BOP Manufacturer Shear Information.

Data edited to include: only drillpipe; only pipe dimensions as found in API 5L or provided by Grant Prideco; only sealing shear rams with double V blades; and only material data meeting API requirements. Blank cells mean no data was provided by the manufacturer. Sorted by Material Grade and cross-sectional area.

	PIPE DESCRIPTION					BOP and RAM DESCRIPTION					PIPE MATERIAL PROPERTIES										
#	DIA. (IN.)	WALL (IN.)	PPF	MATERIAL GRADE	BOP MANUFACTURER	BOP BORE	WORKING PRESSURE	BOP TYPE	BOP CLOSE AREA	SHEAR RAM TYPE	YIELD STRENGTH (PSI)	ULTIMATE TENSILE STRENGTH (PSI)	CHARPY, CVN	ELONGATION %	HARDNESS RC	ACTUAL SHEAR PRESSURE (PSI)	ACTUAL SHEAR FORCE (KIPS)	SHEAR FORCE CALCULATED USING YIELD (KIPS)	SHEAR FORCE CALCULATED USING ULTIMATE (KIPS)	SOURCE OF INFORMATION	COMMENTS
1	5.00	0.500	25.6	E?	HYDRIL	18.75	10000	14 1/4	159.48	Blind	83100	112800		26.0		1455	232.05	338.93	460.06	1983	
2	5.00	0.500	25.6	E?	HYDRIL	18.75	10000	14 1/4	159.48	Blind	83100	112800		26.0		1530	244.01	338.93	460.06	1983	
3	5.00	0.500	25.6	E?	HYDRIL	18.75	10000	14 1/4	159.48	Blind	83100	112800		26.0		1620	258.37	338.93	460.06	1983	
4	5.00	0.500	25.6	E?	HYDRIL	18.75	10000	14 1/4	159.48	Blind	83100	112800		26.0		1530	244.01	338.93	460.06	1983	
5	3.50	0.368	13.3	E-75	HYDRIL	18.75	10000	14 1/4	159.48	Blind	87700	106600		22.0		1425	227.27	183.23	222.72	1983	
6	3.50	0.368	13.3	E-75	HYDRIL	18.75	10000	14 1/4	159.48	Blind	87700	106600		22.0		1310	208.93	183.23	222.72	1983	
7	3.50	0.368	13.3	E-75	HYDRIL	18.75	10000	14 1/4	159.48	Blind	87700	106600		22.0		1820	290.26	183.23	222.72	1983	
8	3.50	0.368	13.3	E-75	HYDRIL	18.75	10000	14 1/4	159.48	Blind	87700	106600		22.0		1775	283.09	183.23	222.72	1983	
9	3.50	0.368	13.3	E-75	HYDRIL	18.75	10000	14 1/4	159.48	Blind	87700	106600		22.0		1470	234.44	183.23	222.72	1983	
10	3.50	0.449	15.5	E-75	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	89800	117900		23.0		1750	269.33	222.99	292.77	ER 522, RD23	
11	3.50	0.449	15.5	E-75	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	89800	117900		23.0		1850	284.72	222.99	292.77	ER 522, RD23	
12	5.00	0.362	19.5	E-75	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	80200	110200		28.0		1750	269.33	244.08	335.39	ER 522, RD17	
13	5.00	0.362	19.5	E-75	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	80200	110200		28.0		2100	323.19	244.08	335.39	ER 522, RD17	
14	5.00	0.362	19.5	E-75	HYDRIL	13.625	10000	14 1/4	159.48	Blind	83100	111800		22.3		1212	193.30	252.91	340.26	1987	
15	5.00	0.362	19.5	E-75	HYDRIL	13.625	5000	14 1/4	159.48	Blind	91800	108900		26.0		2398	382.44	279.39	331.43	1989	
16	5.00	0.362	19.5	E-75	HYDRIL	13.625	5000	14 1/4	159.48	Blind	91800	108900		26.0		2490	397.12	279.39	331.43	1989	
17	5.00	0.362	19.5	E-75	HYDRIL	13.625	5000	14 1/4	159.48	Blind	91800	108900		26.0		2467	393.45	279.39	331.43	1989	
18	5.00	0.362	19.5	E-75	HYDRIL	21.25	5000	14 1/4	159.48	Blind	91800	108900		26.0		2203	351.35	279.39	331.43	1990	
19	5.00	0.362	19.5	E-75	HYDRIL	21.25	5000	14 1/4	159.48	Blind	91800	108900		26.0		2146	342.25	279.39	331.43	1990	
20	5.00	0.362	19.5	E-75	HYDRIL	21.25	5000	14 1/4	159.48	Blind	91800	108900		26.0		2173	346.56	279.39	331.43	1990	
21	5.00	0.362	19.5	E-75	HYDRIL	21.25	5000	14 1/4	159.48	Blind	91800	108900		26.0		2203	351.35	279.39	331.43	1990	
22	5.00	0.362	19.5	E-75	HYDRIL	21.25	5000	14 1/4	159.48	Blind	91800	108900		26.0		2146	342.25	279.39	331.43	1990	
