Maximizer® II Enhanced Geometry Surface Pumping Units

Reduces torque and horsepower requirements using field-proven, phased-counterbalance technology

Applications

- Virtually any well including sandy, gaseous, and high viscosity
- Any well geometry including horizontal, slant, directional, and vertical
- Wide-ranging fluid levels from near-surface to seated-nipple depth
- Low- to medium-volume wells
- All land and remote wells

Features and Benefits

- Enhanced geometry delivers greater productivity and efficiency rates—up to 8 to 10% less energy required to lift the same amount of fluid as push-up geometries
- Phased counterbalance movement optimizes lift cycles, decreases gear-reducer torque, and lowers energy costs
- Phased-counterbalance system delivers a 25% increase in useful gearbox load-range
- Extended distance from counterbalance to wellhead enables safer well servicing compared to front-mounted, push-up geometry units
- Two-piece reducer case and bolted crank-arm attachment facilitates simple and fast field change-outs for lower downtime costs
- Exceeds latest API design Specification 11E and backed by API Specification Q1 Quality Assurance Program for universal confidence
- Manufactured to API size specifications from 320 through 1280 to meet wide-ranging well applications and challenges
- Two-point foundation capability saves concrete costs and installation time (foundation plans available)
- Lower gearbox-reducer torque allows for smaller gear reducer and housing than conventional Maximizer units
- Reduced horsepower requirements allow for a smaller prime mover and lower lifting costs
- Slower upstroke allows more time for superior pump-fillage.
- Extended distance from wellhead enhances safety and provides ample space during well service
- Reduced torque and uniform prime-mover load range improves mechanical efficiency and reduces energy costs
- Reduced fluid-pound effects result in long rod life and less downtime

The Maximizer II EG outperforms conventional push-up geometry units and saves 8 to 10% in energy costs in virtually any well or environment.

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Maximizer® II Enhanced Geometry Surface Pumping Units

Tool Description

The Maximizer II enhanced geometry (EG) surface pumping unit is a versatile, energy-efficient system that maximizes production and minimizes costs with field-proven, phased-counterbalance technology. Its field-proven design reduces horsepower requirements and torsional loads on the gearbox. This allows for a smaller gearbox than normally required by conventional geometry units. Although these reductions may increase some internal structural loads, the unit design fully compensates for these loads with heavy structural materials and large structural bearings.

The Maximizer II EG provides more open area around the wellhead for personnel and equipment when a workover is required. This advantage results in enhanced safety and ample space during these activities. Gear reducers are available in a range of sizes from 320 to 1280. Variable- and fixed-speed advanced controllers are also available to optimize performance.

Maximizer II EG surface pumping units adapt to changing well conditions when paired with optional variable-speed drive or ForeSite Edge controller that optimizes each stroke.

Standard Features

Maximizer II EG surface pumping units include the following standard equipment:
- T-frame base
- High-mount package
- Sampson post ladder with ring
- Brake assembly
- Crank pin and weight wrenches
- Wireline assembly
- Adjustable motor rails
- Reducer sheave
- Crank guards
- Gear oil
- Belt guard
- Ground-level lubrication system

Maximizer® II Enhanced Geometry Surface Pumping Units

Complementary Equipment

Maximizer II EG pumping units are compatible with the following Weatherford technologies:

- Premium sucker rods for enhanced run life
- COROD® and semielliptical COROD continuous rods for reduced rod-string weight and deeper lift
- Sand-tolerant pump, for increased run life in solids-bearing wells
- ForeSite® production-optimization platform for increased production, uptime, and personnel efficiency
- ForeSite Edge for high-frequency data, instant IoT alerts, and autonomous well control

Optional Equipment

Maximizer II EG surface pumping units can be optionally equipped with the following:

- Wide-frame base
- Low-mount extension package
- Direct-mount extension package
- Single or dual tie-downs
- Mesh crank guards
- Counterweights
- Concrete base
- Prime mover (electric motor or gas engine)
- Belts and sheave for the prime mover
- Complete software and controller optimization packages
- Caged Sampson post ladder
- Jackshaft assembly
- CE/ATEX units

