



THE GOLDEN ROD – 30 SERIES

The Golden Rod 30 Series is a Pump-To-Surface hydraulic jack with a 40,000lb lift capacity designed specifically for the production of heavy oil and high sand cut wells. The GR-30 series represents a revolution in artificial lift systems, reciprocating the entire tubing string – rather than sucker rods – to work a large bore downhole pump. This technique can produce highly viscous oils, sand and formation solids as the production is lifted to the surface through a clean, unrestricted pipe.

APPLICATIONS

Permanent Applications	Temporary Applications
Heavy Crude Medium Crude High Sand Content High Debris Content	Re-entries Trouble Wells New Well Cleaning Formation Stimulation Prolonged Wellbore Cleanout



SAVE ON INSTALLATION COSTS

Compact and Light Weight

- Low transportation costs
- Installs with the existing rig, flushby or small picker
- Very portable, easily moved
- No site preparation required
- No ground disturbance

Bolts Directly to the Wellhead

- No pilings
- No concrete pads
- No gravel pads
- No guidewires
- No misalignment issues
- Extremely quick installation

Versatile and Adaptable

- Adapts to any wellhead or powerskid unit
- Bolts directly to slant wells

SAVE ON OPERATING COSTS

- Variable Up and Down stroke speeds
- Can independently control up and down speeds
- Optimize production with the turn of a knob

Simple Operation and Adjustment

- Adjust stroke length in seconds

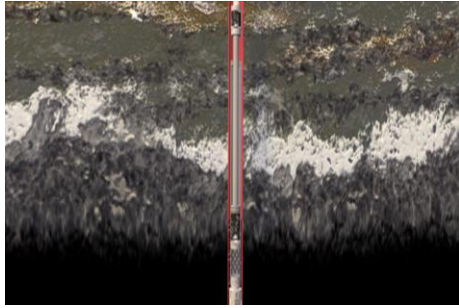
Pump to Surface Applications

- Reduces or eliminates workover costs
- Capable of high sand cuts/reduces sand slugs
- Pumps tubing and a large-bore pump

SAVE ON MAINTENANCE COSTS

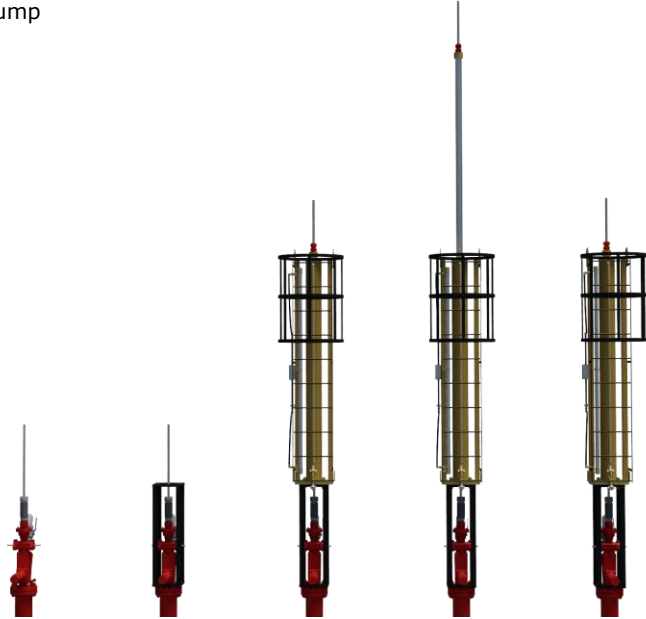
- Maintenance Friendly Design
- Can install/remove without downhole interference
- No open hole time
- Install and service from ground level
- Optional surface level coil tubing access for cleanout
- Can attach to top of polish rod with flush-by to work the downhole pump
- Few moving parts

HOW IT WORKS



1) The Golden Rod 30 Series

- a) The downhole pump, attached to an anchor, is run into the well
- b) Tubing is run to a cross-over joint just below surface and the anchor is set
- c) A polished rod is run above surface
- d) The wellhead or ICI's coil tubing access wellhead (the Y-tool) is installed
- e) The service rig clamps off on the stuffing box leaving 3 ft stickup
- f) ICI drops 4 studs from a standard wellhead and installs long studs
- g) The pedestal stand sits on the wellhead bolts and is attached with the long studs
- h) The ICI hydraulic jack is bolted onto the pedestal stand
- i) A connecting rod connects the polished rod to the top of the pump jack
- j) The ICI Hydraulic jack reciprocates, lifting the tubing string up and down to work the downhole pump



