

# Curved Beam Pumping Unit

Enhanced geometry pumping unit

## APPLICATIONS

- High-load wells that benefit from variable counter balance
- Wells that benefit from a faster downstroke and slower upstroke
- Unconventional shale wells
- Oil wells with large variations in production
- Conventional oil wells

## BENEFITS

- Simplifies installation
- Reduces maintenance with long service life of over 25 years
- Minimizes year-over-year operational cost
- Decreases initial cost and day-to-day operation costs with ability to downsize the unit and prime mover

## FEATURES

- Advanced geometry creating a larger allowable load range and more efficient operation
- Curved walking beam providing maximum counterbalance effect when it is needed and minimum when it is not needed
- High-capacity gear reducer designed far beyond API requirements
- Large, low-speed shaft for long life and increased counterbalance support
- Field-serviceable gear reducer design with bolt-on cranks

The curved beam pumping unit is engineered with a combination of crank- and beam-based counterbalance weights to provide a dynamic structural imbalance. This superior combination of counterbalances results in a considerable reduction in operation energy requirements and net torque curve.

The curved beam pumping unit uses two counterweights instead of one: the conventional crank weight and an adjustable beam weight positioned at the end of an engineered curved walking beam, which allows the counterweights to benefit the gearbox torque when it's needed most.

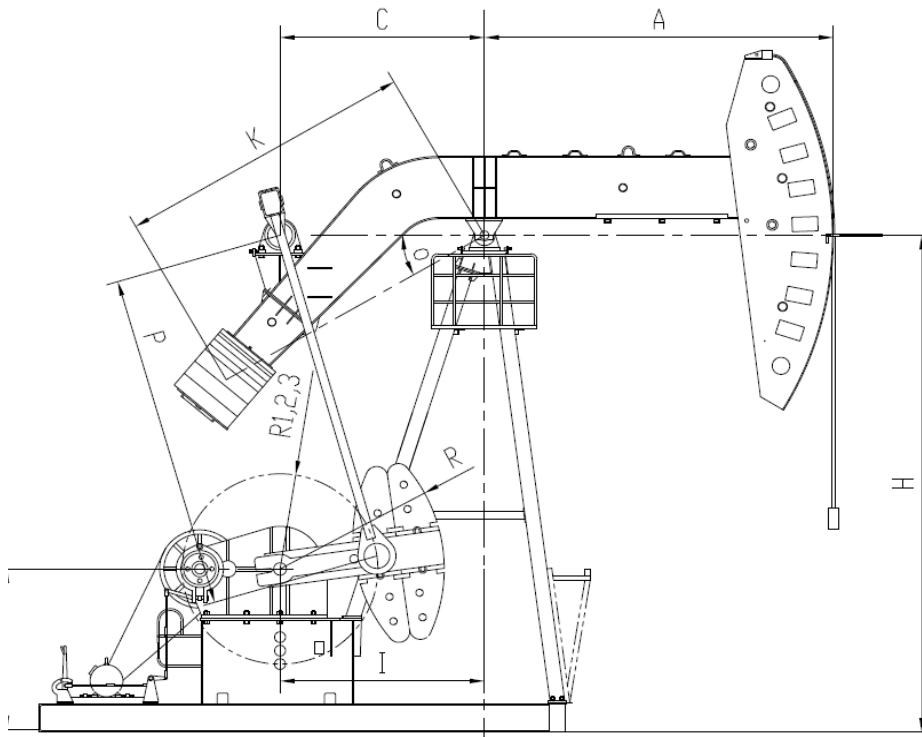
At the beginning of the upstroke, when the horsehead is down, the motor and the counterweight have to do most of the work to bring the rods and fluid up.

With the curved beam pumping unit, the curved walking beam places the beam weight at the furthest distance from the samson post to provide maximum leverage, helping the crank weight and the motor to bring the horsehead back up.

At the end of the upstroke, when the horsehead is up, the motor and conventional weight do the least amount of work. The weight of the rodstring takes the horsehead back down. Conventional pumping units use the weight of the rodstring to pull the crank weight back up, which usually results in negative torque on the motor. With the curved beam pumping unit, the beam weight is at a minimum distance from the samson post, resulting in less leverage to resist the horsehead's fall.

Size	Structure	Stroke, in	Gear Box Ratio	Set Back, in	Structural Unbalance with No Tail Weights, lbf	Weight, lbf	Bottom of Stroke, in	Effective Counterbalance, lbf
80	119	64 (54) (42)	30.12	52	375	17,070	52	7,000
114	143	74 (64) (54)	30.52	51.5	300	25,300	54	8,000
160	173	86 (74) (64)	31.71	52	-225	30,800	54	10,300
228	173	100 (86) (74)	31.62	76	450	38,750	75	10,700
228	213	100 (86) (74)	31.62	75	450	42,000	55	11,500
320	256	120 (100) (86)	30.87	74	200	49,700	48	14,300
320	256	144 (120) (100)	32.47	98	200	52,600	52	14,300
456	256	144 (120) (100)	31.5	98	200	52,600	52	14,300
456	305	168 (144) (120)	31.5	121.5	211	67,100	68	15,300
640	305	168 (144) (120)	31.3	121.5	211	71,000	74	16,400
640	365	192 (168) (144)	31.3	147	211	74,270	46	18,800
912	365	192 (168) (144)	31.05	147	579	81,800	46	18,000
912	427	168 (144) (120)	31.05	121.5	211	81,000	57	23,100
1,280	427	192 (168) (144)	30.47	147	410	90,000	52	23,100
1,280	427	216 (192) (168)	30.47	166	-516	92,000	52	23,100

# Curved Beam Pumping Unit



## Curved Beam Pumping Unit Geometry Dimensions

### Straight Beam

Unit Type	A, in	C, in	I, in	P, in	H, in	G, in	O, °	K, in	R1, in	R2, in	R3, in	R, in
C 80-119-64	84.06	62.2	62.99	85.04	143.7	58.66			12.4	17.72	23.03	56
C 114-143-74	82.68	66.14	70.08	114.76	181.1	66.93			18.7	23.62	28.54	65
C 160-173-86	94.49	73.23	73.23	102.76	169.29	66.93			20.87	25.98	31.1	65
CW 228-173-100	118.11	73.23	77.95	126.77	200.79	74.8	30	95	19.69	24.8	29.53	73
CW 228-213-100	118.11	94.49	77.95	134.65	208.66	74.8	31	106	24.33	32.2	38.35	73
CW 320-256-144	141.73	94.49	94.49	134.65	224.41	90.55	28	110	31.1	38.19	45.28	89
CW 456-256-144	141.73	94.49	94.49	134.65	224.41	90.55	28	110	31.1	38.19	45.28	89
CW 456-305-168	165.35	110.24	110.24	185.63	275.59	90.55	29	158	37.8	45.28	52.76	89
CW 640-305-168	165.35	110.24	110.24	185.63	275.59	90.55	29	158	37.8	45.28	52.76	89
CW 640-365-192	192.13	110.24	110.24	185.63	275.59	90.55	29	177	37.8	45.28	52.76	89
CW 912-365-192	192.13	110.24	110.24	185.63	275.59	90.55	29	161	37.8	45.28	52.76	89
CW 912-427-168	165.35	119.09	126.77	198.23	287.4	90.55	29	169	41.73	49.21	56.89	89
CW 1280-427-192	188.98	119.09	126.77	198.23	287.4	90.55	29	169	41.73	49.21	56.89	89
CW 1280-427-216	208.66	119.09	126.77	198.23	299.21	102.36	29	169	43.31	50.79	58.47	100

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