3 7/8	3 3/16	2 45/64	3 3/16	2	3	1/2	3 59/64
	3 1/2 - 13.3#	3 61/64	4 1/2	3 27/32	3 29/64	3 27/32	2 3/4	3	1/2	3 31/32
	3 1/2 - 15.5#	3 61/64	4 1/2	3 27/32	3 23/64	3 27/32	2 9/16	3	1/2	3 31/32
	4 1/2 - 16.6#	4	6	5 13/64	4 35/64	5 7/32	3 3/4	3	1/2	4 1/64
	4 1/2 - 20.0#	4	6	5 13/64	4 35/64	5 7/32	3 3/4	3	1/2	4 1/64
	5 - 20.5#	4 23/32	6 5/8	5 25/32	5 1/64	5 51/64	4 3/16	2	1/2	4 3/4
F	2 3/8	2 5/8	2 3/8	1 59/64	1 43/64	1 15/16	1	4	1/2	2 15/32
	2 7/8	3 21/32	2 7/8	2 25/64	1 29/32	2 3/8	1 1/16	4	1/2	3 1/2
	3 1/2	4 1/16	3 1/2	2 13/16	2 21/64	2 13/16	1 1/2	3	1/2	3 59/64
	4	3 59/64	4 1/16	3 5/16	2 63/64	3 11/32	2	3	1/2	3 23/32
	4 1/2	3 61/64	4 1/2	3 27/32	3 23/64	3 27/32	2 3/16	3	1/2	3 31/32
	5	4 5/16	5	4 3/16	3 35/64	4 13/64	2 5/16	3	1/2	4
	5 1/2	4 1/4	5 3/16	4 21/32	4 1/64	4 43/64	2 3/4	3	1/2	4 1/32
	6 5/8	5 5/16	6 5/8	5 11/16	4 29/32	5 45/64	3 1/2	2	1/2	5 1/8
EIU	3 1/2	4 1/4	4 5/8	3 47/64	3 17/64	3 3/4	2 7/16	3	1/2	4
	4	4 5/16	5 9/16	4 21/64	4 1/64	4 43/64	3 1/8	3	1/2	4 1/32
	4 1/2	4 7/16	5 3/4	4 47/64	4 3/32	4 3/4	3 5/32	3	1/2	4 1/8
	5 1/2	5 1/2	7	5 33/64	5 1/16	5 27/32	4	2	1/2	5 1/8
	6 5/8	5 1/2	8	6 7/8	6 7/64	6 57/64	5	2	1/2	5 1/8

PERFORMANCE PROPERTIES OF SEAMLESS DRILL PIPE.

NEW DRILL PIPE DIMENSIONAL, TORSIONAL, AND TENSILE DATA																	
Size OD in.	Nominal Weight Threads & Couplings lb/ft	Plain End Weight lb/ft	Wall Thick-ness in.	ID in.	Section Area Body of Pipe sq. in.	Polar Sectional Modulus Z cu. in	Torsional Data* Torsional Yield Strength, ft-lb					Tensile Data Based on Minimum Values Load at the Minimum Yield Strength, lb;				
							D	E	95	105	135	D	E	95	105	135
2-3/8	4.85	4.43	.190	1.995	1.3042	1.320	—	4760	6020	6660	—	—	97820	123900	136940	176070
	6.65	6.26	.280	1.815	1.8429	1.734	4580	6240	7900	8740	—	101360	138220	175080	193500	248790
2-7/8	6.85	6.16	.217	2.441	1.8120	2.242	—	8070	10220	11300	—	—	135900	172140	190260	244620
	10.40	9.72	.362	2.151	2.8579	3.204	8460	11530	14610	16150	20760	157190	214340	271500	300080	385820
3-1/2	9.50	8.81	.254	2.992	2.5902	3.922	—	14120	17890	19770	25420	—	194260	246070	271970	349680
	13.30	12.31	.368	2.764	3.6209	5.144	13580	18520	23460	25930	33330	199160	271570	343990	380190	488820
	15.50	14.63	.449	2.602	4.3037	5.846	15440	21050	26660	29470	37890	236720	322780	408850	451890	581000
4	11.85	10.46	.262	3.476	3.0767	5.400	—	19440	24620	27220	34990	—	230750	292290	323050	415360
	14.00	12.93	.330	3.340	3.8048	6.458	17050	23250	29450	32550	41840	209280	285360	361460	399500	513650
	15.70	14.69	.380	3.240	4.3216	7.156	18890	25760	32630	36070	46380	237710	324150	410590	453810	583420
4-1/2	13.75	12.24	.271	3.958	3.6004	7.184	—	25860	32760	36210	46550	—	270030	342040	378050	486060
	16.60	14.98	.337	3.826	4.4074	8.542	22550	30750	38950	43050	55350	242380	330560	418700	462780	595000
	20.00	18.69	.430	3.640	5.4981	10.232	27010	36840	46660	51570	66300	302390	412360	522320	577300	742240
5	16.25	14.87	.296	4.408	4.3743	9.718	—	34980	44310	48970	62970	—	328070	415560	459300	590530
	19.50	17.93	.362	4.276	5.2746	11.416	30135	41090	52050	57530	73970	290100	395600	501090	553830	712070
	25.60	24.03	.500	4.000	7.0686	14.490	38250	52160	66070	73030	93900	388770	530140	671520	742200	954260
5-1/2	19.20	16.87	.304	4.892	4.9624	12.222	—	44180	55960	61850	79520	—	372180	471430	521050	669920
	21.90	19.81	.361	4.778	5.8282	14.062	37120	50620	64120	70870	91120	320550	437120	553680	611960	786810
	24.70	22.54	.415	4.670	6.6296	15.688	41410	56470	71530	79060	101650	364630	497220	629810	696110	895000
6-5/8	25.20	22.19	.330	5.965	6.5262	19.572	51740	70550	89360	98770	—	358930	489460	619990	685250	881040

*Based on the shear strength equal to 57.7% of minimum yield strength and nominal wall thickness.

STANDARD SMITH HEVI-WATE DRILL PIPE
DIMENSIONAL DATA

TUBE SPECIFICATIONS					
Nom. Size	2 7/8"	3 ½"	4"	4 ½"	5"
O.D.	3 1/16"	3 ½"	4"	4 ½"	5"
Inside Diameter	2"	2 ¼"	2 9/16"	2 ¾"	3"
Wall Thickness	.531"	.625"	.719"	.875"	1.0"
Area (in. 2)	4.22	5.645	7.410	9.965	12.566
Center Upset O.D.	3.875"	4"	4 ½"	5"	5 ½"
Center Upset Length	24"	24"	24"	24"	24"
Elevator Upset O.D.	3 1/8"	3 5/8"	4 1/8"	4 5/8"	5 1/8"
Tensile Yield	464.420 lbs.	310,475 lbs.	407,550 lbs.	548,075 lbs.	691,185 lbs.
Torsional Yield	24,388 ft./ bs.	18,460 ft./ bs.	27,635 ft./ bs.	40,715 ft./ bs.	56,495 ft./ bs.

TOOL JOINT SPECIFICATIONS					
Connector Size	2 7/8" SLH-90	3 ½" I.F. (N.C. 38)	4" F.H. (N.C. 40)	4 ½" X.H. (N.C. 46)	4 ½" I.F. (N.C. 50)
Tool Joint O.D.	3 7/8"	4 ¾"	5 ¼"	6 ¼"	6 ½"
Tool Joint I.D.	2"	2 3/8"	2 11/16"	2 7/8"	3 1/16"
Length Pin/Box	28"/24"	25"/23"	25"/23"	25"/23"	25"/23"
Tool Joint Tensile Yield	400,070 lbs.	675,045 lbs.	711,475 lbs.	1,024,500 lbs.	1,266,000 lbs.
Tool Joint Torsional Yield	12,014 ft./ bs.	17,575 ft./lbs.	23,525 ft./ bs.	38,800 ft./ bs.	51,375 ft./ bs.

ENGINEERING DATA					
Weight/Foot	17.3 lbs.	23.2 lbs.	27.2 lbs.	41.0 lbs.	49.3 lbs.
Weight/Jt. 30 ft.	520 bs.	695 bs.	815 bs.	1,230 lbs.	1,480 lbs.
Make-Up Torque	6,577 ft./lbs.	9,900 ft./lbs.	13,250 ft./ bs.	21,800 ft./ bs.	29,400 ft./ bs.
Lory Make-Up Torque	4,600 ft./lbs.	9,000 ft./lbs.	13,000 ft./ bs.	21,000 ft./ bs.	29,000 ft./ bs.
Capacity (I.D.)	.003886 bbl./ft.	*.005 bbl./ft.	.0073 bbl./ft.	.007434 bbl./ft.	.008834 bbl./ft.
Displacement (run in open ended)	.006323 bbl./ft.	*.008434 bbl./ft.	.010 bbl./ft.	.014934 bbl./ft.	.017967 bbl./ft.

** 2 ¼" I.D.*

TOOL JOINT THREADS—DIMENSIONS AND STRENGTH DATA

(All types—API and Hydril joints)

Size, Inches	TYPE	O.D. (Std.)	I.D. (Std.)	Pin Length	Thds. per Inch	Pitch Diameter at Gage Point	O.D. of Pin at Base	JOINT STRENGTH *Min. Tensile Yield Strength (Calc.)	JOINT STRENGTH †Torsional Ultimate Strength (Experimental)	Recommended Makeup Torque
		Inches	Inches	Inches		Inches	Inches	Lbs.	Ft. Lbs.	Ft. Lbs.
2⅜	API "IF"	3⅜	1¾	3	4	2.668	2.876	337,000	9,500	2,700
	Hydril "IF"	3⅜	1¾	3 15/16	3	....	2,806	384,000	12,500	3,800
	API Regular	3⅜	1	3	5	2.365	2.625	391,100	7,500	2,200
	Hydril "F"	2 7/16	1	2 9/16	4	....	1.926	207,000	5,000	1,600
2⅞	API "IF"	4⅛	2⅛	3½	4	3.183	3.391	478,340	17,000	5,400
	Hydril "IF"	3⅞	2 3/32	3 15/16	3	....	3.181	460,000	17,000	5,400
	API-Regular	3¾	1¼	3½	5	2.740	3.000	514,250	21,000	5,400
	Hydril "SH"	3⅜	1¾	3 15/16	3	....	2.806	384,000	12,500	4,300
	Hydril "F"	2 15/16	1¼	3 9/16	4	....	2.367	366,000	9,000	2,700
3½	API "IF"	4¾	2 11/16	4	4	3.808	4.016	627,000	20,000	6,500
	Hydril "IF"	4½	2 11/16	3 15/16	3	....	3.837	613,000	28,000	6,500
	Hydril "Extra Hole"‡	4¾	2 7/16	3¼	4	3.604	3.812	608,900	24,000	6,500
	Hydril "EIU"	4⅝	2 7/16	4¼	3	....	3.741	670,000	30,000	6,500
	API Full Hole	4⅝	2 7/16	3¾	5	3.734	3.994	690,000	22,000	6,500
	API Regular	4¼	1½	3¾	5	3.240	3.500	727,400	22,000	6,500
	Double Streamline	3⅞	1 13/16	4	4	3.119	3.327	561,120	14,000	5,400
	Hydril "SH"	3⅞	2 3/32	3 15/16	3	....	3.181	460,000	17,000	5,400
	Hydril "F"	3 9/16	1½	4	3	....	2.806	463,000	16,000	4,300
4	API "IF"	5¼	3¼	4½	4	4.626	4.834	957,050	43,000	11,400
	Hydril "EIU"	5 9/16	3⅛	4 5/16	3	....	4.661	950,000	51,000	11,400
	API Full Hole	5¼	2 13/16	4½	4	4.072	4.280	757,500	31,000	6,500
	Double Streamline	4½	2⅜	4	4	3.678	3.886	689,620	22,000	6,500
	Hydril "SH"	4½	2 9/16	3 15/16	3	....	3.837	678,000	31,000	6,500
	Hydril "F"	4 1/16	2	3 15/16	3	....	3.337	593,000	28,000	5,400
4½	API "IF"	6⅛	3¾	4½	4	5.042	5.250	999,000	50,000	11,400
	Hydril "IF"	6	3¾	4	3	....	5.201	1,025,000	60,000	11,400
	Hydril "Extra Hole"‡	6	3¼	4½	4	4.626	4.834	957,050	43,000	11,400
	Hydril "EIU"	5¾	3 5/32	4 7/16	3	....	4.739	997,000	55,000	11,400
	API Full Hole	5¾	3	4	5	4.532	4.792	1,017,000	45,000	11,400
	API Regular	5½	2¼	4¼	5	4.365	4.625	1,262,000	40,000	11,400
	Double Streamline	5	2 11/16	4½	4	4.072	4.280	817,500	31,000	8,700
	Hydril "SH"	5	2 11/16	4⅛	3	....	4.191	814,000	39,000	8,700
	Hydril "F"	4 9/16	2⅜	3 15/16	3	....	3.837	853,000	35,000	6,500