23	5.00	0.362	19.5	E-75	HYDRIL	21.25	5000	14 1/4	159.48	Blind	91800	108900		26.0		2173	346.56	279.39	331.43	1990	
24	5.00	0.362	19.5	E-75	HYDRIL	13.625	15000	14 1/4	159.48	Blind	91800	108900		26.0		2315	369.21	279.39	331.43	1990	
25	5.00	0.362	19.5	E-75	HYDRIL	13.625	15000	14 1/4	159.48	Blind	91800	108900		26.0		2311	368.57	279.39	331.43	1990	
26	5.00	0.362	19.5	E-75	HYDRIL	13.625	15000	14 1/4	159.48	Blind	91800	108900		26.0		2229	355.49	279.39	331.43	1990	
27	5.00	0.362	19.5	E-75	HYDRIL	18.75	5000	20	314.16	Blind	95700	109600		26.0		1412	443.59	291.26	333.56	1992	
28	5.00	0.362	19.5	E-75	HYDRIL	18.75	5000	20	314.16	Blind	95700	109600		26.0		1469	461.50	291.26	333.56	1992	
29	5.00	0.362	19.5	E-75	HYDRIL	18.75	5000	20	314.16	Blind	95700	109600		26.0		1459	458.36	291.26	333.56	1992	
30	5.00	0.500	25.6	E-75	HYDRIL	18.75	10000	14 1/4	159.48	Blind	94600	109500		30.0		2220	354.06	385.83	446.60	1983	
31	5.00	0.500	25.6	E-75	HYDRIL	18.75	10000	14 1/4	159.48	Blind	94600	109500		30.0		2340	373.19	385.83	446.60	1983	
32	5.00	0.500	25.6	E-75	HYDRIL	18.75	10000	14 1/4	159.48	Blind	94600	109500		30.0		2610	416.26	385.83	446.60	1983	
33	5.00	0.500	25.6	E-75	HYDRIL	18.75	10000	14 1/4	159.48	Blind	94600	109500		30.0		2730	435.39	385.83	446.60	1983	
34	5.00	0.362	19.5	G-105	Cameron	18-3/4"	5K	TL	214	DVS	113000	132500	75	21.2	25.0	1660	355.24	343.91	403.26	ER 2209	
35	5.00	0.362	19.5	G-105	Cameron	18-3/4"	5K	TL	214	DVS	113000	132500	75	21.2	25.0	1775	379.85	343.91	403.26	ER 2209	
36	5.00	0.362	19.5	G-105	Cameron	18-3/4"	5K	TL	214	DVS	113000	132500	75	21.2	25.0	1775	379.85	343.91	403.26	ER 2209	
37	5.00	0.362	19.5	G-105	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear						2600	400.14			ER 522, RD15-1	
38	5.00	0.362	19.5	G-105	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear						2575	396.29			ER 522, RD15-3	
39	5.00	0.362	19.5	G-105	HYDRIL	13.625	10000	14 1/4	159.48	Blind	113700	125500		23.5		2213	352.94	346.04	381.95	1987	
40	5.00	0.362	19.5	G-105	HYDRIL	13.625	5000	14 1/4	159.48	Blind	123100	137200		19.5		2337	372.72	374.65	417.56	1989	
41	5.00	0.362	19.5	G-105	HYDRIL	13.625	5000	14 1/4	159.48	Blind	123100	137200		19.5		2162	344.81	374.65	417.56	1989	
42	5.00	0.362	19.5	G-105	HYDRIL	13.625	5000	14 1/4	159.48	Blind	123100	137200		19.5		2276	362.99	374.65	417.56	1989	
43	5.00	0.362	19.5	G-105	HYDRIL	21.25	5000	14 1/4	159.48	Blind	123100	137200		19.5		1935	308.60	374.65	417.56	1990	
44	5.00	0.362	19.5	G-105	HYDRIL	21.25	5000	14 1/4	159.48	Blind	123100	137200		19.5		1948	310.68	374.65	417.56	1990	
45	5.00	0.362	19.5	G-105	HYDRIL	21.25	5000	14 1/4	159.48	Blind	123100	137200		19.5		1927	307.33	374.65	417.56	1990	
46	5.00	0.362	19.5	G-105	HYDRIL	21.25	5000	14 1/4	159.48	Blind	123100	137200		19.5		1935	308.60	374.65	417.56	1990	
47	5.00	0.362	19.5	G-105	HYDRIL	21.25	5000	14 1/4	159.48	Blind	123100	137200		19.5		1948	310.68	374.65	417.56	1990	
48	5.00	0.362	19.5	G-105	HYDRIL	21.25	5000	14 1/4	159.48	Blind	123100	137200		19.5		1927	307.33	374.65	417.56	1990	
49	5.00	0.362	19.5	G-105	HYDRIL	13.625	15000	14 1/4	159.48	Blind	123100	137200		19.5		1953	311.47	374.65	417.56	1990	
50	5.00	0.362	19.5	G-105	HYDRIL	13.625	15000	14 1/4	159.48	Blind	123100	137200		19.5		2443	389.62	374.65	417.56	1990	
51	5.00	0.362	19.5	G-105	HYDRIL	13.625	15000	14 1/4	159.48	Blind	123100	137200		19.5		2164	345.13	374.65	417.56	1990	
52	5.00	0.362	19.5	G-105	HYDRIL	18.75	5000	20	314.16	Blind	129400	141800		23.0		1450	455.53	393.82	431.56	1992	

BOP Manufacturer Shear Information.