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Maximizer® II Enhanced Geometry Surface Pumping Units

Parts Identification

1	Sampson post A-leg	12	Reducer sheave
2	Main frame	13	Pitman arm
3	Reducer sub-base	14	Sampson post support leg
4	Counterweights	15	Center bearing assembly
5	Crank-pin assembly	16	Equilizer beam
6	Crank	17	Equilizer bearing assembly
7	High-mount base extension	18	Sampson post ladder
8	Motor rails	19	Walking beam
9	Brake lever	20	Horsehead
10	Brake assembly	21	Wireline
11	Gear reducer	22	Polish-rod hanger

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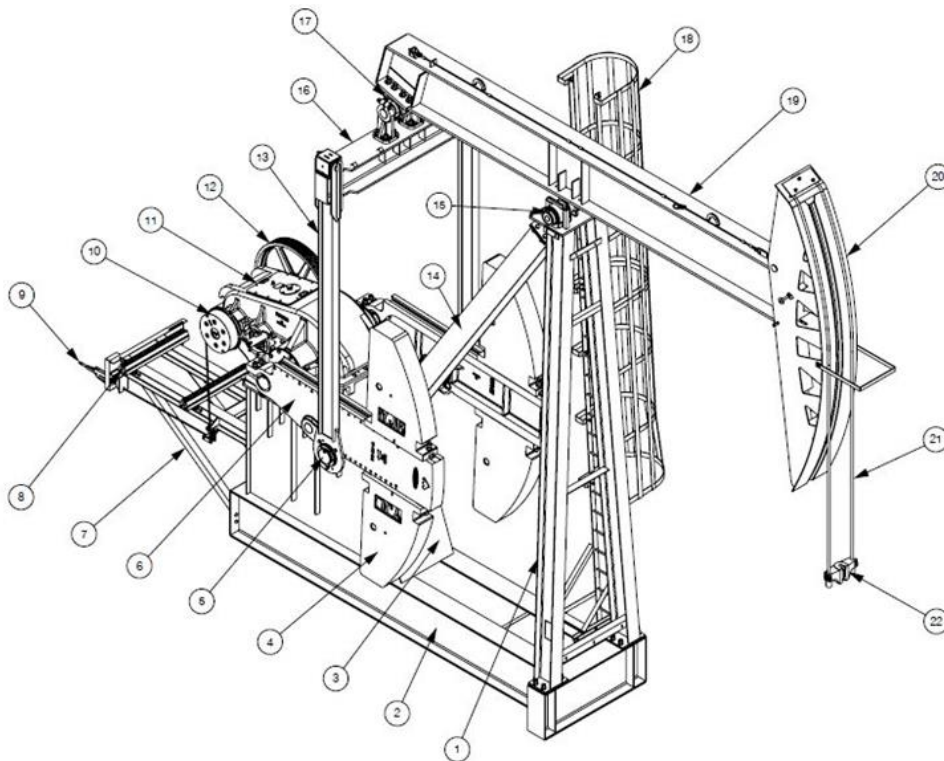
Maximizer® II Enhanced Geometry Surface Pumping Units