DRILL PIPE SIZES

Size and Style		Drill Pipe	Pipe Body			Pipe Upset		Tool Joint	
			O.D.		I.D.	O.D.	I.D.	Box OD	Pin ID
Tool Joint	Drill Pipe		In.	MM.	In.	In.	In.	In.	* In.
REGULAR STYLE									
2-7/8 REG	2-7/8 IU	10.40	2.875	73,0	2.441	2.875	1.875	3.750	1.250
3-1/2 REG	3-1/2 IU	13.30	3.500	88,9	2.764	3.500	1.937	4.250	1.500
4-1/2 REG	4-1/2 IU	16.60	4.500	114,3	3.826	4.500	3.156	5.500	2.250
4-1/2 REG	4-1/2 IEU	20.00	4.500	114,3	3.640	4.781	3.000	5.500	2.250
5-1/2 REG	5-1/2 IEU	21.90	5.500	139,7	4.778	5.563	4.000	6.750	2.750
FULL-HOLE STYLE									
3-1/2 FH	3-1/2 IU	13.30	3.500	88,9	2.764	3.500	1.937	4.625	2.437
3-1/2 FH	3-1/2 IU	15.50	3.500	88,9	2.602	3.500	1.937	4.625	2.437
4 FH	4 IU	14.00	4.000	101,6	3.340	4.000	2.750	5.250	2.812
4-1/2 FH	4-1/2 IU	16.60	4.500	114,3	3.826	4.500	3.156	5.750	3.000
4-1/2 FH	4-1/2 IEU	20.00	4.500	114,3	3.640	4.781	3.000	5.750	3.000
5-1/2 FH	5-1/2 IEU	21.90	5.500	139,7	4.778	5.563	4.000	7.000	4.000
5-1/2 FH	5-1/2 IEU	24.70	5.500	139,7	4.670	5.563	4.000	7.000	4.000
INTERNAL-FLUSH STYLE									
2-3/8 IF	2-3/8 EU	6.65	2.375	60,3	1.815	2.656	1.815	3.375	1.750
2-7/8 IF	2-7/8 EU	10.40	2.875	73,0	2.151	3.219	2.151	4.125	2.125
3-1/2 IF	3-1/2 EU	13.30	3.500	88,9	2.764	3.824	2.602	4.750	2.687
3-1/2 IF	3-1/2 EU	15.50	3.500	88,9	2.602	3.824	2.602	5.000	2.687
4 IF	4 EU	14.00	4.000	101,6	3.340	4.500	3.340	5.750	3.250
4-1/2 IF	4-1/2 EU	16.60	4.500	114,3	3.826	5.000	3.826	6.125	3.750
4-1/2 IF	4-1/2 EU	16.60	4.500	114,3	3.826	5.000	3.826	6.250	3.750
4-1/2 IF**	5 IEU	19.50	5.000	127,0	4.276	5.188	3.687	6.375	3.750
4-1/2 IF**	5 IEU	19.50	5.000	127,0	4.276	5.188	3.687	6.500	3.500

*The Pin ID dimensions apply also to box members of FH and IF tool joints but not to the bores of box members of REG tool joints, which are optional with the manufacturer.

**4-1/2-in. IF joint with 6-3/8 and 6-1/2-in. OD is used on 5-in. IEU drill pipe to produce an assembly variously known as 5-in. Extra-Hole and 5-in. Semi-Internal Flush.

Specifications of 1.66″ Drill Pipe with 2″ L.D.C. Tool Joints

Wall Thickness	.228
Recommend OD Joint	2.00
Max. I.D Recommend T.J. Pin	1.0625
OD Tube	1.660
ID Tube	1.2139
Recommended Makeup Torque	700 ft. lbs.
Yield Tube - C-75 Spec	66,300 lbs
Yield Tool Joint Pin	114,972 lbs.
Weight per Foot Plain End Tube	3.48 lbs.
Weight per Foot Tool Joints Attached	3.65 lbs

All prices subject to change without notice.

WEIGHTS OF 30'-0" DRILL COLLARS

Collar O.D.	BORE OF COLLAR										
	1-1/2	1-3/4	2	2-1/4	2-1/2	2-13/16	3	3-1/4	3-1/2	3-3/4	4
3-3/8	730	665									
3-1/2	799	734									
3-3/4	944	879									
3-7/8	1020	955	880	795							
4	1099	1034	959	874							
4-1/8	1180	1115	1040	955							
4-1/4	1264	1199	1124	1039							
4-1/2	1439	1374	1299	1214							
4-3/4	1624	1559	1484	1399	1304						
5	1819	1754	1679	1594	1499						
5-1/4	2024	1959	1884	1799	1704	1599					
5-1/2	2239	2174	2099	2014	1919	1814	1699				
5-3/4	2464	2399	2324	2239	2144	2039	1924				
6	2699	2634	2559	2474	2379	2274	2159	2034	1899		
6-1/4	2944	2879	2804	2719	2624	2519	2404	2279	2144		
6-1/2	3199	3134	3059	2974	2879	2774	2659	2534	2399		
6-3/4	3463	3398	3323	3238	3143	3039	2924	2799	2664		
7	3738	3673	3598	3513	3418	3313	3199	3074	2939	2794	2639
7-1/4	4023	3958	3883	3798	3703	3598	3483	3358	3223	3078	2924
7-1/2	4318	4253	4178	4093	3998	3893	3778	3653	3518	3373	3219
7-3/4	4623	4558	4483	4398	4303	4198	4083	3958	3823	3678	3523
8	4938	4873	4798	4713	4618	4513	4398	4273	4138	3993	3838
8-1/4	5263	5198	5123	5038	4943	4838	4723	4598	4463	4318	4163
8-1/2	5598	5533	5458	5373	5278	5058	5173	4933	4798	4653	4498
8-3/4	5943	5878	5803	5718	5623	5518	5403	5278	5143	4998	4843
9		6233	6158	6073	5978	5873	5758	5633	5498	5353	5198
9-1/2		6972	6897	6812	6498	6717	6613	6373	6238	6093	5938
10			7677	7592	7497	7392	7277	7152	7017	6872	6717
10-1/2			8497	8412	8317	8212	8097	7972	7837	7692	7537
11					9177	9072	8957	8832	8697	8552	8397

DRILL COLLARS

CONNECTIONS AND RECOMMENDED MAKE-UP TORQUE[1]

(SEE REMARKS ON PAGE 3-4)

CONNECTION			MINIMUM MAKE-UP TORQUE IN FOOT-POUNDS[2]							
SIZE		O.D.	BORE OF DRILL COLLAR (in inches)							
(in.)	TYPE	(in.)	1	1-1/4	1-1/2	1-3/4	2	2-1/4	2-1/2	2-13/16
API	NC 23	3	*2,500	*2,500	*2,500					
		3-1/8	*3,300	*3,300	*2,600					
		3-1/4	4,000	3,400	2,600					
2-3/8	regular	3		*2,200	*2,200	*2,200				
		3-1/8		*3,000	*3,000	2,600				
		3-1/4		*3,900	*3,300	2,600				
2-7/8	PAC[3]	3		*3,800	*3,800	2,900				
		3-1/8		*4,900	4,200	2,900				
		3-1/4		5,200	4,200	2,900				
2-3/8	API I.F.	3-1/2		*4,600	*4,600	3,700				
API	NC 26	3-3/4		5,500	4,700	3,700				
2-7/8	regular	3-1/2		*3,800	*3,800	*3,800				
		3-3/4		*6,000	5,800	5,000				
		3-7/8		6,500	5,800	5,000				
2-7/8	SLIM HOLE									
2-7/8	EXTRA HOLE	3-3/4		*4,100	*4,100	*4,100				
3-1/2	DBL STREAMLINE	3-7/8		*5,300	*5,300	*5,300				
2-7/8	MOD. OPEN	4-1/8		*8,000	*8,000	7,400				
2-7/8	API I.F.	3-7/8		*4,600	*4,600	*4,600	*4,600			
API	NC 31	4-1/8		*7,300	*7,300	*7,300	6,800			
3-1/2	regular	4-1/8		*6,500	*6,500	*6,500	*6,500	*6,500		
		4-1/4		*7,900	*7,900	*7,900	*7,900	7,200		
		4-1/2		*10,900	10,500	*9,600	8,500	7,300		
3-1/2	SLIM HOLE	4-1/4		*8,600	*8,800	8,100	6,800			
		4-1/2		10,000	9,300	8,100	6,800			
API	NC 35	4-1/2				*8,900	*8,900	*8,900	7,400	
		4-3/4				12,100	10,800	9,200	7,400	
		5				12,100	10,800	9,200	7,400	
3-1/2	EXTRA HOLE	4-1/4				*5,100	*5,100	*5,100	*5,100	
4	SLIM HOLE	4-1/2				*8,400	*8,400	*8,400	8,200	
3-1/2	MOD. OPEN	4-3/4				*11,900	11,700	10,000	8,200	
		5				13,200	11,700	10,000	8,200	
		5-1/4				13,200	11,700	10,000	8,200	
3-1/2	API I.F.	4-3/4				*9,900	*9,900	*9,900	*9,900	8,300
API	NC 38	5				*13,800	*13,800	12,800	10,900	8,300
4-1/2	SLIM HOLE	5-1/4				16,000	14,600	12,800	10,900	8,300
		5-1/2				16,000	14,600	12,800	10,900	8,300
3-1/2	H-90[4]	4-3/4				*8,700	*8,700	*8,700	*8,700	*8,700
		5				*12,700	*12,700	*12,700	*12,700	10,400
		5-1/4				*16,900	16,700	15,000	13,100	10,400
		5-1/2				18,500	16,700	15,000	13,100	10,400
4	FULL HOLE	5				*10,800	*10,800	*10,800	*10,800	*10,800
API	NC 40	5-1/4				*15,100	*15,100	*15,100	14,800	12,100
4	MOD. OPEN	5-1/2				*19,700	18,600	16,900	14,800	12,100
4-1/2	DBL STREAMLINE	5-3/4				20,400	18,600	16,900	14,800	12,100
		6				20,400	18,600	16,900	14,800	12,100

DRILL COLLARS

CONNECTIONS AND RECOMMENDED MAKE-UP TORQUE[1]

(SEE REMARKS ON PAGE 3-4)

CONNECTION			MINIMUM MAKE-UP TORQUE IN FOOT-POUNDS[2]					
SIZE		O.D.	BORE OF DRILL COLLAR (in inches)					
(in.)	TYPE	(in.)	2	2-1/4	2-1/2	2-13/16	3	3-1/4
4	H-90 [4]	5-1/4	*12,500	12,500	12,500	*12,500		
		5-1/2	*17,300	17,300	17,300	16,500		
		5-3/4	*22,300	21,500	19,400	16,500		
		6	23,500	21,500	19,400	16,500		
		6-1/4	23,500	21,500	19,400	16,500		
4-1/2	API REGULAR	5-1/2	*15,400	*15,400	*15,400	*15,400		
		5-3/4	*20,300	*20,300	19,400	16,200		
		6	23,400	21,600	19,400	16,200		
		6-1/4	23,400	21,600	19,400	16,200		
API	NC 44	5-3/4	*20,600	*20,600	*20,600	18,000		
		6	25,000	23,300	21,200	18,000		
		6-1/4	25,000	23,300	21,200	18,000		
		6-1/2	25,000	23,300	21,200	18,000		
4-1/2	API FULL HOLE	5-1/2	*12,900	*12,900	*12,900	*12,900	*12,900	
		5-3/4	*17,900	*17,900	*17,900	*17,900	17,700	
		6	*23,300	*23,300	22,800	19,800	17,700	
		6-1/4	27,000	25,000	22,800	19,800	17,700	
		6-1/2	27,000	25,000	22,800	19,800	17,700	
4-1/2	EXTRA HOLE	5-3/4		*17,600	*17,600	*17,600	*17,600	
API	NC 46	6		*23,200	*23,200	22,200	20,200	
4	API I.F.	6-1/4		28,000	25,500	22,200	20,200	
4-1/2	SEMI I.F.	6-1/2		28,000	25,500	22,200	20,200	
5	DBL STREAMLINE	6-3/4		28,000	25,500	22,200	20,200	
4-1/2	MOD. OPEN							
4-1/2	H-90 [4]	5-3/4		*17,600	*17,600	*17,600	*17,600	
		6		*23,400	*23,400	23,000	21,000	
		6-1/4		28,500	26,000	23,000	21,000	
		6-1/2		28,500	26,000	23,000	21,000	
		6-3/4		28,500	26,000	23,000	21,000	
5	H-90 [4]	6-1/4		*25,000	*25,000	*25,000	*25,000	
		6-1/2		*31,500	*31,500	29,500	27,000	
		6-3/4		35,000	33,000	29,500	27,000	
		7		35,000	33,000	29,500	27,000	
4-1/2	API I.F.	6-1/4		*22,800	*22,800	*22,800	*22,800	*22,800
API	NC 50	6-1/2		*29,500	*29,500	*29,500	*29,500	26,500
5	EXTRA HOLE	6-3/4		*36,000	35,500	32,000	30,000	26,500
5	MOD.OPEN	7		38,000	35,500	32,000	30,000	26,500
5-1/2	DBL STREAMLINE	7-1/4		38,000	35,500	32,000	30,000	26,500
5	SEMI I.F.							
5-1/2	H-90 [4]	6-3/4		*34,000	*34,000	*34,000	34,000	
		7		*41,500	40,000	36,500	34,000	
		7-1/4		42,500	40,000	36,500	34,000	
		7-1/2		42,500	40,000	36,500	34,000	

DRILL COLLARS

CONNECTIONS AND RECOMMENDED MAKE-UP TORQUE[1]

(SEE REMARKS ON PAGE 3-4)