Data edited to include: only drillpipe; only pipe dimensions as found in API 5L or provided by Grant Prideco; only sealing shear rams with double V blades; and only material data meeting API requirements. Blank cells mean no data was provided by the manufacturer. Sorted by Material Grade and cross-sectional area.

	PIPE DESCRIPTION					BOP and RAM DESCRIPTION					PIPE MATERIAL PROPERTIES									
#	DIA. (IN.)	WALL (IN.)	PPF	MATERIAL GRADE	BOP MANUFACTURER	BOP BORE	WORKING PRESSURE	BOP TYPE	BOP CLOSE AREA	SHEAR RAM TYPE	YIELD STRENGTH (PSI)	ULTIMATE TENSILE STRENGTH (PSI)	CHARPY, CVN	ELONGATION %	HARDNESS RC	ACTUAL SHEAR PRESSURE (PSI)	ACTUAL SHEAR FORCE (KIPS)	SHEAR FORCE CALCULATED USING YIELD (KIPS)	SHEAR FORCE CALCULATED USING ULTIMATE (KIPS)	SOURCE OF INFORMATION	COMMENTS
53	5.00	0.362	19.5	G-105	HYDRIL	18.75	5000	20	314.16	Blind	129400	141800		23.0		1456	457.42	393.82	431.56	1992	
54	5.00	0.362	19.5	G-105	HYDRIL	18.75	5000	20	314.16	Blind	129400	141800		23.0		1327	416.89	393.82	431.56	1992	
55	5.00	0.362	19.5	G-105	HYDRIL	13.625	15000	19	283.53	Blind	128800	137900		21.3		2017	571.88	392.00	419.69	2003	
56	5.00	0.500	25.6	G-105	HYDRIL	18.75	10000	14 1/4	159.48	Blind	120700	135400		24.0		1830	291.86	492.28	552.24	1983	
57	5.00	0.500	25.6	G-105	HYDRIL	18.75	10000	14 1/4	159.48	Blind	120700	135400		24.0		1910	304.62	492.28	552.24	1983	
58	5.00	0.500	25.6	G-105	HYDRIL	18.75	10000	14 1/4	159.48	Blind	120700	135400		24.0		1770	282.29	492.28	552.24	1983	
59	5.00	0.500	25.6	G-105	HYDRIL	18.75	10000	14 1/4	159.48	Blind	120700	135400		24.0		1940	309.40	492.28	552.24	1983	
60	5.00	0.500	25.6	G-105	HYDRIL	18.75	15000	15 1/2	188.69	Blind	116400	144600		22.4		2135	402.86	474.75	589.76	1993	
61	5.00	0.500	25.6	G-105	HYDRIL	18.75	15000	15 1/2	188.69	Blind	116400	144600		22.4		2408	454.37	474.75	589.76	1993	
62	5.00	0.500	25.6	G-105	HYDRIL	18.75	15000	15 1/2	188.69	Blind	116400	144600		22.4		2335	440.60	474.75	589.76	1993	
63	5.00	0.500	25.6	G-105	HYDRIL	18.75	15000	15 1/2	188.69	Blind	116400	144600		22.4		2362	445.69	474.75	589.76	1993	
64	5.00	0.500	25.6	G-105	HYDRIL	18.75	15000	15 1/2	188.69	Blind	116400	144600		22.4		2355	444.37	474.75	589.76	1993	
65	5.00	0.500	25.6	G-105	HYDRIL	18.75	15000	15 1/2	188.69	Blind	116400	144600		22.4		2315	436.82	474.75	589.76	1993	
66	5.00	0.500	25.6	G-105	HYDRIL	18.75	15000	15 1/2	188.69	Blind	116400	144600		22.4		2339	441.35	474.75	589.76	1993	
67	5.00	0.500	25.6	G-105	HYDRIL	18.75	15000	15 1/2	188.69	Blind	113900	142600		21.4		2325	438.71	464.55	581.61	1993	
68	5.00	0.500	25.6	G-105	HYDRIL	18.75	15000	15 1/2	188.69	Blind	113900	142600		21.4		2413	455.31	464.55	581.61	1993	
69	5.00	0.500	25.6	G-105	HYDRIL	18.75	15000	15 1/2	188.69	Blind	113900	142600		21.4		2368	446.82	464.55	581.61	1993	
70	5.00	0.500	25.6	G-105	HYDRIL	18.75	15000	15 1/2	188.69	Blind	113900	142600		21.4		2298	433.61	464.55	581.61	1993	
71	5.00	0.500	25.6	G-105	HYDRIL	18.75	15000	15 1/2	188.69	Blind	113900	142600		21.4		2316	437.01	464.55	581.61	1993	
72	5.00	0.500	25.6	G-105	HYDRIL	18.75	15000	15 1/2	188.69	Blind	113900	142600		21.4		2242	423.05	464.55	581.61	1993	
73	5.00	0.500	25.6	G-105	HYDRIL	18.75	15000	15 1/2	188.69	Blind	113900	142600		21.4		2367	446.63	464.55	581.61	1993	
74	5.00	0.500	25.6	G-105	HYDRIL	18.75	15000	15 1/2	188.69	Blind	113900	142600		21.4		2344	442.29	464.55	581.61	1993	
75	5.00	0.500	25.6	G-105	HYDRIL	18.75	15000	15 1/2	188.69	Blind	113900	142600		21.4		2363	445.88	464.55	581.61	1993	
76	5.00	0.500	25.6	G-105	HYDRIL	18.75	15000	15 1/2	188.69	Blind	113900	142600		21.4		2395	451.92	464.55	581.61	1993	