Dimension Schematic
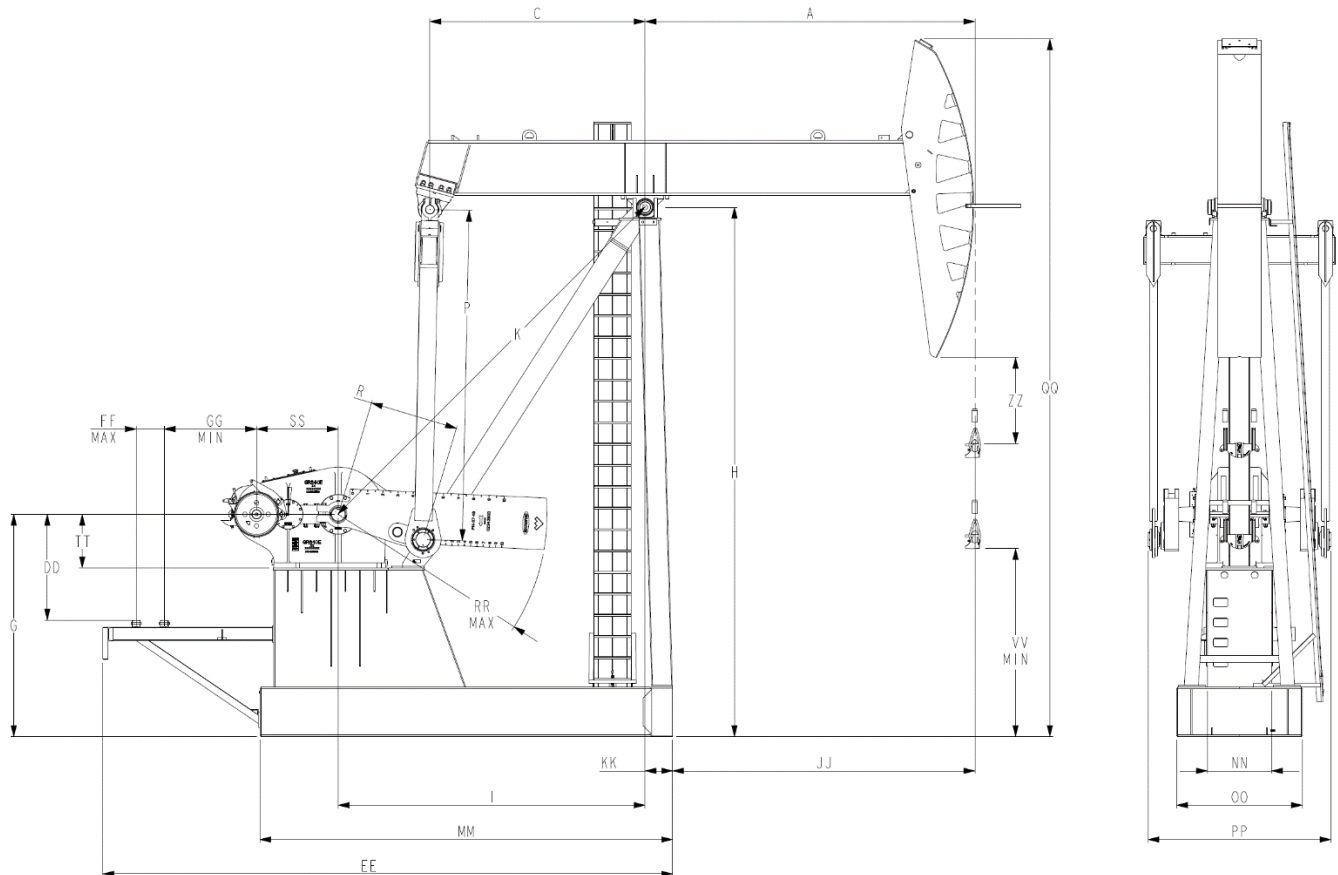
Maximizer® II Enhanced Geometry Surface Pumping Units