CONNECTION			MINIMUM MAKE-UP TORQUE IN FOOT-POUNDS[2]						
			BORE OF DRILL COLLAR (in inches)						
SIZE (in.)	TYPE	O.D. (in.)	2-1/4	2-1/2	2-13/16	3	3-1/4	3-1/2	3-3/4
5-1/2	API REGULAR	6-3/4	*31,500	*31,500	*31,500	*31,500			
		7	*39,000	*39,000	36,000	33,500			
		7-1/4	42,000	39,500	36,000	33,500			
		7-1/2	42,000	39,500	36,000	33,500			
5-1/2	API FULL HOLE	7		*32,500	*32,500	*32,500	*32,500		
		7-1/4		*40,500	*40,500	*40,500	*40,500		
		7-1/2		*49,000	47,000	45,000	41,500		
		7-3/4		51,000	47,000	45,000	41,500		
API	NC 55	7-1/4		*40,000	*40,000	*40,000	*40,000		
		7-1/2		*48,500	48,000	45,000	42,000		
		7-3/4		51,000	48,000	45,000	42,000		
		8		51,000	48,000	45,000	42,000		
6-5/8	API REGULAR	7-1/2		*46,000	*46,000	*46,000	*46,000		
		7-3/4		*55,000	53,000	50,000	47,000		
		8		57,000	53,000	50,000	47,000		
		8-1/4		57,000	53,000	50,000	47,000		
6-5/8	H-90 [4]	7-1/2		*46,000	*46,000	*46,000	*46,000		
		7-3/4		*55,000	*55,000	53,000	49,500		
		8		59,500	56,000	53,000	49,500		
		8-1/4		59,500	56,000	53,000	49,500		
API	NC 61	8		*54,000	*54,000	*54,000	*54,000		
		8-1/4		*64,000	*64,000	*64,000	61,000		
		8-1/2		72,000	68,000	65,000	61,000		
		8-3/4		72,000	68,000	65,000	61,000		
		9		72,000	68,000	65,000	61,000		
5-1/2	API I.F.	8		*56,000	*56,000	*56,000	*56,000	*56,000	
		8-1/4		*66,000	*66,000	*66,000	63,000	59,000	
		8-1/2		74,000	70,000	67,000	63,000	59,000	
		8-3/4		74,000	70,000	67,000	63,000	59,000	
		9		74,000	70,000	67,000	63,000	59,000	
		9-1/4		74,000	70,000	67,000	63,000	59,000	
6-5/8	API FULL HOLE	8-1/2			*67,000	*67,000	*67,000	*67,000	66,500
		8-3/4			*78,000	*78,000	76,000	72,000	66,500
		9			83,000	80,000	76,000	72,000	66,500
		9-1/4			83,000	80,000	76,000	72,000	66,500
		9-1/2			83,000	80,000	76,000	72,000	66,500
API	NC 70	9			*75,000	*75,000	*75,000	*75,000	*75,000
		9-1/4			*88,000	*88,000	*88,000	*88,000	*88,000
		9-1/2			*101,000	*101,000	100,000	95,000	90,000
		9-3/4			107,000	105,000	100,000	95,000	90,000
		10			107,000	105,000	100,000	95,000	90,000
		10-1/4			107,000	105,000	100,000	95,000	90,000
API	NC 77	10				*107,000	*107,000	*107,000	*107,000
		10-1/4				*122,000	*122,000	*122,000	*122,000
		10-1/2				*138,000	*138,000	133,000	128,000
		10-3/4				143,000	138,000	133,000	128,000
		11				143,000	138,000	133,000	128,000

DRILL COLLARS
CONNECTIONS AND RECOMMENDED MAKE-UP TORQUE[1]

CONNECTION			MINIMUM MAKE-UP TORQUE IN FOOT-POUNDS[2]				
SIZE		O.D.	BORE OF DRILL COLLAR (In inches)				
(In.)	TYPE	(In.)	2-13/16	3	3-1/4	3-1/2	3-3/4
7	H-90 [4]	8	*53,000	*53,000	*53,000	*53,000	
		8-1/4	*63,000	*63,000	*63,000	60,500	
		8-1/2	71,500	68,500	65,000	60,500	
7-5/8	API REGULAR	8-1/2		*60,000	*60,000	*60,000	*60,000
		8-3/4		*71,000	*71,000	*71,000	*71,000
		9		*83,000	*83,000	79,000	74,000
		9-1/4		88,000	83,000	79,000	74,000
		9-1/2		88,000	83,000	79,000	74,000
7-5/8	H-90 [4]	9		*72,000	*72,000	*72,000	*72,000
		9-1/4		*85,500	*85,500	*85,500	*85,500
		9-1/2		*98,000	*98,000	*98,000	95,500
8-5/8	API REGULAR	10		*108,000	*108,000	*108,000	*108,000
		10-1/4		*123,000	*123,000	*123,000	123,000
		10-1/2		139,000	134,000	129,000	123,000
8-5/8	H-90 [4]	10-1/4		*112,500	*112,500	*112,500	*112,500
		10-1/2		*126,500	*126,500	*126,500	*126,500
7	H-90 [4]	8-3/4	*67,500	*67,500	66,500	62,000	
	(with low torque face)	9	74,000	71,000	66,500	62,000	
7-5/8	API REGULAR	9-1/4		*72,000	*72,000	*72,000	*72,000
	(with low torque face)	9-1/2		*85,000	*85,000	82,000	77,000
		9-3/4		91,000	87,000	82,000	77,000
		10		91,000	87,000	82,000	77,000
7-5/8	H-90 [4]	9-3/4		*91,000	*91,000	*91,000	*91,000
	(with low torque face)	10		*105,000	*105,000	103,500	98,000
		10-1/4		112,500	108,000	103,500	98,000
		10-1/2		112,500	108,000	103,500	98,000
8-5/8	API REGULAR	10-3/4		*112,000	*112,000	*112,000	*112,000
	(with low torque face)	11		*129,000	*129,000	*129,000	*129,000
8-5/8	H-90 [4]	10-3/4		*92,500	*92,500	*92,500	*92,500
	(with low torque face)	11		*110,000	*110,000	*110,000	*110,000
		11-1/4		*128,000	*128,000	*128,000	*128,000

NOTE: IN EACH CONNECTION SIZE AND TYPE GROUP, TORQUE VALUES APPLY TO ALL CONNECTION TYPES IN THE GROUP WHEN USED WITH THE SAME DRILL COLLAR OUTSIDE COLLAR DIAMETER AND BORE; I.E., 2-3/8" API I.F., API NC 26 AND 2-7/8" SLIM HOLE CONNECTIONS USED WITH 3-1/2" X 1-1/4" DRILL COLLARS ALL HAVE THE SAME MINIMUM MAKE-UP TORQUE OF 4600 FT.LBS. AND THE BOX IS THE WEAKER MEMBER.

* TORQUE FIGURES PRECEDED BY AN ASTERISK INDICATE THE BOX AS THE WEAKER MEMBER FOR THE CORRESPONDING OUTSIDE DIAMETER (O.D.) AND BORE. THE PIN IS THE WEAKER MEMBER FOR ALL OTHER TORQUE VALUES.

[1] RECOMMENDED MAKE-UP TORQUE CALCULATIONS ASSUME THE THOROUGH APPLICATION TO ALL THREADS AND SHOULDERS OF A THREAD COMPOUND WHICH CONTAINS EITHER 40 - 60% BY WEIGHT FINELY POWDERED METALIC ZINC OR 60% BY WEIGHT FINELY POWDERED METALIC LEAD AND NEVER MORE THAN 0.3% SULFUR. CALCULATIONS ALSO ASSUME USE OF THE MODIFIED JACK SCREW FORMULA CONTAINED IN API RP7G, APPENDIX A, PARAGRAPH A.8, AND A UNIT STRESS OF 62,500 PSI IN THE BOX OR PIN, WHICHEVER IS WEAKER.

[2] NORMAL TORQUE RANGE IS TABULATED VALUE PLUS 10%. HIGHER VALUES MAY BE USED UNDER EXTREME CONDITIONS.

[3] MAKE-UP TORQUE FOR 2-7/8" PAC BASED ON 87,500 PSI STRESS AND OTHER FACTORS IN 1, ABOVE.

[4] MAKE-UP TORQUE FOR H-90 BASED ON 56,200 PSI STRESS AND OTHER FACTORS IN 1, ABOVE.

DATA REPRINTED FROM TABLE 3.2, PP 34-36, 14 ED., API RP7G, AUGUST 1, 1990.

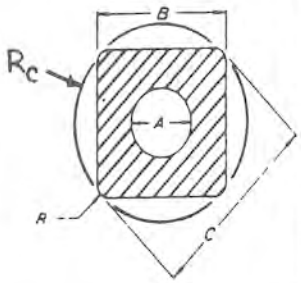
STANDARD STEEL PIPE SIZES

Nom. Size	O.D.	"Standard Weight"			"Extra Strong"			"Double Extra Strong"		
		I.D.	Wall Thickness	Wt. Per Ft. Plain Ends	I.D.	Wall Thickness	Wt. Per Ft. Plain Ends	I.D.	Wall Thickness	Wt. Per Ft. Plain Ends
1/8	0.405	0.269	0.068	0.24	0.215	0.095	0.31	–	–	–
1/4	0.540	0.364	0.088	0.42	0.302	0.119	0.54	–	–	–
3/8	0.675	0.493	0.091	0.57	0.423	0.126	0.74	–	–	–
1/2	0.840	0.622	0.109	0.85	0.546	0.147	1.09	0.252	0.294	1.71
3/4	1.050	0.824	0.113	1.13	0.742	0.154	1.47	0.434	0.308	2.44
1	1.315	1.049	0.133	1.68	0.957	0.179	2.17	0.599	0.358	3.66
1-1/4	1.660	1.380	0.140	2.27	1.278	0.191	3.00	0.896	0.382	5.21
1-1/2	1.900	1.610	0.145	2.72	1.500	0.200	3.63	1.100	0.400	6.41
2	2.375	2.067	0.154	3.65	1.939	0.218	5.02	1.503	0.436	9.03
2-1/2	2.875	2.469	0.203	5.79	2.323	0.276	7.66	1.771	0.552	13.70
3	3.500	3.068	0.216	7.58	2.900	0.300	10.25	2.300	0.600	18.58
3-1/2	4.000	3.548	0.226	9.11	3.364	0.318	12.51	2.728	0.636	22.85
4	4.500	4.026	0.237	10.79	3.826	0.337	14.98	3.152	0.674	27.54
5	5.563	5.047	0.258	14.62	4.813	0.375	20.78	40.63	0.750	38.55
6	6.625	6.065	0.280	18.97	5.761	0.432	28.57	4.897	0.864	53.16
8	8.625	8.071	0.277	24.70	7.625	0.500	43.39	6.875	0.875	72.42
8	8.625	7.981	0.322	28.55	–	–	–	–	–	–
10	10.750	10.192	0.279	31.20	9.750	0.500	54.74	–	–	–
10	10.750	10.136	0.307	34.24	–	–	–	–	–	–
10	10.750	10.020	0.365	40.48	–	–	–	–	–	–
12	12.750	12.090	0.330	43.77	11.750	0.500	65.42	–	–	–
12	12.750	12.000	0.375	49.56	–	–	–	–	–	–

LINE PIPE SIZES
STANDARD WEIGHT, THREADED

Nom. Size	O.D.	I.D.	Weight Per Ft.		Thds. Per In.	Taper Per Ft.	Male Thd. Length	Coupl. Length	Coupl. Dia.
			Plain	Thd. & Cpl.					
1/8	0.405	0.269	0.24	0.25	27	3/4	0.392	1-1/16	0.563
1/4	0.540	0.364	0.42	0.43	18	3/4	0.595	1-5/8	0.719
3/8	0.675	0.493	0.57	0.57	18	3/4	0.601	1-5/8	0.875
1/2	0.840	0.622	0.85	0.86	14	3/4	0.782	2-1/8	1.063
3/4	1.050	0.824	1.13	1.14	14	3/4	0.794	2-1/8	1.313
1	1.315	1.049	1.68	1.70	11-1/2	3/4	0.985	2-5/8	1.576
1-1/4	1.660	1.380	2.27	2.30	11-1/2	3/4	1.009	2-3/4	2.054
1-1/2	1.900	1.610	2.72	2.75	11-1/2	3/4	1.025	2-3/4	2.200
2	2.375	2.067	3.65	3.75	11-1/2	3/4	1.058	2-7/8	2.875
2-1/2	2.875	2.469	5.79	5.90	8	3/4	1.571	4-1/8	3.375
3	3.500	3.068	7.58	7.70	8	3/4	1.634	4-1/4	4.000
3-1/2	4.000	3.548	9.11	9.25	8	3/4	1.684	4-3/8	4.625
4	4.500	4.026	10.79	11.00	8	3/4	1.734	4-1/2	5.200
5	5.563	5.047	14.62	15.00	8	3/4	1.840	4-5/8	6.296
6	6.625	6.065	18.97	19.45	8	3/4	1.946	4-7/8	7.390
8	8.625	8.071	24.70	25.55	8	3/4	2.146	5-1/4	9.625
10	10.750	10.192	31.20	32.75	8	3/4	2.359	5-3/4	11.750
10	10.750	10.136	34.24	35.75	8	3/4	2.359	5-3/4	11.750
12	12.750	12.090	43.77	45.45	8	3/4	2.559	6-1/8	14.000
14	14.000	13.250	54.57	57.00	8	3/4	2.684	6-3/8	15.000
16	16.000	15.250	62.58	65.30	8	3/4	2.884	6-3/4	17.000
18	18.000	17.250	70.59	73.00	8	3/4	3.084	7-1/8	19.000
20	20.000	19.250	78.60	81.00	8	3/4	3.284	7-5/8	21.000