77	5.00	0.500	25.6	G-105	HYDRIL	18.75	15000	15 1/2	188.69	Blind	116400	144600		22.4		2393	451.54	474.75	589.76	1993	
78	5.00	0.500	25.6	G-105	HYDRIL	18.75	15000	15 1/2	188.69	Blind	116400	144600		22.4		2372	447.58	474.75	589.76	1993	
79	5.00	0.500	25.6	G-105	HYDRIL	18.75	15000	15 1/2	188.69	Blind	116400	144600		22.4		2254	425.31	474.75	589.76	1993	
80	3.50	0.368	13.3	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	138600	147800		20.2		1878	299.51	289.57	308.80	1994	
81	3.50	0.368	13.3	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	138600	147800		20.2		1892	301.75	289.57	308.80	1994	
82	3.50	0.368	13.3	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	138600	147800		20.2		1860	296.64	289.57	308.80	1994	
83	3.50	0.368	13.3	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	138600	147800		20.2		1708	272.40	289.57	308.80	1994	
84	3.50	0.368	13.3	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	138600	147800		20.2		1702	271.44	289.57	308.80	1994	
85	3.50	0.368	13.3	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	138600	147800		20.2		1691	269.69	289.57	308.80	1994	
86	5.00	0.362	19.5	S-135	Cameron	18-3/4"	5K	TL	214	DVS	141800	157400	45	17.1	34.0	1900	406.60	431.56	479.04	ER 2209	
87	5.00	0.362	19.5	S-135	Cameron	18-3/4"	5K	TL	214	DVS	141800	157400	45	17.1	34.0	1900	406.60	431.56	479.04	ER 2209	
88	5.00	0.362	19.5	S-135	Cameron	18-3/4"	5K	TL	214	DVS	141800	157400	45	17.1	34.0	1875	401.25	431.56	479.04	ER 2209	
89	5.00	0.362	19.5	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	156200	165300	48	21		2500	384.75	475.39	503.08	ER 522, Heat B67552	Charpy @ 72
90	5.00	0.362	19.5	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	156200	165300	48	21		2145	330.12	475.39	503.08	ER 522, Heat B67552	Charpy @ 72
91	5.00	0.362	19.5	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	148800	159000	49	18.8		1850	284.72	452.87	483.91	ER 522, NOBLE	
92	5.00	0.362	19.5	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	135600	157400		22.0		3050	469.40	412.69	479.04	ER 522, RD16-1	
93	5.00	0.362	19.5	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	135600	157400		22.0		3025	465.55	412.69	479.04	ER 522, RD16-2	
94	5.00	0.362	19.5	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	143600	160100		20.0		2700	415.53	437.04	487.26	ER 522, RD07-3	
95	5.00	0.362	19.5	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	140700	162000		21.0		2900	446.31	428.21	493.04	ER 522, RD18-1	
96	5.00	0.362	19.5	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	140700	162000		21.0		2950	454.01	428.21	493.04	ER 522, RD18-2	
97	5.00	0.362	19.5	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear						2650	407.84			ER 522, RD08-1	
98	5.00	0.362	19.5	S-135	HYDRIL	13.625	10000	14 1/4	159.48	Blind	138600	179300		22.0		1350	215.30	421.82	545.69	1980	
99	5.00	0.362	19.5	S-135	HYDRIL	13.625	10000	14 1/4	159.48	Blind	138600	179300		22.0		1300	207.33	421.82	545.69	1980	
100	5.00	0.362	19.5	S-135	HYDRIL	13.625	10000	14 1/4	159.48	Blind	138600	179300		22.0		1250	199.36	421.82	545.69	1980	
101	5.00	0.362	19.5	S-135	HYDRIL	18.75	5000	20	314.16	Blind	156300	164900		20.0		1127	354.06	475.69	501.86	1992	
102	5.00	0.362	19.5	S-135	HYDRIL	18.75	5000	20	314.16	Blind	156300	164900		20.0		1189	373.54	475.69	501.86	1992	
103	5.00	0.362	19.5	S-135	HYDRIL	18.75	5000	20	314.16	Blind	156300	164900		20.0		1212	380.76	475.69	501.86	1992	
104	5.00	0.362	19.5	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	147100	159500		23.1		1445	272.66	447.69	485.43	1992	

BOP Manufacturer Shear Information.