Dimension Schematic Data

GRP	API Size	API Dimension Data (in.)								Dimension Data (in.)						
		A	C	G	H	I	K	P	R	AA Min.	BB Max.	CC	DD	EE	FF Max.	GG Min.
3C	320-256-120	132.00	96.25	103.03	267.75	110.00	218.16	174.75	40.00	25.88	50.38	48.50	84.25	331.88	71.00	62.50
	320-256-144	158.38	96.25	103.03	267.75	110.00	218.16	174.75	40.00	25.88	50.38	48.50	84.25	331.88	71.00	62.50
4C	456-305-144	158.38	120.63	122.49	296.50	172.00	244.66	186.75	49.63	25.00	56.50	56.50	103.70	370.88	71.00	62.50
	456-365-144	158.38	120.63	N/A	296.50	172.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	640-365-144	158.38	120.63	124.49	296.50	172.00	243.25	185.00	49.63	19.13	58.50	58.50	105.70	370.88	71.00	57.00
	912-427-144	158.38	120.63	124.49	296.50	172.00	243.25	185.00	49.63	19.13	58.50	58.50	105.70	370.88	71.00	57.00
	456-305-168	184.75	120.63	122.49	296.50	172.00	244.66	186.75	49.63	25.00	56.50	56.50	103.70	370.88	71.00	62.50
	640-365-168	184.75	120.63	124.49	296.50	172.00	243.25	185.00	49.63	19.13	58.50	58.50	105.70	370.88	71.00	57.00
	912-365-168	184.75	120.63	124.49	296.50	172.00	243.25	185.00	49.63	19.13	58.50	58.50	105.70	370.88	71.00	57.00
	912-427-168	184.75	120.63	124.49	296.50	172.00	243.25	185.00	49.63	19.13	58.50	58.50	105.70	370.88	71.00	57.00
	912-365-192	211.00	120.63	124.49	296.50	172.00	243.25	185.00	49.63	19.13	58.50	58.50	105.70	370.88	71.00	57.00
	912-427-192	211.00	120.63	124.49	296.50	172.00	243.25	185.00	49.63	19.13	58.50	58.50	105.70	370.88	71.00	57.00
5C	1280-427-216	211.00	120.63	129.31	325.31	172.00	260.77	207.38	55.63	N/A	N/A	63.63	N/A	N/A	55.13	31.88
	1280-427-192	187.38	120.63	129.31	301.31	172.00	243.25	185.75	54.69	N/A	N/A	63.63	N/A	N/A	55.13	31.88

Dimension Schematic Data (continued)

GRP	API Size	Dimension Data (in.)														
		HH	JJ	KK	MM	NN	OO	PP	QQ	RR Max.	SS	TT	UU	VV Min.	WW	ZZ
3C	320-256-120	23.63	121.88	10.13	191.75	37.81	68.00	86.13	378.00	99.00	35.67	24.00	55.44	80.50	49.94	55.40
	320-256-144	23.63	148.19	10.13	191.75	37.81	68.00	86.13	399.63	99.00	35.67	24.00	55.44	80.50	49.94	30.80
4C	456-305-144	27.50	143.00	15.38	231.38	42.38	70.38	90.88	428.75	117.00	39.92	28.00	66.88	78.60	61.38	60.80
	456-365-144	27.50	132.00	15.38	231.38	42.38	70.38	90.88	N/A	117.00	39.92	28.00	66.88	77.88	61.38	60.80
	640-365-144	27.50	143.00	15.38	231.38	42.38	70.38	102.25	428.75	117.00	45.79	30.00	66.88	78.40	61.38	60.80
	912-427-144	27.50	143.00	15.38	231.38	42.38	70.38	106.19	427.75	117.00	45.79	30.00	66.88	78.50	61.38	60.70
	456-305-168	27.50	169.38	15.38	231.38	42.38	70.38	90.88	448.25	117.00	39.92	28.00	66.88	78.90	61.38	35.90
	640-365-168	27.50	169.38	15.38	231.38	42.38	70.38	102.25	449.13	117.00	45.79	30.00	66.88	78.70	61.38	35.90
	912-365-168	27.50	169.38	15.38	231.38	42.38	70.38	106.19	448.75	117.00	45.79	30.00	66.88	78.70	61.38	35.90
	912-427-168	27.50	169.38	15.38	231.38	42.38	70.38	106.19	428.75	117.00	45.79	30.00	66.88	78.70	61.38	36.00
	912-365-192	27.50	195.63	15.38	231.38	42.38	70.38	106.19	470.75	117.00	45.79	30.00	66.88	67.90	61.38	25.60
	912-427-192	27.50	195.63	15.38	231.38	42.38	70.38	106.19	470.00	117.00	45.79	30.00	66.88	55.90	61.38	37.60
5C	1280-427-216	27.50	189.63	21.38	238.38	52.38	83.13	118.56	511.63	122.00	52.54	33.00	68.75	68.20	61.50	27.60
	1280-427-192	27.50	166.00	21.38	238.38	52.38	83.13	118.56	467.13	122.00	52.54	33.00	68.75	43.50	61.50	55.40