SQUARE KELLYS

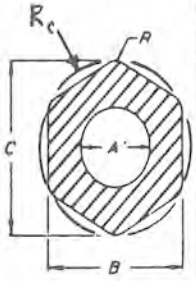


A.P.I. Nom. Size	Max. Bore A	Across Flats B	Across Corner C	Radius R	Radius Rc*
2-1/2	1-1/4	2-1/2	3-9/32	5/16	1-5/8
3	1-3/4	3	3-15/16	3/8	1-15/16
3-1/2	2-1/4	3-1/2	4-17/32	1/2	2-7/32
4-1/4	2-3/4	4-1/4	5-9/16	1/2	2-3/4
5-1/4	3-1/2	5-1/4	6-29/32	5/8	3-3/8
**6	3-1/2	6	7-7/8	3/4	–

* Corner Configuration at Manuf. Option

** 6" Square Not A.P.I.

HEXAGON KELLYS



A.P.I. St'd. Size	Alternate	Max. Bore A	Across Flats B	Across Corner C	Radius R	Radius Rc*
3		1-1/2	3	3-3/8	1/4	1-11/16
3-1/2		1-3/4	3-1/2	3-31/32	1/4	1-31/32
	3-1/2	2-1/4	3-3/4	4-1/4	5/16	–
4-1/4		2-1/4	4-1/4	4-13/16	5/16	2-25/64
	4-1/2	3-1/4	4-27/32	5-1/2	5/16	–
5-1/4		3-1/4	5-1/4	5-31/32	3/8	2-61/64
	5-9/16	4	5-31/32	6-3/4	3/8	–
6		4	6	6-13/16	3/8	3-13/32
	6-5/8	4-1/4	6-27/32	7-3/4	1/2	–

* Corner Configuration at Manuf. Option

CASING SIZES Threaded & Coupled Type

O.D.	I.D.	Wt. Per Ft.		Thd/Inch		Taper/Ft.		Length of Male Thread				Coupling Length				Coupling Dia.	
								Round		"V" Form		Round		"V" Form			
In.	In.	Plain	Thd. & Cplg.	Rnd.	"V"	Rnd.	"V"	Short	Long	Short	Long	Short	Long	Short	Long	Rnd.	"V"
4½	4.090	9.40	9.50	8	14	¾	⅜	2.000	–	1.407	–	6¼	–	3⅝	–	5.000	5.021
	4.052	10.23	10.50	8	–	¾	–	2.625	–	–	–	6¼	–	–	–	5.000	–
	4.000	11.35	11.60	8	–	¾	–	2.625	3.000	–	–	6¼	–	–	–	5.000	–
	3.920	13.04	13.50	8	–	¾	–	–	3.000	–	–	6¼	7	–	–	5.000	–
5	4.560	11.23	11.50	8	–	¾	–	2.500	–	–	–	6½	–	–	–	5.563	–
	4.494	12.83	13.00	8	10	¾	⅜	2.750	3.375	2.550	–	6½	7¾	6⅝	–	5.563	5.491
	4.408	14.87	15.00	8	10	¾	⅜	2.750	3.375	2.550	3.300	6½	7¾	6⅝	8	5.563	5.750
	4.276	17.93	18.00	8	10	¾	⅜	–	3.375	2.550	3.300	6½	7¾	6⅝	8	5.563	5.750
5½	5.012	13.70	14.00	8	10	¾	⅜	2.875	–	2.750	3.300	6¾	–	7⅛	8	6.050	6.155
	4.950	15.35	15.50	8	–	¾	–	2.875	3.500	–	–	6¾	8	–	–	6.050	–
	4.892	16.87	17.00	8	10	¾	⅜	2.875	3.500	2.750	3.300	6¾	8	7⅛	8	6.050	6.155
	4.778	19.81	20.00	8	10	¾	⅜	–	3.500	2.750	3.300	–	8	7⅛	8	6.050	6.155
	4.670	22.54	23.00	8	–	¾	–	–	3.500	–	–	–	8	–	–	6.050	–
6⅝	6.049	19.49	20.00	8	10	¾	⅜	3.125	3.875	3.000	3.800	7¼	8¾	7⅝	9	7.390	7.390
	5.921	23.58	24.00	8	10	¾	⅜	3.125	3.875	3.000	3.800	7¼	8¾	7⅝	9	7.390	7.390
	5.791	27.65	28.00	8	10	¾	⅜	–	3.875	3.000	3.800	–	8¾	7⅝	9	7.390	7.390
	5.675	31.20	32.00	8	–	¾	–	–	3.875	–	–	–	8¾	–	–	7.390	–
7	6.538	16.70	17.00	8	–	¾	–	2.375	–	–	–	7¼	–	–	–	7.656	–
	6.456	19.54	20.00	8	10	¾	⅜	3.125	–	3.000	–	7¼	–	7⅝	–	7.656	7.750
	6.366	22.63	23.00	8	10	¾	⅜	3.125	4.000	3.000	4.050	7¼	9	7⅝	9½	7.656	7.750
	6.276	25.66	26.00	8	10	¾	⅜	3.125	4.000	3.000	4.050	7¼	9	7⅝	9½	7.656	7.750
	6.184	28.72	29.00	8	–	¾	–	–	4.000	–	–	–	9	–	–	7.656	–
	6.094	31.68	32.00	8	–	¾	–	–	4.000	–	–	–	9	–	–	7.656	–
	6.004	34.58	35.00	8	–	¾	–	–	4.000	–	–	–	9	–	–	7.656	–
	5.920	37.26	38.00	8	–	¾	–	–	4.000	–	–	–	9	–	–	7.656	–

CASING SIZES Threaded & Coupled Type

O.D.	I.D.	Wt. Per Ft.		Thd/Inch		Taper/Ft.		Length of Male Thread				Coupling Length				Coupling Dia.	
								Round		"V" Form		Round		"V" Form			
In.	In.	Plain	Thd. & Cplg.	Rnd.	"V"	Rnd.	"V"	Short	Long	Short	Long	Short	Long	Short	Long	Rnd.	"V"
7⅝	7.025	23.47	24.00	8	–	¾	–	3.250	–	–	–	7½	–	–	–	8.500	–
	6.969	25.56	26.40	8	8	¾	¾	3.250	4.125	3.250	4.125	7½	9¼	7½	9¼	8.500	8.500
	6.875	29.04	29.70	8	8	¾	¾	–	4.125	3.250	4.125	–	9¼	7½	9¼	8.500	8.500
	6.765	33.04	33.70	8	8	¾	¾	–	4.125	3.250	4.125	–	9¼	7½	9¼	8.500	8.500
	6.625	38.05	39.00	8	–	¾	–	–	4.125	–	–	–	9¼	–	–	8.500	–
8⅝	8.097	23.57	24.00	8	–	¾	–	3.000	–	–	–	7¾	–	–	–	9.625	–
	8.017	27.02	28.00	8	8	¾	¾	3.375	–	3.250	–	7¾	–	8⅛	–	9.625	9.625
	7.921	31.10	32.00	8	8	¾	¾	3.375	4.500	3.250	4.75	7¾	–	8⅛	10¾	9.625	9.625
	7.825	35.14	36.00	8	8	¾	¾	3.375	4.500	3.250	4.75	7¾	10	8⅛	10¾	9.625	9.625
	7.725	39.29	40.00	8	–	¾	–	–	4.500	–	–	–	10	–	–	9.625	–
	7.625	43.39	44.00	8	8	¾	¾	–	4.500	–	4.75	–	10	–	10¾	9.625	9.625
	7.511	48.00	49.00	8	–	¾	–	–	4.500	–	–	–	10	–	–	9.625	–
9⅝	9.001	31.03	32.30	8	–	¾	–	3.375	–	–	–	7¾	–	–	–	10.625	–
	8.921	34.86	36.00	8	8	¾	¾	3.375	4.750	3.250	5.250	7¾	10½	8⅛	11¾	10.625	10.625
	8.835	38.94	40.00	8	8	¾	¾	3.375	4.750	3.250	5.250	7¾	10½	8⅛	11¾	10.625	10.625
	8.755	42.70	43.50	8	8	¾	¾	–	4.750	3.250	5.250	–	10½	8⅛	11¾	10.625	10.625
	8.681	46.14	47.00	8	8	¾	¾	–	4.750	–	5.250	–	10½	–	11¾	10.625	10.625
	8.535	52.85	53.50	8	8	¾	¾	–	4.750	–	5.250	–	10½	–	11¾	10.625	10.625
10¾	10.192	31.20	32.75	8	–	¾	–	2.750	–	–	–	8	–	–	–	11.750	–
	10.050	38.88	40.50	8	8	¾	¾	3.500	–	3.625	5.375	8	–	8½	12	11.750	11.750
	9.950	44.22	45.50	8	8	¾	¾	3.500	–	3.625	5.375	8	–	8½	12	11.750	11.750
	9.850	49.50	51.00	8	8	¾	¾	3.500	–	3.625	5.375	8	–	8½	12	11.750	11.750
	9.760	54.21	55.50	8	8	¾	¾	3.500	–	3.625	5.375	8	–	8½	12	11.750	11.750

CASING SIZES Threaded & Coupled Type

O.D.	I.D.	Wt. Per Ft.		Thd/Inch		Taper/Ft.		Length of Male Thread				Coupling Length				Coupling Dia.	
								Round		"V" Form		Round		"V" Form			
In.	In.	Plain	Thd. & Cplg.	Rnd.	"V"	Rnd.	"V"	Short	Long	Short	Long	Short	Long	Short	Long	Rnd.	"V"
11¾	11.084	40.60	42.00	8	–	¾	–	3.500	–	–	–	8	–	–	–	12.750	–
	11.000	45.56	47.00	8	8	¾	¾	3.500	–	3.250	5.500	8	–	8⅛	12¼	12.750	12.750
	10.880	52.57	54.00	8	8	¾	¾	3.500	–	3.250	5.500	8	–	8⅛	12¼	12.750	12.750
	10.772	58.81	60.00	8	8	¾	¾	3.500	–	3.250	5.500	8	–	8⅛	12¼	12.750	12.750
13⅜	12.715	45.98	48.00	8	8	¾	¾	3.500	–	3.875	–	8	–	9	–	14.375	14.375
	12.615	52.74	54.50	8	8	¾	¾	3.500	–	3.875	–	8	–	9	–	14.375	14.375
	12.515	59.45	61.00	8	8	¾	¾	3.500	–	3.875	5.500	8	–	9	12¼	14.375	14.375
	12.415	66.11	68.00	8	8	¾	¾	3.500	–	3.875	5.500	8	–	9	12¼	14.375	14.375
	12.347	70.60	72.00	8	8	¾	¾	3.500	–	3.875	5.500	8	–	9	12¼	14.375	14.375
16	15.250	62.58	65.00	8	8	¾	¾	4.000	–	3.875	–	9	–	9	–	17.000	17.000
	15.124	72.72	75.00	8	8	¾	¾	4.000	–	3.875	–	9	–	9	–	17.000	17.000
	15.010	81.97	84.00	8	8	¾	¾	4.000	–	3.875	–	9	–	9	–	17.000	17.000
18⅝	17.755	84.51	87.50	8	8	¾	¾	4.000	–	3.875	–	9	–	9	–	20.000	19.625
20	19.124	91.41	94.00	8	8	¾	¾	4.000	5.250	3.875	–	9	11½	9	–	21.000	21.000
	19.000	104.13	106.50	8	–	¾	–	4.000	5.250	–	–	9	11½	–	–	21.000	–
	18.730	131.33	133.00	8	–	¾	–	4.000	5.250	–	–	9	11½	–	–	21.000	–

API DRIFT TEST

Casing size	Drift Mandrel Length	Drift Mandrel Diameter
8⅝ In. and Smaller	6 Ft.	Casing ID Minus ⅛ In.
9⅝ In. to 13⅜ In., Incl.	12 Ft.	Casing ID Minus 5/32 In.
16 In. and Larger	12 Ft.	Casing ID Minus 3/16 In.