Data edited to include: only drillpipe; only pipe dimensions as found in API 5L or provided by Grant Prideco; only sealing shear rams with double V blades; and only material data meeting API requirements. Blank cells mean no data was provided by the manufacturer. Sorted by Material Grade and cross-sectional area.

	PIPE DESCRIPTION					BOP and RAM DESCRIPTION					PIPE MATERIAL PROPERTIES									
#	DIA. (IN.)	WALL (IN.)	PPF	MATERIAL GRADE	BOP MANUFACTURER	BOP BORE	WORKING PRESSURE	BOP TYPE	BOP CLOSE AREA	SHEAR RAM TYPE	YIELD STRENGTH (PSI)	ULTIMATE TENSILE STRENGTH (PSI)	CHARPY, CVN	ELONGATION %	HARDNESS RC	ACTUAL SHEAR PRESSURE (PSI)	ACTUAL SHEAR FORCE (KIPS)	SHEAR FORCE CALCULATED USING YIELD (KIPS)	SHEAR FORCE CALCULATED USING ULTIMATE (KIPS)	SOURCE OF INFORMATION	COMMENTS
105	5.00	0.362	19.5	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	147100	159500		23.1		1425	268.89	447.69	485.43	1992	
106	5.00	0.362	19.5	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	147100	159500		23.1		1434	270.58	447.69	485.43	1992	
107	5.00	0.362	19.5	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	147100	159500		23.1		1460	275.49	447.69	485.43	1992	
108	5.00	0.362	19.5	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	147100	159500		23.1		1440	271.72	447.69	485.43	1992	
109	5.00	0.362	19.5	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	147100	159500		23.1		1459	275.30	447.69	485.43	1992	
110	5.00	0.362	19.5	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	147100	159500		23.1		1404	264.92	447.69	485.43	1992	
111	5.00	0.362	19.5	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	147100	159500		23.1		1410	266.06	447.69	485.43	1992	
112	5.00	0.362	19.5	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	147100	159500		23.1		1430	269.83	447.69	485.43	1992	
113	5.00	0.362	19.5	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	147100	159500		23.1		1406	265.30	447.69	485.43	1992	
114	5.00	0.362	19.5	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	147100	159500		23.1		1367	257.94	447.69	485.43	1992	
115	5.00	0.362	19.5	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	147100	159500		23.1		1402	264.55	447.69	485.43	1992	
116	5.00	0.362	19.5	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	142600	155100		20.1		2051	327.10	434.00	472.04	1994	
117	5.00	0.362	19.5	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	142600	155100		20.1		1988	317.06	434.00	472.04	1994	
118	5.00	0.362	19.5	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	142600	155100		20.1		2024	322.80	434.00	472.04	1994	
119	5.00	0.362	19.5	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	142600	155100		20.1		1801	287.23	434.00	472.04	1994	
120	5.00	0.362	19.5	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	142600	155100		20.1		1690	269.53	434.00	472.04	1994	
121	5.00	0.362	19.5	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	142600	155100		20.1		1481	236.20	434.00	472.04	1994	
122	5.00	0.362	19.5	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	142600	155100		20.1		2200	350.87	434.00	472.04	1994	
123	5.00	0.362	19.5	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	142600	155100		20.1		2195	350.07	434.00	472.04	1994	
124	4.50	0.430	20/18.7	S-135	HYDRIL	18.75	10000	14 1/4	159.48	Blind	155000	167500		19.0		1725	275.11	491.72	531.38	1983	
125	4.50	0.430	20/18.7	S-135	HYDRIL	18.75	10000	14 1/4	159.48	Blind	155000	167500		19.0		1800	287.07	491.72	531.38	1983	
126	4.50	0.430	20/18.7	S-135	HYDRIL	18.75	10000	14 1/4	159.48	Blind	155000	167500		19.0		1910	304.62	491.72	531.38	1983	
127	4.50	0.430	20/18.7	S-135	HYDRIL	18.75	10000	14 1/4	159.48	Blind	155000	167500		19.0		1890	301.43	491.72	531.38	1983	
128	4.50	0.430	20/18.7	S-135	HYDRIL	18.75	10000	14 1/4	159.48	Blind	155000	167500		19.0		1860	296.64	491.72	531.38	1983	
129	4.50	0.430	20/18.7	S-135	HYDRIL	18.75	10000	14 1/4	159.48	Blind	155000	167500		19.0		1725	275.11	491.72	531.38	1983	