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13025.00

Maximizer® II Enhanced Geometry Surface Pumping Units

Specifications

API Size	Maximum Polished–Rod Capacity (lb)	Standard Strokes Fourth Stroke Optional (in.)	Torque Factor at 90° Fourth Stroke Optional (in.)	Wireline Size (in.)	Wireline Center (in.)
320-256-120	25,600	120, 101, 83	55, 47, 39	1.25 × 420	16
320-256-144	25,600	144, 121, 100	66, 56, 47	1.25 × 408	16
456-305-144	30,500	144, 119, 96	65, 55, 45	1.375 × 408	16
456-305-168	30,500	168, 139, 112	76, 65, 53	1.375 × 468	16
456-365-144	36,500	144, 119, 96	65, 55, 45	1.375 × 408	16
640-365-144	36,500	144, 119, 96	65, 55, 45	1.375 × 408	16
640-365-168	36,500	168, 139, 112	76, 65, 53	1.375 × 468	16
912-427-144	42,700	144, 119, 96	65, 55, 45	1.375 × 408	16
912-365-168	36,500	168, 139, 112	76, 65, 53	1.375 × 468	16
912-427-168	42,700	168, 139, 112	76, 65, 53	1.375 × 492	16
912-365-192	36,500	192, 159, 128	87, 74, 60	1.375 × 492	16
912-427-192	42,700	192, 159, 128	87, 74, 60	1.375 × 516	16
1280-427-192	42,700	192, 157, 126	86, 72, 59	1.375 × 452	16
1280-427-216	42,700	216, 179, 145	98, 83, 68	1.375 × 452	16

Gear Reducer Technical Data

Model Size	Torque Rating (in.-lb)	Gear Ratio	Crank-Shaft Diameter (in.)	Sheave-Bore Diameter (in.)	Sheave–Belt Section/ Pitch Diameter (in.)	Oil Capacity (gal)
1280	1,280,000	28.05:1	9.25	5	10C/50	141
912	912,000	31.49:1	7.75	4.25	8C/50	121
640	640,000	31.49:1	7.75	4.25	6C/50	111
456	456,000	28.396:1	7.75	3.62	5C/50	80
320	320,000	30.72:1	7.75	3.5	4C/44	48

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Maximizer® II Enhanced Geometry Surface Pumping Units

Maximum Effective Counterbalance* A

API Size	Imbalance	Crank	Crank Only	4-B	4-D	4-F	4-H	4-J	4-L	4-N
320-256-120	717	P15-99-40	8,393	11,076	11,892	13,004	13,782	14,743	15,847	17,467
			9,802	12,989	13,959	15,280	16,204	17,345	18,657	20,582
			11,664	15,519	16,691	18,289	19,406	20,786	22,373	24,701
320-256-144	-81	P15-99-40	6,317	8,553	9,233	10,160	10,808	11,609	12,529	13,880
			7,491	10,148	10,955	12,056	12,827	13,778	14,871	16,475
			9,043	12,256	13,233	14,564	15,496	16,646	17,969	19,909
456-305-144	1,120	P14-117-49	9,112	11,738	12,542	13,652	14,433	15,401	16,509	18,161
			10,657	13,811	14,776	16,110	17,047	18,211	19,540	21,525
			12,857	16,763	17,959	19,611	20,772	22,212	23,859	26,317
456-305-168	30	P14-117-49	6,881	9,132	9,821	10,773	11,442	12,272	13,222	14,638
			8,206	10,909	11,737	12,880	13,684	14,681	15,821	17,522
			10,092	13,440	14,465	15,881	16,876	18,111	19,523	21,630
640-365-144	1,208	P14-117-49	9,199	11,825	12,628	13,739	14,519	15,488	16,595	18,247
			10,747	13,901	14,866	16,200	17,138	18,301	19,631	21,616
			12,950	16,857	18,053	19,706	20,867	22,308	23,956	26,415
640-305-168	340	P14-117-49	7,190	9,441	10,130	11,082	11,751	12,581	13,530	14,947
			8,517	11,221	12,048	13,192	13,996	14,993	16,133	17,835
			10,406	13,755	14,781	16,197	17,193	18,428	19,841	21,949
640-365-168	31	P14-117-49	6,881	9,132	9,821	10,773	11,442	12,272	13,221	14,638
			8,208	10,912	11,739	12,883	13,687	14,684	15,824	17,526
			10,097	13,446	14,472	15,888	16,884	18,119	19,532	21,640

*Measured in pounds at the polished rod maximum stroke.