DRILL BIT SPECIFICATIONS

SIZE (Inches)	Approx. Weight (Lbs.)	Reg. *A.P.I. Pin Shank Size, (Inches)
3-3/4	10	
3-7/8	10	
4-1/8	11	2-3/8
4-1/4	11	
4-3/8	11	
4-1/2	11	2-3/8
4-5/8	16	
4-3/4	16	2-7/8
4-7/8	16	2-7/8
5-1/8	25	
5-3/8	25	3-1/2
5-5/8	25	
5-3/4	25	
5-7/8	25	
6	28	3-1/2
6-1/8	28	
6-1/4	28	
6-3/8	29	
6-1/2	29	3-1/2
6-5/8	29	
6-3/4	37	
7	42	
7-3/8	42	3-1/2
7-1/2	56	
7-5/8	57	4-1/2
7-3/4	58	
7-7/8	59	
8-1/8	64	
8-3/8	67	
8-1/2	68	
8-5/8	73	4-1/2
8-3/4	74	
9	75	
9-1/2	102	
9-5/8	112	4-1/2
9-3/4	112	
9-7/8	112	5-1/2 or 6-5/8
10-5/8	140	5-1/2 or 6-5/8
11	145	6-5/8
11-3/4	170	
12	175	6-5/8
12-1/4	179	
13-3/4	245	6-5/8
14-3/4	300	
15	300	6-5/8
16	334	6-5/8
17	497	6-5/8
17-1/2	500	6-5/8
18-1/2	569	6-5/8
20	614	6-5/8
	758	
22	1039	
23	1065	6-5/8
24	1165	or
	1190	8-5/8
26	1225	

CASING DATA SHOWING BIT SIZES AND CLEARANCES

A.P.I. CASING

CASING SPECIFICATIONS				BIT SIZE AND DIAMETRAL CLEARANCE		
Casing Size O.D. (Inches)	Casing Coupling Dia. O.D. (Inches)	Wt. per Ft. with Couplings (Pounds)	Inside Diameter of Casing (Inches)	Bit Size (Inches)	CLEARANCE	
					Thou-sandths	Nearest 64th
4-1/2	5.000	9.50	4.090	3-7/8	.215	7/32
4-1/2	5.000	11.60	4.000	3-7/8	.125	1/8
4-1/2	5.000	13.50	3.920	3-3/4	.170	11/64
5	5.563	11.50	4.560	4-1/4	.310	5/16
5	5.563	13.00	4.494	4-1/4	.244	1/4
5	5.563	15.00	4.408	4-1/4	.158	5/32
5	5.563	18.00	4.276	4-1/8	.151	5/32
5-1/2	6.050	13.00	5.044	4-3/4	.294	19/64
5-1/2	6.050	14.00	5.012	4-3/4	.262	17/64
5-1/2	6.050	15.50	4.950	4-3/4	.200	13/64
5-1/2	6.050	17.00	4.892	4-3/4	.142	9/64
5-1/2	6.050	20.00	4.778	4-1/8	.153	5/32
5-1/2	6.050	23.00	4.670	4-1/2	.170	11/64
6	6.625	15.00	5.524	5-3/8	.149	5/32
6	6.625	18.00	5.424	5-1/8	.299	19/64
6	6.625	20.00	5.352	5-1/8	.227	15/64
6	6.625	23.00	5.240	5-1/8	.115	7/64
6-5/8	7.390	17.00	6.135	6	.135	9/64
6-5/8	7.390	20.00	6.049	5-7/8	.174	11/64
6-5/8	7.390	24.00	5.921	5-5/8	.296	19/64
6-5/8	7.390	28.00	5.791	5-5/8	.166	11/64
6-5/8	7.390	32.00	5.675	5-3/8	.300	19/64
7	7.656	17.00	6.538	6-1/4	.288	9/32
7	7.656	20.00	6.456	6-1/4	.206	13/64
7	7.656	23.00	6.366	6-1/4	.116	7/64
7	7.656	26.00	6.276	6-1/8	.151	5/32
7	7.656	29.00	6.184	6	.184	3/16
7	7.656	32.00	6.094	6	.094	3/32
7	7.656	35.00	6.004	5-7/8	.129	1/8
7	7.656	38.00	5.920	5-3/4	.170	11/64
7-5/8	8.500	20.00	7.125	6-3/4	.375	3/8
7-5/8	8.500	24.00	7.025	6-3/4	.275	9/32
7-5/8	8.500	26.40	6.969	6-3/4	.219	7/32
7-5/8	8.500	29.70	6.875	6-3/4	.125	1/8
7-5/8	8.500	33.70	6.765	6-5/8	.140	9/64

CASING DATA SHOWING BIT SIZES AND CLEARANCES

A.P.I. CASING

CASING SPECIFICATIONS				BIT SIZE AND DIAMETRAL CLEARANCE		
Casing Size O.D. (Inches)	Casing Coupling Dia. O.D. (Inches)	Wt. per Ft. with Couplings (Pounds)	Inside Diameter of Casing (Inches)	Bit Size (Inches)	CLEARANCE	
					Thousandths	Nearest 64th
7-5/8	8.500	39.00	6.625	6-1/4	.375	3/8
8-5/8	9.625	24.00	8.097	7-7/8	.222	7/32
8-5/8	9.625	28.00	8.017	7-7/8	.142	9/64
8-5/8	9.625	32.00	7.921	7-5/8	.296	19/64
8-5/8	9.625	36.00	7.825	7-5/8	.200	13/64
8-5/8	9.625	40.00	7.725	7-5/8	.100	3/32
8-5/8	9.625	44.00	7.625	7-5/8	.250	1/4
8-5/8	9.625	49.00	7.511	7-5/8	.136	9/64
9-5/8	10.625	29.30	9.063	8-3/4	.313	5/16
9-5/8	10.625	32.30	9.001	8-3/4	.251	1/4
9-5/8	10.625	36.00	8.921	8-3/4	.171	11/64
9-5/8	10.625	40.00	8.835	8-5/8	.210	13/64
9-5/8	10.625	43.50	8.755	8-5/8	.130	1/8
9-5/8	10.625	47.00	8.681	8-1/2	.181	3/16
9-5/8	10.625	53.50	8.535	8-3/8	.160	5/32
10-3/4	11.750	32.75	10.192	9-7/8	.317	5/16
10-3/4	11.750	40.50	10.050	9-7/8	.175	11/64
10-3/4	11.750	45.50	9.950	9-3/4	.200	13/64
10-3/4	11.750	51.00	9.850	9-5/8	.225	7/32
10-3/4	11.750	55.50	9.760	9-5/8	.135	9/64
11-3/4	12.750	38.00	11.150	11	.150	5/32
11-3/4	12.750	42.00	11.084	10-3/4	.334	21/64
11-3/4	12.750	47.00	11.000	10-3/4	.250	1/4
11-3/4	12.750	54.00	10.880	10-5/8	.255	1/4
11-3/4	12.750	60.00	10.772	10-5/8	.147	9/64
13-3/8	14.375	48.00	12.715	12-1/4	.465	15/32
13-3/8	14.375	54.50	12.615	12-1/4	.365	23/64
13-3/8	14.375	61.00	12.515	12-1/4	.265	17/64
13-3/8	14.375	68.00	12.415	12-1/4	.165	11/64
13-3/8	14.375	72.00	12.347	12	.347	11/32
16	17.000	55.00	15.375	15	.375	3/8
16	17.000	65.00	15.250	15	.250	1/4
16	17.000	75.00	15.125	14-3/4	.375	3/8
16	17.000	84.00	15.010	14-3/4	.260	17/64
20	21.000	94.00	19.124	17-1/2	1.624	1-5/8

CASING MAKE-UP TORQUE GUIDE

SHORT THREAD
RECOMMENDED MAKE-UP TORQUE*

O.D. (In.)	Nominal Weight (lb/ft)	Grade	Torque (ft-lb)		
			Minimum	Optimum	Maximum
4½	9.5	H-40	580	770	960
		J-55	760	1010	1260
		K-55	840	1120	1400
	10.5	J-55	990	1320	1650
		K-55	1100	1460	1830
	11.6	J-55	1160	1540	1930
		K-55	1280	1700	2130
5	11.5	J-55	1000	1330	1660
		K-55	1100	1470	1840
	13.0	J-55	1270	1690	2110
		K-55	1400	1860	2330
	15.0	J-55	1550	2070	2590
		K-55	1710	2280	2850
5½	14.0	H-40	960	1300	1630
		J-55	1290	1720	2150
		K-55	1420	1890	2360
	15.5	J-55	1520	2020	2530
		K-55	1670	2220	2780
	17.0	J-55	1720	2290	2860
		K-55	1890	2520	3150
6⅝	20.0	H-40	1380	1840	2300
		J-55	1840	2450	3060
		K-55	2000	2670	3340
	24.0	J-55	2360	3140	3930
		K-55	2570	3420	4280
7	17.0	H-40	920	1220	1530
	20.0	H-40	1320	1760	2200
		J-55	1760	2340	2930
		K-55	1910	2540	3180
	23.0	J-55	2130	2840	3550
		K-55	2320	3090	3860
	26.0	J-55	2510	3340	4180
		K-55	2730	3640	4550
7⅝	24.0	H-40	1590	2120	2650
	26.4	J-55	2360	3150	3940
		K-55	2570	3420	4280

SHORT THREAD
RECOMMENDED MAKE-UP TORQUE*

O.D. (In.)	Nominal Weight (lb/ft)	Grade	Torque (ft-lb)		
			Minimum	Optimum	Maximum
8⅝	24.0	J-55	1830	2440	3050
		K-55	1970	2630	3290
	28.0	H-40	1750	2330	2910
	32.0	H-40	2090	2790	3490
		J-55	2790	3720	4650
		K-55	3020	4020	5030
	36.0	J-55	3260	4340	5430
		K-55	3510	4680	5850
9⅝	32.3	H-40	1910	2540	3180
	36.0	H-40	2210	2940	3680
		J-55	2960	3940	4930
		K-55	3170	4230	5290
	40.0	J-55	3390	4520	5650
		K-55	3650	4860	6080
10¾	32.75	H-40	1540	2050	2560
	40.5	H-40	2360	3140	3930
		J-55	3150	4200	5250
		K-55	3380	4500	5630
	45.5	J-55	3700	4930	6160
		K-55	3960	5280	6600
	51.0	J-55	4240	5850	7060
		K-55	4550	6060	7580
		C-75	5670	7560	9450
		L-80	5960	7940	9930
		N-80	6030	8040	10050
		C-95	6950	9270	11590
		P-110	8100	10800	13500
	55.5	C-75	6320	8430	10540
		L-80	6630	8840	11050
		N-80	6710	8950	11190
		C-95	7740	10320	12900
		P-110	9020	12030	15040
	60.7	P-110	10040	13380	16730
	65.7	P-110	11040	14720	18400

CASING MAKE-UP TORQUE GUIDE

SHORT THREAD
RECOMMENDED MAKE-UP TORQUE*

O.D. (In.)	Nominal Weight (lb/ft)	Grade	Torque (ft-lb)		
			Minimum	Optimum	Maximum
11¾	42.0	H-40	2300	3070	3840
	47.0	J-55	3580	4770	5960
		K-55	3820	5090	6360
	54.0	J-55	4260	5680	7100
		K-55	4550	6060	7580
	60.0	J-55	4870	6490	8110
		K-55	5200	6930	8660
		C-75	6520	8690	10860
		L-80	6850	9130	11410
		N-80	6930	9240	11550
		C-95	8000	10660	13330
		P-110	9320	12420	15530
13⅜	48.0	H-40	2420	3220	4030
	54.5	J-55	3860	5140	6430
		K-55	4100	5470	6840
	61.0	J-55	4460	5950	7440
		K-55	4750	6330	7910
	68.0	J-55	5060	6750	8440
		K-55	5390	7180	8960
		C-75	6800	9060	11330
		L-80	7140	9520	11900
		N-80	7220	9630	12040
		C-95	8360	11140	13930
		P-110	9730	12970	16210
	72.0	C-75	7340	9780	12230
		L-80	7720	10290	12860
		N-80	7800	10400	13000
		C-95	9030	12040	15050
		P-110	10520	14020	17530
16	65.0	H-40	4390		
	75.0	J-55	7100		
		K-55	7520		
	84.0	J-55	8170		
		K-55	8650		
18⅝	87.5	H-40	5590		
		J-55	7540		
		K-55	7940		
20	94.0	H-40	5810		
		J-55	7840		
		K-55	8240		
	106.5	J-55	9130		
		K-55	9600		
	133.0	J-55	11920		
		K-55	12530		

*Data reprinted from API Bulletin RP5C1, "Recommended Practice for Care and Use of Casing, Tubing, and Drill Pipe," Twelfth Edition, March 1981.

LONG THREAD
RECOMMENDED MAKE-UP TORQUE*

O.D. (In.)	Nominal Weight (lb/ft)	Grade	Torque (ft-lb)		
			Minimum	Optimum	Maximum
4½	11.6	J-55	1220	1620	2030
		K-55	1350	1800	2250
		C-75	1610	2150	2690
		L-80	1670	2230	2790
		N-80	1710	2280	2850
		C-95	1940	2580	3230
		P-110	2270	3020	3780
	13.5	C-75	1950	2600	3250
		L-80	2030	2710	3390
		N-80	2070	2760	3450
		C-95	2350	3130	3910
		P-110	2750	3680	4580
	15.1	P-110	3300	4400	5500
5	13.0	J-55	1370	1820	2280
		K-55	1510	2010	2510
	15.0	J-55	1670	2230	2790
		K-55	1850	2460	3080
		C-75	2220	2960	3700
		L-80	2310	3080	3850
		N-80	2360	3140	3930
		C-95	2670	3560	4450
		P-110	3130	4170	5210
	18.0	C-75	2830	3770	4710
		L-80	2950	3950	4910
		N-80	3000	4000	5000
		C-95	3410	4550	5690
		P-110	3980	5310	6640
	21.4	C-75	3500	4660	5830
		L-80	3650	4880	6080
		N-80	3710	4950	6190
		C-95	4220	5620	7030
		P-110	4940	6580	8230
	24.1	C-75	4040	5390	6740
		L-80	4210	5610	7010
		N-80	4290	5720	7150
		C-95	4880	6500	8130
		P-110	5700	7600	9500
5½	15.5	J-55	1630	2170	2710
		K-55	1790	2390	2990
	17.0	J-55	1850	2470	3090
		K-55	2040	2720	3400
		C-75	2450	3270	4090
		L-80	2560	3410	4260
		N-80	2610	3480	4350
		C-95	2970	3960	4950
		P-110	3470	4620	5780

*Data reprinted from API Bulletin RP5C1, "Recommended Practice for Care and Use of Casing, Tubing, and Drill Pipe," Twelfth Edition, March 1981.