130	4.50	0.430	20/18.7	S-135	HYDRIL	18.75	10000	14 1/4	159.48	Blind	155000	167500		19.0		1800	287.07	491.72	531.38	1983	
131	4.50	0.430	20/18.7	S-135	HYDRIL	18.75	10000	14 1/4	159.48	Blind	155000	167500		19.0		1910	304.62	491.72	531.38	1983	
132	4.50	0.430	20/18.7	S-135	HYDRIL	18.75	10000	14 1/4	159.48	Blind	155000	167500		19.0		1900	303.02	491.72	531.38	1983	
133	4.50	0.430	20/18.7	S-135	HYDRIL	18.75	10000	14 1/4	159.48	Blind	155000	167500		19.0		1890	301.43	491.72	531.38	1983	
134	4.50	0.430	20/18.7	S-135	HYDRIL	18.75	10000	14 1/4	159.48	Blind	155000	167500		19.0		1860	296.64	491.72	531.38	1983	
135	5.50	0.361	21.9	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	152700	159800	51.3	20		2150	330.89	513.51	537.39	ER 522, Heat U82849	Charpy @ 72
136	5.50	0.361	21.9	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	152700	159800	51.3	20		2200	338.58	513.51	537.39	ER 522, Heat U82849	Charpy @ 72
137	5.50	0.361	21.9	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	152700	159800	51.3	20		2080	320.11	513.51	537.39	ER 522, Heat U82849	Charpy @ 72
138	5.50	0.361	21.9	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	150000	163500		24.7		2101	396.44	504.43	549.83	1992	
139	5.50	0.361	21.9	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	150000	163500		24.7		2122	400.40	504.43	549.83	1992	
140	5.50	0.361	21.9	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	150000	163500		24.7		2431	458.71	504.43	549.83	1992	
141	5.50	0.361	21.9	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	150000	163500		24.7		1960	369.84	504.43	549.83	1992	
142	5.50	0.361	21.9	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	150000	163500		24.7		2438	460.03	504.43	549.83	1992	
143	5.50	0.361	21.9	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	150000	163500		24.7		2712	511.73	504.43	549.83	1992	
144	5.50	0.361	21.9	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	150000	163500		24.7		2647	499.47	504.43	549.83	1992	
145	5.50	0.361	21.9	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	150000	163500		24.7		2068	390.21	504.43	549.83	1992	
146	5.50	0.361	21.9	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	150000	163500		24.7		2196	414.37	504.43	549.83	1992	
147	5.50	0.361	21.9	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	150000	163500		24.7		2361	445.50	504.43	549.83	1992	
148	5.50	0.361	21.9	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	150000	163500		24.7		2025	382.10	504.43	549.83	1992	
149	5.50	0.361	21.9	S-135	HYDRIL	18.75	15000	15 1/2	188.69	Blind	150000	163500		24.7		2587	488.15	504.43	549.83	1992	
150	6.63	0.33	25.2	S-135	Cameron	18-3/4"	5K	TL	214	DVS	142400	162100	45	18.5	34.0	1950	417.30	536.22	610.41	ER 2209	
151	6.63	0.33	25.2	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	150800	160900		19.0		2850	438.62	567.86	605.89	ER 522, RD03-1	
152	6.63	0.33	25.2	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	152400	163100		20.0		2600	400.14	573.88	614.17	ER 522, RD01-1	
153	6.63	0.33	25.2	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	152400	163100		20.0		2700	415.53	573.88	614.17	ER 522, RD01-2	
154	6.63	0.33	25.2	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	166500	178000		19.0		2750	423.23	626.98	670.28	ER 522, RD34-3	
155	6.63	0.33	25.2	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	166500	178000		19.0		2625	403.99	626.98	670.28	ER 522, RD34-1	
156	6.63	0.330	25.2	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	127200	157500		20.0		2519	401.74	478.99	593.08	1989	

BOP Manufacturer Shear Information.

Data edited to include: only drillpipe; only pipe dimensions as found in API 5L or provided by Grant Prideco; only sealing shear rams with double V blades; and only material data meeting API requirements. Blank cells mean no data was provided by the manufacturer. Sorted by Material Grade and cross-sectional area.