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Maximizer® II Enhanced Geometry Surface Pumping Units

Maximum Effective Counterbalance* A (continued)

API Size	4-P	4-R	4-S	4-X	4-Y	4-Z	4-ZJ
	19,579	20,095	24,856	N/A	N/A	N/A	N/A
320-256-120	23,090	23,703	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	15,639	16,070	20,038	22,170	N/A	N/A	N/A
320-256-144	18,566	19,077	23,791	N/A	N/A	N/A	N/A
	22,437	23,055	N/A	N/A	N/A	N/A	N/A
	20,226	20,819	25,555	28,199	N/A	N/A	N/A
456-305-144	24,005	24,717	30,405	N/A	N/A	N/A	N/A
	29,389	30,270	N/A	N/A	N/A	N/A	N/A
	16,408	16,916	20,977	23,243	27,034	N/A	N/A
456-305-168	19,648	20,258	25,135	27,856	N/A	N/A	N/A
	24,263	25,019	N/A	N/A	N/A	N/A	N/A
	20,312	20,905	25,641	28,284	32,705	N/A	N/A
640-365-144	24,096	24,808	30,498	33,673	N/A	N/A	N/A
	29,488	30,370	N/A	N/A	N/A	N/A	N/A
	16,716	17,225	21,285	23,551	27,341	N/A	N/A
640-305-168	19,961	20,571	25,448	28,170	N/A	N/A	N/A
	24,582	25,339	N/A	N/A	N/A	N/A	N/A
	16,407	16,916	20,976	23,242	27,032	30,455	34,011
640-365-168	19,652	20,262	25,139	27,861	32,414	N/A	N/A
	24,273	25,030	31,072	34,444	N/A	N/A	N/A

*Measured in pounds at the polished rod maximum stroke.

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Maximizer® II Enhanced Geometry Surface Pumping Units

Maximum Effective Counterbalance* B

API Size	Imbalance	Crank	Crank Only	4-B	4-D	4-F	4-H	4-J	4-L	4-N
912-427-144	1,010	P9-117-49	7,899	10,516	11,318	12,426	13,206	14,173	15,279	16,931
			9,186	12,315	13,273	14,599	15,530	16,687	18,009	19,984
			11,020	14,880	16,062	17,697	18,846	20,272	21,903	24,339
912-365-168	66	P9-117-49	5,971	8,215	8,902	9,853	10,521	11,350	12,298	13,714
			7,074	9,757	10,579	11,715	12,514	13,505	14,638	16,331
			8,647	11,956	12,969	14,370	15,356	16,579	17,976	20,064
912-427-168	-111	P14-117-49	6,739	8,990	9,679	10,631	11,300	12,130	13,079	14,496
			8,066	10,770	11,597	12,741	13,545	14,542	15,682	17,384
			9,955	13,304	14,330	15,746	16,742	17,977	19,390	21,498
912-365-192	-832	P14-117-49	5,166	7,137	7,740	8,573	9,159	9,886	10,717	11,957
			6,328	8,695	9,420	10,421	11,125	11,998	12,996	14,486
			7,981	10,914	11,812	13,052	13,924	15,006	16,243	18,088
912-427-192	-1,196	P14-117-49	4,802	6,773	7,376	8,209	8,795	9,522	10,353	11,593
			5,964	8,331	9,056	10,057	10,761	11,634	12,632	14,122
			7,617	10,550	11,448	12,688	13,560	14,642	15,879	17,724
1280-427-192	-360	P15-122-54	8,918	11,005	11,645	12,532	13,156	13,931	14,816	16,142
			10,753	13,270	14,042	15,111	15,864	16,799	17,866	19,466
			13,361	16,490	17,450	18,780	19,715	20,878	22,205	24,194
1280-427-216	-1,304	P13-122-55	6,759	8,572	9,128	9,899	10,441	11,115	11,884	13,036
			8,281	10,451	11,116	12,038	12,687	13,494	14,414	15,793
			10,429	13,105	13,925	15,062	15,862	16,855	17,990	19,690

*Measured in pounds at the polished rod maximum stroke.