CASING MAKE-UP TORQUE GUIDE

LONG THREAD
RECOMMENDED MAKE-UP TORQUE*

O.D. (In.)	Nominal Weight (lb/ft)	Grade	Torque (ft-lb)		
			Minimum	Optimum	Maximum
5½	20.0	C-75	3020	4030	5040
		L-80	3150	4200	5250
		N-80	3210	4280	5350
		C-95	3650	4870	6090
		P-110	4270	5690	7110
	23.0	C-75	3550	4730	5910
		L-80	3700	4930	6160
		N-80	3770	5020	6280
		C-95	4290	5720	7150
		P-110	5010	6680	8350
6⅝	20.0	J-55	2000	2660	3330
		K-55	2180	2900	3630
	24.0	J-55	2550	3400	4250
		K-55	2790	3720	4650
		C-75	3400	4530	5660
		L-80	3550	4730	5910
		N-80	3610	4810	6010
		C-95	4120	5490	6860
		P-110	4810	6410	8010
	28.0	C-75	4140	5520	6900
		L-80	4320	5760	7200
		N-80	4400	5860	7330
		C-95	5020	6690	8360
		P-110	5860	7810	9760
	32.0	C-75	4790	6380	7980
		L-80	5000	6660	8330
		N-80	5080	6770	8460
		C-95	5810	7740	9680
		P-110	6780	9040	11300
7	23.0	J-55	2350	3130	3910
		K-55	2560	3410	4260
		C-75	3120	4160	5200
		L-80	3260	4350	5440
		N-80	3320	4420	5530
		C-95	3790	5050	6310
	26.0	J-55	2750	3670	4590
		K-55	3010	4010	5010
		C-75	3670	4890	6110
		L-80	3830	5110	6390
		N-80	3890	5190	6490
		C-95	4450	5930	7410
		P-110	5200	6930	8660
	29.0	C-75	4220	5620	7030
		L-80	4400	5870	7340
		N-80	4480	5970	7460
		C-95	5120	6830	8540
		P-110	5980	7970	9960

LONG THREAD
RECOMMENDED MAKE-UP TORQUE*

O.D. (In.)	Nominal Weight (lb/ft)	Grade	Torque (ft-lb)		
			Minimum	Optimum	Maximum
7	32.0	C-75	4750	6330	7910
		L-80	4960	6610	8260
		N-80	5040	6720	8400
		C-95	5760	7680	9600
		P-110	6730	8970	11210
	35.0	C-75	5270	7030	8790
		L-80	5510	7340	9180
		N-80	5600	7460	9330
		C-95	6400	8530	10660
		P-110	7470	9960	12450
	38.0	C-75	5750	7670	9590
		L-80	6010	8010	10010
		N-80	6110	8140	10180
		C-95	6980	9310	11640
		P-110	8150	10870	13590
7⅝	26.4	J-55	2600	3460	4330
		K-55	2830	3770	4710
		C-75	3460	4610	5760
		L-80	3620	4820	6030
		N-80	3680	4900	6130
		C-95	4200	5600	7000
	29.7	C-75	4070	5420	6780
		L-80	4250	5670	7090
		N-80	4310	5750	7190
		C-95	4940	6590	8240
		P-110	5770	7690	9610
	33.7	C-75	4760	6350	7940
		L-80	4980	6640	8300
		N-80	5060	6740	8430
		C-95	5790	7720	9650
		P-110	6760	9010	11260
	39.0	C-75	5630	7510	9390
		L-80	5900	7860	9830
		N-80	5980	7980	9980
		C-95	6860	9140	11430
		P-110	8000	10660	13330
	42.8	C-75	6390	8520	10650
		L-80	6680	8910	11140
		N-80	6800	9060	11330
		C-95	7780	10370	12960
		P-110	9080	12100	15130

CASING MAKE-UP TORQUE GUIDE

LONG THREAD
RECOMMENDED MAKE-UP TORQUE*

O.D. (In.)	Nominal Weight (lb/ft)	Grade	Torque (ft-lb)		
			Minimum	Optimum	Maximum
7⅝	47.1	C-75	7150	9530	11910
		L-80	7480	9970	12460
		N-80	7600	10130	12660
		C-95	8690	11590	14490
		P-110	10150	13530	16910
8⅝	32.0	J-55	3130	4170	5210
		K-55	3390	4520	5650
	36.0	J-55	3650	4860	6080
		K-55	3950	5260	6580
		C-75	4860	6480	8100
		L-80	5090	6780	8480
		N-80	5160	6880	8600
		C-95	5920	7890	9860
	40.0	C-75	5570	7420	9280
		L-80	5820	7760	9700
		N-80	5910	7880	9850
		C-95	6780	9040	11300
		P-110	7910	10550	13190
	44.0	C-75	6260	8340	10430
		L-80	6560	8740	10930
		N-80	6650	8870	11090
		C-95	7630	10170	12710
		P-110	8900	11860	14830
	49.0	C-75	7040	9390	11740
		L-80	7370	9830	12290
		N-80	7480	9970	12460
		C-95	8580	11440	14300
		P-110	10010	13350	16690
9⅝	36.0	J-55	3400	4530	5660
		K-55	3670	4890	6110
	40.0	J-55	3900	5200	6500
		K-55	4210	5610	7010
		C-75	5210	6940	8680
		L-80	5450	7270	9090
		N-80	5530	7370	9210
		C-95	6350	8470	10590
	43.5	C-75	5820	7760	9700
		L-80	6100	8130	10160
		N-80	6190	8250	10310
		C-95	7110	9480	11850
		P-110	8300	11060	13830

LONG THREAD
RECOMMENDED MAKE-UP TORQUE*

O.D. (In.)	Nominal Weight (lb/ft)	Grade	Torque (ft-lb)		
			Minimum	Optimum	Maximum
9⅝	47.0	C-75	6390	8520	10650
		L-80	6700	8930	11160
		N-80	6790	9050	11310
		C-95	7800	10400	13000
		P-110	9100	12130	15160
	53.5	C-75	7490	9990	12490
		L-80	7850	10470	13090
		N-80	7970	10620	13280
		C-95	9150	12200	15250
		P-110	10670	14220	17780
20	94.0	J-55	9070		
		K-55	9550		
	106.5	J-55	10570		
		K-55	11130		
	133.0	J-55	13900		
		K-55	14530		

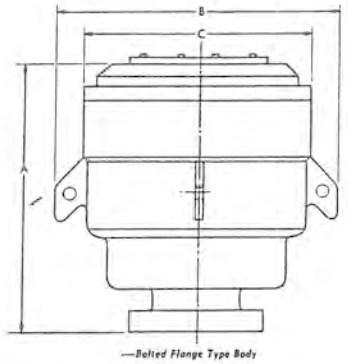
*Data reprinted from API Bulletin RP5C1, "Recommended Practice for Care and Use of Casing, Tubing, and Drill Pipe." See Thirteenth-Edition dated November 1, 1984 for correct torque values attached.

A.P.I. RING JOINT FLANGE DATA Service Pressure Ratings in P.S.I. - Other Dimensions in Inches

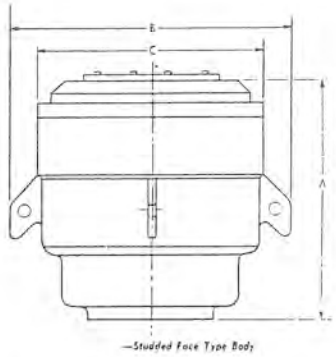
Nom. Size	Pressure Rating (P.S.I.)	Old Series Service	O.D.	Thickness	Dia. Bolt Circle	Bolt Quantity	Bolt Dia.	Bolt Length	Stud Length	Pitch Di.	Ring No.
1 13/16	10,000		7 3/8	1 21/32	5 3/4	8	3/4	5 1/4	3 5/8	3 1/16	BX-151
2 1/16	960	400	6 1/2	1 5/16	5	8	5/8	4 1/2	3 1/8	3 1/4	R-23
2 1/16	2,000	600	6 1/2	1 5/16	5	8	5/8	4 3/4	3 3/4	3 1/4	R-23
2 1/16	3,000	900	8 1/2	1 13/16	6 1/2	8	7/8	6 3/8	4 1/4	3 3/4	R-24
2 1/16	5,000	1500	8 1/2	1 13/16	6 1/2	8	7/8	6 1/4	4 3/8	3 3/4	R-24
2 1/16	10,000		7 7/8	1 47/64	6 1/4	8	3/4	5 1/2	3 5/8		BX-152
2 9/16	960	400	7 1/2	1 7/16	5 7/8	8	3/4	5 1/4	4	4	R-26
2 9/16	2,000	600	7 1/2	1 7/16	5 7/8	8	3/4	5 1/4	4	4	R-26
2 9/16	3,000	900	9 5/8	1 15/16	7 1/2	8	1	7	4 7/8	4 1/4	R-27
2 9/16	5,000	1500	9 5/8	1 15/16	7 1/2	8	1	6 7/8	4 1/4	4 1/4	R-27
2 9/16	10,000		9 1/8	2 1/64	7 1/4	8	7/8	6 1/4	4 1/8		BX-153
3 1/8	960	400	8 1/4	1 9/16	6 5/8	8	3/4	5 1/4	3 1/2	4 7/8	R-31
3 1/8	2,000	600	8 1/4	1 9/16	6 5/8	8	3/4	5 1/2	4 1/4	4 7/8	R-31
3 1/8	3,000	900	9 1/2	1 13/16	7 1/2	8	7/8	6 1/4	4 3/8	4 7/8	R-31
3 1/8	5,000	1500	10 1/2	2 3/16	8	8	1 1/8	7 3/4	5 5/8	5 3/8	R-35
3 1/16	10,000		10 5/8	2 19/64	8 1/2	8	1	7 1/4	4 7/8		BX-154
4 1/16	960	400	10	1 11/16	7 7/8	8	7/8	5 3/4	4	5 7/8	R-37
4 1/16	2,000	600	10 3/4	1 13/16	8 1/2	8	7/8	6 3/8	4 3/4	5 7/8	R-37
4 1/16	3,000	900	11 1/2	2 1/16	9 1/4	8	1 1/8	7 3/8	5 1/4	5 7/8	R-37
4 1/16	5,000	1500	12 1/4	2 7/16	9 1/2	8	1 1/4	8 1/2	5 7/8	6 3/8	R-39
4 1/16	10,000		12 7/16	2 19/64	10 3/16	8	1 1/8	8 1/2	5 5/8		BX-155
5	10,000	2900	14 1/4	4 3/16	11	8	1 5/8	12 3/4	8 1/4	6 1/8	R-90

A.P.I. RING JOINT FLANGE DATA (Continued)

Nom. Size	Pressure Rating (P.S.I.)	Old Series Service	O.D.	Thickness	Dia. Bolt Circle	Bolt Quantity	Bolt Dia.	Bolt Length	Stud Length	Pitch Di.	Ring No.
7 1/16	960	400	12 1/2	1 15/16	10 5/8	12	7/8	6 1/4	4 1/4	8 5/16	R-45
7 1/16	2,000	600	14	2 3/16	11 1/2	12	1	7 3/8	5	8 5/16	R-45
7 1/16	3,000	900	15	2 1/2	12 1/2	12	1 1/8	8 1/2	5 5/8	8 5/16	R-45
7 1/16	5,000	1500	15 1/2	3 5/8	12 1/2	12	1 3/8	11 1/4	7 1/4	8 5/16	R-46
7 1/16	10,000		18 7/8	4 1/16	15 7/8	12	1 1/2	11 3/4	7 1/2		BX-156
9	960	400	15	2 3/16	13	12	1	7	4 3/4	10 5/8	R-49
9	2,000	600	16 1/2	2 1/2	13 3/4	12	1 1/8	8 1/2	5 7/8	10 5/8	R-49
9	3,000	900	18 1/2	2 13/16	15 1/2	12	1 3/8	9 1/2	6 3/4	10 5/8	R-49
9	5,000	1500	19	4 1/16	15 1/2	12	1 5/8	12 1/2	8 1/4	10 5/8	R-50
9	10,000		21 3/4	4 7/8	18 3/4	16	1 1/2	13 1/4	8 1/2		BX-157
11	960	400	17 1/2	2 7/16	15 1/4	16	1 1/8	7 3/4	5	12 3/4	R-53
11	2,000	600	20	2 13/16	17	16	1 1/4	9 1/4	6 1/4	12 3/4	R-53
11	3,000	900	21 1/2	3 1/16	18 1/2	16	1 3/8	10	6 3/4	12 3/4	R-53
11	5,000	1500	23	4 11/16	19	12	1 7/8	14 1/2	9 3/8	12 3/4	R-54
11	10,000		25 3/4	5 9/16	22 1/4	16	1 3/4	15 3/8	9 5/8		BX-158
13 5/8	960	400	20 1/2	2 9/16	17 3/4	16	1 1/4	8 1/2	5 11/16	15	R-57
13 5/8	2,000	600	22	2 15/16	19 1/4	20	1 1/4	9 1/2	6 1/2	15	R-57
13 5/8	3,000	900	24	3 7/16	21	20	1 3/8	10 3/4	7 1/4	15	R-57
13 5/8	5,000	1500	26 1/2	4 7/16	23 1/4	16	1 5/8	12 3/4	8 1/4		BX-160
13 5/8	10,000		30 1/4	6 5/8	26 1/2	20	1 7/8	17 3/4	10 7/8		BX-159
14	5,000	1500	29 1/2	5 7/8	25	16	2 1/4	18	11 3/4	16 1/2	R-63
16 3/4	2,000	600	27	3 5/16	23 3/4	20	1 1/2	10 3/4	7 1/2	18 1/2	R-66
16 3/4	3,000	900	27 3/4	3 15/16	24 1/4	20	1 5/8	12 1/2	8 1/4	18 1/2	R-66
21 1/4	2,000	600	32	3 7/8	28 1/2	24	1 5/8	12 1/2	8 1/4	23	R-73
20 3/4	3,000	900	33 3/4	4 3/4	29 1/2	20	2	15 1/4	10 1/8	23	R-74