	PIPE DESCRIPTION					BOP and RAM DESCRIPTION					PIPE MATERIAL PROPERTIES									
#	DIA. (IN.)	WALL (IN.)	PPF	MATERIAL GRADE	BOP MANUFACTURER	BOP BORE	WORKING PRESSURE	BOP TYPE	BOP CLOSE AREA	SHEAR RAM TYPE	YIELD STRENGTH (PSI)	ULTIMATE TENSILE STRENGTH (PSI)	CHARPY, CVN	ELONGATION %	HARDNESS RC	ACTUAL SHEAR PRESSURE (PSI)	ACTUAL SHEAR FORCE (KIPS)	SHEAR FORCE CALCULATED USING YIELD (KIPS)	SHEAR FORCE CALCULATED USING ULTIMATE (KIPS)	SOURCE OF INFORMATION	COMMENTS
157	6.63	0.330	25.2	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	127200	157500		20.0		2522	402.22	478.99	593.08	1989	
158	6.63	0.330	25.2	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	127200	157500		20.0		2922	466.01	478.99	593.08	1989	
159	6.63	0.330	25.2	S-135	HYDRIL	21.25	5000	14 1/4	159.48	Blind	127200	157500		20.0		2444	389.78	478.99	593.08	1990	
160	6.63	0.330	25.2	S-135	HYDRIL	21.25	5000	14 1/4	159.48	Blind	127200	157500		20.0		2570	409.88	478.99	593.08	1990	
161	6.63	0.330	25.2	S-135	HYDRIL	21.25	5000	14 1/4	159.48	Blind	127200	157500		20.0		2397	382.29	478.99	593.08	1990	
162	6.63	0.330	25.2	S-135	HYDRIL	21.25	5000	14 1/4	159.48	Blind	127200	157500		20.0		2444	389.78	478.99	593.08	1990	
163	6.63	0.330	25.2	S-135	HYDRIL	21.25	5000	14 1/4	159.48	Blind	127200	157500		20.0		2570	409.88	478.99	593.08	1990	
164	6.63	0.330	25.2	S-135	HYDRIL	21.25	5000	14 1/4	159.48	Blind	127200	157500		20.0		2397	382.29	478.99	593.08	1990	
165	6.63	0.330	25.2	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	138000	149000		21.3		2027	323.28	519.66	561.08	1994	
166	6.63	0.330	25.2	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	138000	149000		21.3		1972	314.50	519.66	561.08	1994	
167	6.63	0.330	25.2	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	138000	149000		21.3		2095	334.12	519.66	561.08	1994	
168	6.63	0.330	25.2	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	138000	149000		21.3		1647	262.67	519.66	561.08	1994	
169	6.63	0.330	25.2	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	138000	149000		21.3		2340	373.19	519.66	561.08	1994	
170	6.63	0.330	25.2	S-135	HYDRIL	13.625	5000	14 1/4	159.48	Blind	138000	149000		21.3		1401	223.44	519.66	561.08	1994	
171	6.63	0.33	25.2	S-135	Cameron	18-3/4"	5K	TL	214	DVS	142400	162100	45	18.5	34.0	1925	411.95	536.65	610.89	ER 2209	
172	6.63	0.33	25.2	S-135	Cameron	18-3/4"	5K	TL	214	DVS	142400	162100	45	18.5	34.0	1975	422.65	536.65	610.89	ER 2209	
173	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear		178675	23.85	17		1960	301.64		683.49	ER 522, SES	Charpy @ -4
174	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear		178675	24.85	17		1970	303.18		683.49	ER 522, SES	Charpy @ -4
175	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear		177400	26.2	17		2140	329.35		678.61	ER 522, SES	Charpy @ -4
176	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear		178350	26.65	17		2250	346.28		682.24	ER 522, SES	Charpy @ -4
177	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear		173250	27.35	16		2360	363.20		662.73	ER 522, SES	Charpy @ -4
178	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear		162850	32.35	18		2150	330.89		622.95	ER 522, SES	Charpy @ -4
179	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear		172200	33	17		1950	300.11		658.72	ER 522, SES	Charpy @ -4
180	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear		171275	34	17		1850	284.72		655.18	ER 522, SES	Charpy @ -4
181	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear		169400	35.2	17		2175	334.73		648.01	ER 522, SES	Charpy @ -4
182	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear		159000	41.8	19		4220	649.46		608.22	ER 522, SES	Charpy @ -4
183	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	155600	165000	46.3	22.2		2580	397.06	595.22	631.17	ER 522, Heat U82848	Charpy @ 72
184	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	155600	165000	46.3	22.2		3700	569.43	595.22	631.17	ER 522, Heat U82848	Charpy @ 72
185	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	155600	165000	46.3	22.2		3100	477.09	595.22	631.17	ER 522, Heat U82848	Charpy @ 72
186	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	155600	165000	46.3	22.2		2675	411.68	595.22	631.17	ER 522, Heat U82848	Charpy @ 72