Maximizer® II Enhanced Geometry
Surface Pumping Units

Maximum Effective Counterbalance* B (continued)

API Size	4-P	4-R	4-S	4-X	4-Y	4-Z	4-ZJ	4-1ZJ
912-427-144	18,989	19,586	24,313	26,958	31,383	35,392	39,567	N/A
	22,444	23,158	28,810	31,972	37,262	42,055	N/A	N/A
	27,374	28,254	35,225	39,126	N/A	N/A	N/A	N/A
912-365-168	15,478	15,990	20,042	22,310	26,103	29,540	33,119	N/A
	18,440	19,053	23,897	26,608	31,143	35,252	N/A	N/A
	22,666	23,421	29,397	32,740	N/A	N/A	N/A	N/A
912-427-168	16,265	16,774	20,834	23,100	26,890	30,313	33,869	38,660
	19,510	20,120	24,997	27,719	32,272	36,384	40,656	N/A
	24,131	24,888	30,930	34,302	39,942	N/A	N/A	N/A
912-365-192	13,507	13,952	17,507	19,491	22,810	25,807	28,920	33,115
	16,348	16,882	21,153	23,536	27,523	31,123	34,863	N/A
	20,394	21,057	26,347	29,300	34,238	N/A	N/A	N/A
912-427-192	13,143	13,588	17,143	19,127	22,445	25,442	28,556	32,751
	15,983	16,518	20,788	23,172	27,158	30,758	34,499	39,538
	20,030	20,693	25,983	28,936	33,874	38,334	N/A	N/A
1280-427-192	17,783	18,271	22,051	24,179	27,739	30,991	34,397	38,939
	21,445	22,033	26,592	29,158	33,452	37,374	41,481	N/A
	26,654	27,386	33,052	36,243	41,582	N/A	N/A	N/A
1280-427-216	14,461	14,886	18,169	20,018	23,112	25,938	28,897	32,845
	17,499	18,007	21,937	24,151	27,853	31,235	34,777	39,502
	21,793	22,419	27,264	29,992	34,557	38,726	N/A	N/A

*Measured in pounds at the polished rod maximum stroke.

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Maximizer® II Enhanced Geometry Surface Pumping Units

Effective Counterbalance Chart

Crank Number	CBTC (2 cranks/in.-lb)
A55L	62,300
A80L	120,600
A80	151,000
A100	265,200
A118, Group 4	492,700
A118, Group 5	495,200
A118, Group 6	495,200

Counter-Balance ID	Weight (lb)	G (in.)
B	400	10.625
D	550	11.8125
F	715	14
H	870	15.75
J	1,060	16.75
L	1,225	18
N	1,560	20.5
P	1,875	16.81
R	2,041	19.875
S	2,850	20.75
X	3,375	22.5
Y	4,265	26.6
Z	5,600	28.8
ZJ	6,336	26.125
1ZJ	7,630	29.92

$$CBTW = [(Crank\ No.) - (X + G)] \times W$$
$$ECB = \frac{CBTC + CBTW}{TF} + SU*$$

To determine X:
$$A = [(Crank\ No.) - G]$$
$$B = (ECB - SU)$$
$$C = (B \times TF)$$
$$D = \frac{(C - CBTC)}{W}$$
$$X = A - D$$

Effective Counterbalance Chart Key

CBTC	Counterbalance torque of cranks (in.-lb)
CBTW	Counterbalance torque of counterweights (in.-lb)
ECB	Effective counterbalance at polish rod (lb)
W	Total weight of counterweights used on two cranks (lb)
X	Distance of counterweights from the end of crank (in.)
G	Distance of center of gravity from counterweight bottom (in.)
TF	Torque factor at 90°, from catalog (in.)
SU	Structural imbalance at polish rod, from catalog (lb)
CG	Center of gravity

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