—Bolted Flange Type Body

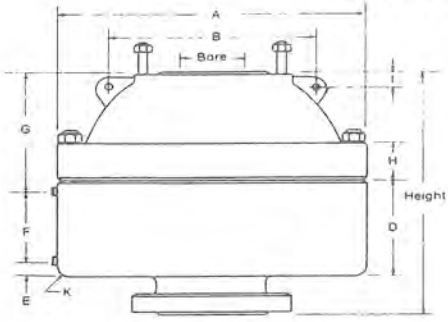


—Studded Face Type Body

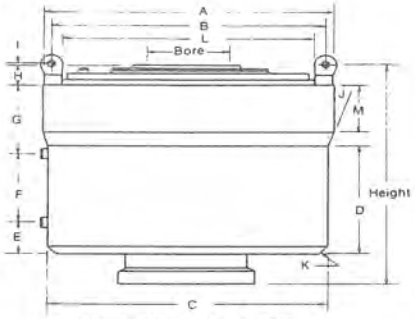
ENGINEERING AND DIMENSIONAL DATA, HYDRIL "GK" BLOWOUT PREVENTERS

Body Size and Series	Open Bore	Pack-Off Range	Maximum Service Pressure Rating PSI	Manufacturer's Hydrostatic Test Pressure PSI	Approx. Weight, Pounds		A Bolted Flange Body	A Studded Face Body	B	C
					Flanged Body Assembly	Studded Body Assembly				
6-900	7 1/16"	7 1/16" to 0	3,000	6,000	2620	2500	32"	27 3/4"	32"	26"
6-1500	7 1/16"	7 1/16" to 0	5,000	10,000	3940	3740	36 7/8"	30 3/4"	35 3/4"	29 1/4"
8-900	8 1/2 1/16"	8 1/2 1/16" to 0	3,000	6,000	3560	3420	37 3/8"	32 3/4"	34 1/2"	28"
8-1500	8 1/2 1/16"	8 1/2 1/16" to 0	5,000	10,000	6000	5740	41 3/4"	34 3/4"	41"	34"
10-900	11"	11" to 0	3,000	6,000	5300	5140	39 3/4"	34 1/4"	40"	33 3/4"
10-1500	11"	11" to 0	5,000	10,000	8250	7800	47 3/4"	39 5/8"	44 1/4"	37 1/2"
12-900	13 5/8"	13 5/8" to 0	3,000	6,000	8580	8350	45 1/4"	39 3/8"	47 1/2"	40 1/2"
16-600	16 3/4"	16 3/4" to 0	2,000	4,000	11,500	11,220	49 1/2"	43 3/4"	53 1/4"	46 1/4"
18-600	17 3/8"	17 3/8" to 0	2,000	4,000	14,000	....	53 1/2"	.....	55 1/2"	48 1/2"

SPECIFICATIONS



BOLTED COVER



WEDGE COVER

DIMENSIONAL AND ENGINEERING DATA ON SHAFFER SPHERICAL BLOWOUT PREVENTERS

Nominal Size: in.	6	6	7 1/16	8	8	10	10	11	12	13 5/8	13 5/8	16 3/4	18 3/4	20	21 1/4
Working Pressure: psi	3,000	5,000	10,000	3,000	5,000	3,000	5,000	10,000	3,000	5,000	10,000	5,000	5,000	2,000	5,000
Test Pressure: psi	6,000	10,000	15,000	6,000	10,000	6,000	10,000	15,000	6,000	10,000	15,000	10,000	10,000	3,000	10,000
Bore: in.	7 1/16	7 1/16	7 1/16	9	9	11	11	11	13 5/8	13 5/8	13 5/8	16 3/4	18 3/4	21 1/4	21 1/4
Hydraulic Fluid: Close—Gal:	4.57	4.57		7.23	11.05	11.00	18.67		23.50	23.58	47.19	33.26	48.16	32.59	61.37
Open—Gal:	3.21	3.21		5.03	8.72	6.78	14.59		14.67	17.41	37.55	25.61	37.61	16.92	47.76
Recommended Operating Pressure	1,500	1,500		1,500	1,500	1,500	1,500		1,500	1,500	1,500	1,500	1,500	1,500	1,500
Lifting Shackle	(2)	(2)		(2)	(2)	(2)	(2)		(2)	(2)	(4)	(2)	(4)	(2)	(4)
Capacity: lb. (Qty)	19,000	26,000		34,000	48,000	34,000	68,000		68,000	100,000	280,000	280,000	280,000	100,000	280,000
Flanged Bottom—Height: in.	29 1/8	30 7/8		32 1/2	36 1/2	32 7/8	41 1/2		40 11/16	44 15/16	67 1/4	51 15/16	60	46 1/8	66
Weight: lb.	2,950	3,300		4,800	6,800	6,200	9,400		9,425	13,700	36,400	22,900	36,100	10,900	44,500
Studded Bottom—Height: in.	24 7/8	25		27	29 1/2	27 1/16	33 13/16		34 3/4	37 5/8	--	43 5/8	--	39 1/4	56
Weight: lb.	2,850	3,150		4,500	6,500	5,900	9,000		9,125	13,100	--	22,000	--	10,300	42,500

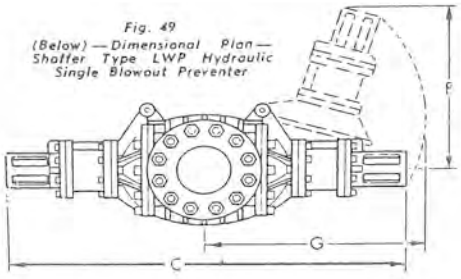


Fig. 49
(Below) — Dimensional Plan — Shaffer Type LWP Hydraulic Single Blowout Preventer

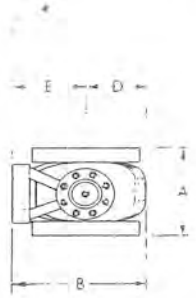


Fig. 50
(Right) — Dimensional End Elevation — Shaffer Type LWP Hydraulic Single Blowout Preventer

DIMENSIONAL AND ENGINEERING DATA ON SHAFFER TYPE LWP HYDRAULIC BLOWOUT PREVENTERS
Refer to Dimensional Drawings — Fig. 49 and Fig. 50

Size	Max. Service Press. Rating PSI	Test Press. PSI	Vertical Bore	Max. Ram Size	Approx. Weight Lbs. Studded Flanges		A Height				B	C	D	E	F	G	Closing Ratio	Opening Ratio	U.S. Gals. Fluid To Close Rams	U.S. Gals. Fluid To Open Rams
							Single		Double											
					Single	Double	Studded Flange	Bolted Flange	Studded Flange	Bolted Flange	Width	Length	Center To Front	Center To Rear	Door Open To Change Rams	Door Open To Change Rams				
6"	3,000	6,000	7 1/16"	5 9/16"	906	1625	14 7/16"	19 1/8"	21 7/8"	30 1/2"	18 7/16"	52 3/8"	8 9/16"	10 1/8"	22"	33 1/2"	4 to 1	2.5 to 1	.55	.51
8"	3,000	6,000	9"	7"	1245	1950	10 11/16"	20 11/16"	23 7/8"	33 3/4"	22 1/16"	60 1/16"	9 3/4"	12 9/16"	31 9/16"	34 1/8"	4 to 1	1.81 to 1	.77	.68

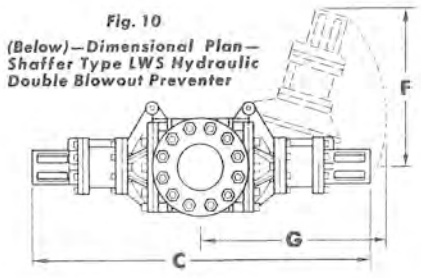


Fig. 10
(Below)—Dimensional Plan—Shaffer Type LWS Hydraulic Double Blowout Preventer

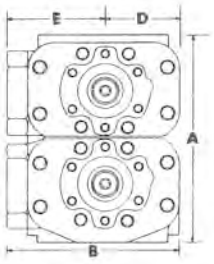
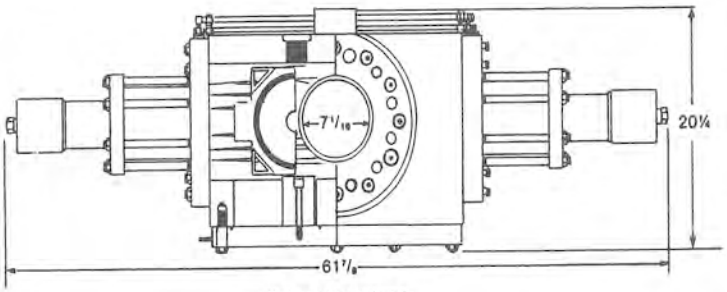


Fig. 11
(Right)—Dimensional End Elevation—Shaffer Type LWS Hydraulic Double Blowout Preventer

DIMENSIONAL AND ENGINEERING DATA ON SHAFFER TYPE LWS HYDRAULIC DOUBLE BLOWOUT PREVENTERS

Size	Max. Service Pressure Rating, psi	Test Pressure, psi	Vertical Bore	Approx. Weight, Lbs.	Max. Ram Size	A HEIGHT Studded Flange	A HEIGHT Bolted Flange	B Width	C Length	D Center To Front	E Center To Rear	F Door Open To Change Rams	G Door Open To Change Rams	Closing Ratio	Opening Ratio	U.S. Gals. Fluid To Close Rams	U.S. Gals. Fluid To Open Rams
6"	3000	6000	7 1/16"	2400	5 9/16"	26 1/4"	36 5/8"	21 1/2"	58"	9 3/16"	12 1/8"	21"	34"	4.44 to 1	1.2 to 1	1.01	.85
6"	5000	10000	7 1/16"	2800	5 9/16"	26 3/4"	39 1/2"	21 1/2"	58"	9 3/16"	12 1/8"	21"	34"	4.44 to 1	1.2 to 1	1.01	.85
8"	3000	6000	9"	3900	7"	29 1/2"	41 3/8"	25 3/4"	79 1/8"	11 1/8"	14 3/4"	23"	46"	5.56 to 1	1.89 to 1	2.75	2.3
8"	5000	10000	9"	3900	7"	29 1/2"	45 1/8"	25 3/4"	79 1/8"	11 1/8"	14 5/8"	23"	46"	5.56 to 1	1.89 to 1	2.75	2.3
10"	3000	6000	11"	4400	8 5/8"	29 5/8"	41 1/2"	26 1/4"	72 5/8"	11 5/16"	14 11/16"	21"	42"	4.44 to 1	1.78 to 1	1.56	1.3
10"	5000	10000	11"	7000	8 5/8"	33"	50 1/2"	28 1/4"	89 1/4"	12 1/2"	16"	32"	46"	5.5 to 1	1.5 to 1	3.25	2.7
12"	3000	6000	13 5/8"	6300	10 3/4"	34 1/2"	47 3/4"	31 7/8"	92 1/4"	13 3/16"	18 1/4"	27"	53"	5.56 to 1	1.89 to 1	3.55	2.9
13 5/8"	5000	10000	13 5/8"	9700	10 3/4"	36"	49 1/8"	33 5/8"	92 1/4"	14 1/4"	18 1/8"	41"	54"	5.5 to 1	1.5 to 1	3.55	2.9
16"	3000	6000	16 3/4"	8500	13 3/4"	35"	51"	33"	105 1/2"	16 1/2"	20 1/4"	32"	60"	5.6 to 1	1.89 to 1	3.6	3.2

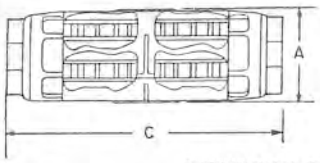
Shaffer SENTINEL™ Ram Blowout Preventer Specifications



Hydraulic Sentinel BOP

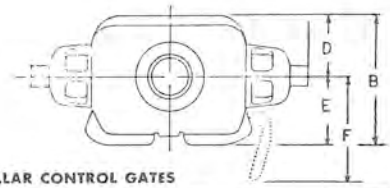
SENTINEL BOP SPECIFICATIONS

		Hydraulic	Manual
Approximate Weight	Single (lbs.)	1.152	1,272
	Double (lbs.)	2,095	2,335
Overall Height, Less Studs	Single (in.)	10	10
	Double (in.)	18½	18½
Overall Length (in.)		61 7/8	51¾
Overall Width, Less Handwheel (in.)		20¼	20¼
Opening Through Preventer (in.)		7 1/16	7 1/16
Working Pressure (psi)		3,000	3,000
Test Pressure (psi)		6,000	6,000
Handwheel Diameter (in.)		20	20
Ring Joint Gasket API Number		R-45	R-45