187	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	155600	165000	46.3	22.2		2400	369.36	595.22	631.17	ER 522, Heat U82848	Charpy @ 72
188	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	155600	165000	46.3	22.2		3450	530.96	595.22	631.17	ER 522, Heat 657346	Charpy @ 72
189	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	149300	160083	48.13	18.91		2315	356.28	571.12	612.37	ER 522, RD-69	
190	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	152200	167800	63	18.9		3950	607.91	582.21	641.89	ER 522, Heat 308426	Charpy @ -4
191	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	152200	167800	63	18.9		3775	580.97	582.21	641.89	ER 522, Heat 308426	Charpy @ -4
192	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	148800	162000	63.5	19.1		2820	434.00	569.20	619.70	ER 522, Heat U01230	Charpy @ -4
193	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	148800	162000	63.5	19.1		3025	465.55	569.20	619.70	ER 522, Heat U01230	Charpy @ -4
194	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	159600	168800	64	21.3		3900	600.21	610.52	645.71	ER 522, Heat 657346	Charpy @ 72
195	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear	159600	168800	64	21.3		3200	492.48	610.52	645.71	ER 522, Heat 657346	Charpy @ 72
196	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear		164375	65.35	21		3825	588.67		628.78	ER 522, SES	Charpy @ -4
197	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear		160575	69	20		3700	569.43		614.25	ER 522, SES	Charpy @ -4
198	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear		159975	73.85	20.0		3810	586.36		611.95	ER 522, SES	Charpy @ -4
199	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear		156900	77	21.0		3710	570.97		600.19	ER 522, SES	Charpy @ -4
200	5.50	0.415	24.7	S-135	Varco Shaffer	18-3/4"		SLX	153.9	"V" Shear		149825	82	19.0		3930	604.83		573.13	ER 522, SES	Charpy @ -4
201	5.50	0.415	24.7	S-135	HYDRIL	13.625	15000	19	283.53	Blind	151300	160900		24.1		2090	592.58	578.77	615.49	2003	
202	6.63	0.362	27.6	S-135	HYDRIL	18.75	5000	20	314.16	Blind	157100	178900		18.2		1244	390.81	645.65	735.24	1992	
203	6.63	0.362	27.6	S-135	HYDRIL	18.75	5000	20	314.16	Blind	157100	178900		18.2		1303	409.35	645.65	735.24	1992	
204	6.63	0.362	27.6	S-135	HYDRIL	18.75	5000	20	314.16	Blind	157100	178900		18.2		1228	385.79	645.65	735.24	1992	
205	6.63	0.362	27.6	S-135	HYDRIL	18.75	5000	20	314.16	Blind	157100	178900		18.2		1250	392.70	645.65	735.24	1992	
206	6.63	0.362	27.6	S-135	HYDRIL	18.75	5000	20	314.16	Blind	157100	178900		18.2		1238	388.93	645.65	735.24	1992	
207	6.63	0.362	27.6	S-135	HYDRIL	18.75	5000	20	314.16	Blind	157100	178900		18.2		1232	387.04	645.65	735.24	1992	
208	6.63	0.362	27.6	S-135	Cameron	18-3/4"	15K	TL	254	DVS	135000	145000				1850	469.90	555.26	596.39	ER 2670	

BOP Manufacturer Shear Information.

Data edited to include: only drillpipe; only pipe dimensions as found in API 5L or provided by Grant Prideco; only sealing shear rams with double V blades; and only material data meeting API requirements. Blank cells mean no data was provided by the manufacturer. Sorted by Material Grade and cross-sectional area.

	PIPE DESCRIPTION					BOP and RAM DESCRIPTION					PIPE MATERIAL PROPERTIES									
#	DIA. (IN.)	WALL (IN.)	PPF	MATERIAL GRADE	BOP MANUFACTURER	BOP BORE	WORKING PRESSURE	BOP TYPE	BOP CLOSE AREA	SHEAR RAM TYPE	YIELD STRENGTH (PSI)	ULTIMATE TENSILE STRENGTH (PSI)	CHARPY, CVN	ELONGATION %	HARDNESS RC	ACTUAL SHEAR PRESSURE (PSI)	ACTUAL SHEAR FORCE (KIPS)	SHEAR FORCE CALCULATED USING YIELD (KIPS)	SHEAR FORCE CALCULATED USING ULTIMATE (KIPS)	SOURCE OF INFORMATION	COMMENTS
209	6.63	0.362	27.6	S-135	Cameron	18-3/4"	15K	TL	254	DVS	135000	145000				2100	533.40	555.26	596.39	ER 2670	
210	6.63	0.362	27.6	S-135	Cameron	18-3/4"	15K	TL	254	DVS	135000	145000				2200	558.80	555.26	596.39	ER 2670	
211	6.63	0.362	27.6	S-135	Cameron	18-3/4"	5K	TL	214	DVS	145000	165600	45	16.9	34.0	2050	438.70	596.39	681.12	ER 2209	
212	6.63	0.362	27.6	S-135	Cameron	18-3/4"	5K	TL	214	DVS	145000	165600	45	16.9	34.0	2000	428.00	596.39	681.12	ER 2209	
213	6.63	0.362	27.6	S-135	Cameron	18-3/4"	5K	TL	214	DVS	145000	165600	45	16.9	34.0	2050	438.70	596.39	681.12	ER 2209	
214	6.63	0.362	27.7	S-135	HYDRIL	13.625	15000	19	283.53	Blind	149500	161900		20.6		2203	624.62	614.90	665.90	2003	