(Left)—Dimensional Elevation—Shaffer Hydraulic Cellar Control Gate

(Right)—Dimensional Plan—Shaffer Hydraulic Cellar Control Gate



DIMENSIONAL AND ENGINEERING DATA ON SHAFFER HYDRAULIC CELLAR CONTROL GATES

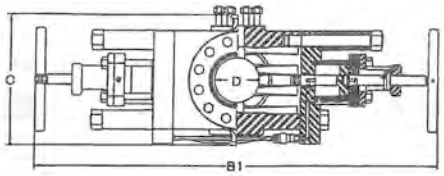
Nominal Gate Size	A.P.I. Series	Vertical Bore	Working Pressure p.s.i.	Test Pressure p.s.i.	Approx. Weight, Lbs.	Ram Size	A Height	B Width	C Length	D Center to Rear	E Center to Front	F Doors Open to Change Rams	Closing Ratio	Opening Ratio	U.S. Gals. Fluid to Close Rams	U.S. Gals. Fluid to Open Rams
7"	6"— 900	7 1/16"	3,000	6,000	5,750	C.S.O. Thru 5" O.D.	25"	28 5/8"	70 3/4"	13 1/2"	15 1/8"	27"	6 to 1	1.67 to 1	2.45	2.1
7"	6"—1500	7 1/16"	5,000	10,000	7,050	C.S.O. Thru 5" O.D.	26 1/2"	31 1/2"	70 3/4"	14 1/4"	17 1/4"	28"	6 to 1	1.55 to 1	2.45	2.1
9"	8"— 900	9"	3,000	6,000	6,200	C.S.O. Thru 7" O.D.	25 1/4"	31 5/8"	71"	15 1/4"	16 3/8"	27 3/4"	6 to 1	1.44 to 1	2.75	2.3
9"	8"—1500	9"	5,000	10,000	7,500	C.S.O. Thru 7" O.D.	27 1/2"	35 1/4"	72"	16 1/2"	18 1/2"	29 1/8"	6 to 1	1.34 to 1	2.75	2.3
10 3/4"	10"— 900 12"— 900	11"	3,000	6,000	7,900	C.S.O. Thru 8 5/8" O.D.	27 1/2"	34 1/4"	79"	16 1/2"	17 3/4"	32 1/8"	6 to 1	1.24 to 1	3.25	2.7
10 3/4"	10"—1500	11"	5,000	10,000	10,500	C.S.O. Thru 8 5/8" O.D.	30 1/2"	37 3/8"	81 1/4"	17 3/8"	20"	33 3/8"	6 to 1	1.15 to 1	3.25	2.7
13 3/8"	12"— 900	13 5/8"	3,000	6,000	12,350	C.S.O. Thru 10 3/4" O.D.	30"	40"	88 1/2"	18 1/2"	21 1/2"	38"	6 to 1	1.05 to 1	3.55	2.9
13 5/8"	12"—1500	13 5/8"	5,000	10,000	15,200	C.S.O. Thru 10 3/4" O.D.	36 1/4"	40 1/2"	88 1/2"	18 3/8"	21 3/4"	38"	6 to 1	0.85 to 1	3.55	2.9

Instructions For Ordering: When ordering Shaffer Hydraulic Cellar Control Gates specify size and A.P.I. rating. In ordering parts, give the serial number of the gate and be sure to specify that the parts are for a "Hydraulic" Gate.

If flanges are ordered state size, weight and thread (number and form) of casing and the A.P.I. flange specifications.

Rams can be furnished for any size Hydraulic Gate to pack off around practically any size drill pipe, casing or tubing that will pass through the bore of the gate. Give outside diameter of pipe for which rams are to be used.

When ordering parts for export and wildcat drilling in remote districts we recommend that an ample supply of extra sets of ram rubbers be ordered. Also, it is advisable to have extra sets of ram blocks with rubbers for the different strings of drill pipe, casing and tubing that will be run. The ram blocks and ram rubbers are the same and are interchangeable for both the hydraulic and mechanical Shaffer Control Gates but the ram block holders are different and cannot be used in both gates. Aside from ram blocks and rubbers, no additional parts will be necessary for a period of one to three years under normal operating conditions.



Top View

Shaffer Chasovoy 7 1/16 5000 Blowout Preventer Specifications

Table 5-8
Dimensions and Weights

		Flange X Flange	Stud X Stud	Stud X Flange
Approximate Weight	Single, lb (kg)	1,600 (726)	1,400 (635)	1,500 (680)
	Double, lb (kg)	2,800 (1270)	2,600 (1,180)	2,700 (1,225)
A) Overall Height, less studs	Single, in. (mm)	24.63 (625.6)	11.25 (285.5)	18.00 (457.2)
	Double, in. (mm)	33.88 (860.6)	20.50 (520.7)	27.25 (692.2)
B1) Overall Length, in. (mm), Bonnets Closed, Locked		64.50 (1638.3)	64.50 (1638.3)	64.50 (1638.3)
B2) Overall Length, in. (mm), Ram Change, Both Bonnets Open		80.75 (2051.0)	80.75 (2051.0)	80.75 (2051.0)
C) Overall Width, in. (mm)		20.62 (523.7)	20.62 (523.7)	20.62 (523.7)
D) Opening through Preventer, in. (mm)		7.062 (179.4)	7.062 (179.4)	7.062 (179.4)
Working Pressure*, psi (bar)		5,000 (345)	5,000 (345)	5,000 (345)
Test Pressure, psi (bar)		10,000 (690)	10,000 (690)	10,000 (690)
Maximum Torque to Close and Seal the Rams, ft-lb (N-m)		735 (996)	735 (996)	735 (996)

** Working pressure may be 3,000 psi (207 bar) depending on end connection.*

Table 5-9
Chasovoy BOP Hydraulic Cylinder

	To Close	To Open
Maximum Operating Pressure, psi (bar)	3,000 (207)	3,000 (207)
Ratio	6.47:1	6.47:1
Volume of Fluid, US gal (liters)	.6 (2.27)	.6 (2.27)
Piston Stroke, in. (mm)	4.062 (103.2)	4.062 (103.2)

ELEVATORS

RATED CAPACITY ON ELEVATORS AND SPIDERS

BJ Type LYT Elevators	20 Tons
BJ Type MYT Elevators	40 Tons
BJ Type YT Tubing Elevators	75 Tons
BJ Type YC Casing Elevators	75 Tons
BJ Slip Grip Casing Elevators 7-5/8"	150 Tons
BJ Slip Casing Elevators 10-3/4"	200 Tons
BJ Slip Grip Casing Elevators 13-3/8"	200 Tons
10-3/4" BJ Slip Grip Casing Elevators and/or Spider	500 Tons
13-3/8" BJ Casing Spider	400 Tons
13-3/8" BJ Slip Grip Casing Elevator and/or Spider	350 Tons

"A" SERIES ELEVATORS—Rated Capacities in Tons

Size (O.D.)	"AA"	"MAA"	"RA"
2-3/8"	–	175	125
2-7/8"	–	175	125
3-1/2"	250	175	125
4",4-1/2" (Reg. & FH)	275	225	150
5",5-1/2",4-1/2" (IF)	300	250	175
6-5/8"	300	250	175
7"	300	250	175

Size (O.D.)	"SLA-100"	"SLA-65"	"SLA-35"
1.050"			35
1.315"			35
1.660"		65	35
1.990"		65	35
2-3/8"	100	65	35
2-7/8"	100	65	35
3-1/2"	100	65	
4"	100	65	
4-1/2"	100	65	
5-1/2"	100		
6-5/8	100		
7"	100		
7-5/8"	100		
8-5/8"	100		

"G" SERIES ELEVATORS—Rated Capacities in Tons

Size (O.D.)	GG	MGG	RG	MG	LG
2-3/8"		175	150	100	40
2-7/8"		175	150	100	40
3-1/2"		175	150	100	
3-1/2" (FH & IF)		200			
4"		225	175	100	
4-1/2" (Reg. & FH)		225	175	100	
5",4-1/2" (IF)	350+500		200	100	
5-1/2"	350+500		200		

BJ TYPE "X" SIDE DOOR ELEVATORS
Rated Capacities in Tons

Size (O.D.)	Light Weight	Extra Heavy (XH)	Double Extra Heavy (XXH)	Triple Extra Heavy (XXXH)	"SX" Series
1.660" – 1.900"		35			
2-3/8" – 2-7/8"		35	60		
3-1/2"		35	75		
4",4-1/2" (Reg. & FH)	30	50	90		
5",5-1/2",4-1/2" (IF)	35	60	100		
6-5/8" – 7"	50	75	125		
7-5/8" – 8-5/8"	60	90	125	150	
9-5/8"	60	90	125	150	
10-3/4"	60	90	125	150	650
11-3/4"	60	90	125	150	
13-3/8"	60	75	125	150	500*
16"	60	90		150	500
18-5/8"	60	90		200	
20"	60	90		200	250
21-1/2"		100			
24-1/2"		100			

English/Metric Conversion Factors

Dimensions

Inches (in) to millimetres (mm) multiply inches by 25.40.
Millimetres (mm) to inches (in) multiply (mm) by 0.03937.

Criticle Section Area

Square inches (sq in) to square centimetres (cm^2) multiply sq in by 6.452.
Square centimetres (cm^2) to square inches (sq in) multiply cm^2 by 0.1550.

Nominal Weight

Pounds per foot (lbs/ft) to kilograms per metre (kg/m) multiply (lbs/ft) by 1.488.
Kilograms per metre (kgm) to pounds per foot (lbs/ft) multiply (kg/m) by 0.671.

Weight/Tension Load

Pounds (lbs) to kilograms (kg) multiply (lbs) by 0.4536.
Kilograms (kg) to pounds (lbs) multiply (kg) by 2.2046.

Weight/Pull/Rating

Pounds (lbs) to decanewton (dan) multiply (lbs) by 0.444822.

Makeup Torque

Foot-pounds (ft-lbs) to kilogram-metres (kgm) multiply (ft-lbs) by 0.138.
Kilogram-metre (kgm) to foot-pounds (ft-lbs) multiply (kgm) by 7.23.
Foot-pounds to Newton metre (Nm) multiply (ft-lbs) by 1.355818.

Pressure Ratings

Pounds per square inch (lbs/sq in) to kilograms per square centimetre (kg/cm^2) multiply (lbs/sq in) by 0.0703.
Kilograms per square centimetre (kg/cm^2) to pounds per square inch (lbs/sq in) multiply (kg/cm^2) by 14.22.

1 Inch = 254 cm	1 Ounce Fl = 28.4 Ml	1 Ounce Wt = 28.3 Gr
1 Inch = 25.4 mm	1 Pint Fl = 0.0057 L	1 Pound Wt = 0.45 KG
1 Foot = 0.03 m	1 Mile = 1.6 Km	1 Gallon Fl = 4.50 L

METRIC CONVERSION

	Old	New	Symbol	To Get New Unit Multiply By:
Depth	feet	metre	m	feet x 0.3048
Volume	gallon (U.S.)	litre	L	gallon x 3.7854
Volume	gallon (Imp.)	litre	L	gallon x 4.546
Volume	barrel	cubic metre	m^3	barrel x 0.159
Volume	foot cube	litre	L	ft^3 x 28.3
Barrels per foot	bbl/ft.	cubic metre per metre	m^3/m	b/f x 0.5216
Pressure	psi	kilopascal	kPa	psi x 6.8946
Mass (wt.)	pounds	kilogram	kg	pound x 0.4535
Pound force	pound force	newton	N	lbs./force x 4.448
Pound force	pound force	decanewton	daN	lbs./force x 0.4448
Pound foot	pound foot	kilogram metre	kg•m	lbs. ft. x 1.488
Foot pound	ft.-lbs.	newton metre	N•m	ft. lbs. x. 1.355
Ton mile	ton-mile	megajoule	MJ	ton-mile x 14.31
Power	horsepower	watts	W	horsepower x 745.7
Distance	mile	kilometre	km	mile x 1.609
Distance (length)	yard	metre	m	yard x 0.914
Length	inch	centimetre	cm	inch x 2.54
Length	inch	millimetre	mm	inch x 25.4

DECIMAL EQUIVALENTS OF FRACTIONS OF ONE INCH

			1/64	.015625				33/64	.515625
		1/32		.03125			17/32		.53125
			3/64	.046875				35/64	.546875
	1/16			.0625		9/16			.5625
			5/64	.078125				37/64	.578125
		3/32		.09375			19/32		.59375
			7/64	.109375				39/64	.609375
1/8				.125	5/8				.625
			9/64	.140625				41/64	.640625
		5/32		.15625			21/32		.65625
			11/64	.171875				43/64	.671875
	3/16			.1875		11/16			.6875
			13/64	.203125				45/64	.703125
		7/32		.21875			23/32		.71875
			15/64	.234375				47/64	.734375
1/4				.25	3/4				.75
			17/64	.265625				49/64	.765625
		9/32		.28125			25/32		.78125
			19/64	.296875				51/64	.796875
	5/16			.3125		13/16			.8125
			21/64	.328125				53/64	.828125
		11/32		.34375			27/32		.84375
			23/64	.359375				55/64	.859375
3/8				.375	7/8				.875
			25/64	.390625				57/64	.890625
		13/32		.40625			29/32		.90625
			27/64	.421875				59/64	.921875
	7/16			.4375		15/16			.9375
			29/64	.453125				61/64	.953125
		15/32		.46875			31/32		.96875
			31/64	.484375				63/64	.984375
1/2				.5	1				1.