Key advantages – Continuous Pump-to-Surface versus other artificial lift systems

- The only currently known solution for *extreme* sand and viscosity
- Successfully deployed for years as a Cold Heavy Oil Production (CHOPS) technique
- Able to produce highly viscous fluids (i.e. 9 API crude)
- Able to produce pyrite, shale, coal, chert, silts and clays asphaltines, paraffin and other waxes
- Can produce drilling mud, cement and perforation debris in post-drill wellbore cleanouts
- Destabilizes sand bridges
- Can function in "pumped off" condition or in episodic sand, water and gas



SPECIFICATIONS – Surface Equipment

Model	GR-30-120
Variable Stroke Length	0"-120"
Shipping Weight	1,280lbs
Vertical Unit Height	12'2"
Maximum Lift	40,000lbs (65,000lbs with GR-40 Series)
Prime Mover Power Source	Propane/Gas/Diesel Engine or Electric Motor
Installation	
Vertical Well	1-3 hours
Slant Well	1-3 hours
Installation Equipment Required	1 or 2 Tonne Picker
Strokes Per Minute (based on 10')	3 (or quicker with shorter stroke length)
Strokes Per Minute Enhanced*	6

*Requires Regen Circuit or N2 Counterbalance

PRODUCTION CAPABILITIES

7 liter PTS Pump Volume Chart

Stroke Length (Feet)	Strokes Per Minute							
	1		2		3		4	
	m3/day	bbls/day	m3/day	bbls/day	m3/day	bbls/day	m3/day	bbls/day
1	1.67	10.50	3.33	20.95	5.01	31.51	6.68	42.02
2	3.34	21.01	6.66	41.89	10.02	63.03	13.36	84.03
3	5.01	31.51	9.99	62.84	15.03	94.54	20.04	126.05
4	6.68	42.02	13.32	83.78	20.04	126.05	26.72	168.07
5	8.35	52.52	16.65	104.73	25.05	157.56	33.40	210.09
6	10.02	63.03	19.98	125.67	30.06	189.08	40.08	252.10
7	11.69	73.53	23.31	146.62	35.07	220.59	46.76	294.12

9.75 liter PTS Pump Volume Chart

Stroke Length (Feet)	Strokes Per Minute							
	1		2		3		4	
	m3/day	bbls/day	m3/day	bbls/day	m3/day	bbls/day	m3/day	bbls/day
1	2.33	14.66	4.67	29.37	6.99	43.97	9.32	58.62
2	4.66	29.31	9.34	58.75	13.98	87.93	18.64	117.25
3	6.99	43.97	14.01	88.12	20.97	131.90	27.96	175.87
4	9.32	58.62	18.68	117.50	27.96	175.87	37.28	234.49
5	11.65	73.28	23.35	146.87	34.95	219.84	46.60	293.11
6	13.98	87.93	28.02	176.25	41.94	263.80	55.92	351.74

14 liter PTS Pump Volume Chart

Stroke Length (Feet)	Strokes Per Minute							
	1		2		3		4	
	m3/day	bbls/day	m3/day	bbls/day	m3/day	bbls/day	m3/day	bbls/day
1	1.67	10.50	3.33	20.95	5.01	31.51	6.68	42.02
2	3.34	21.01	6.66	41.89	10.02	63.03	13.36	84.03
3	5.01	31.51	9.99	62.84	15.03	94.54	20.04	126.05
4	6.68	42.02	13.32	83.78	20.04	126.05	26.72	168.07
5	8.35	52.52	16.65	104.73	25.05	157.56	33.40	210.09
6	10.02	63.03	19.98	125.67	30.06	189.08	40.08	252.10
7	11.69	73.53	23.31	146.62	35.07	220.59	46.76	294.12
8	13.36	84.03	26.64	167.57	40.08	252.10	53.44	336.14
9	15.03	94.54	29.97	188.51	45.09	283.62	60.12	378.15
10	16.70	105.04	33.30	209.46	50.01	314.56	66.80	420.17



19 liter PTS Pump Volume Chart

Stroke Length (Feet)	Strokes Per Minute							
	1		2		3		4	
	m3/day	bbls/day	m3/day	bbls/day	m3/day	bbls/day	m3/day	bbls/day
1	2.33	14.66	4.67	29.37	6.99	43.97	9.32	58.62
2	4.66	29.31	9.34	58.75	13.98	87.93	18.64	117.25
3	6.99	43.97	14.01	88.12	20.97	131.90	27.96	175.87
4	9.32	58.62	18.68	117.50	27.96	175.87	37.28	234.49
5	11.65	73.28	23.35	146.87	34.95	219.84	46.60	293.11
6	13.98	87.93	28.02	176.25	41.94	263.80	55.92	351.74
7	16.31	102.59	32.69	205.62	48.93	307.77	65.24	410.36
8	18.64	117.25	37.36	234.99	55.92	351.74	74.56	468.98
9	20.97	131.90	42.03	264.37	62.91	395.70	83.88	527.61
10	23.30	146.56	46.70	293.74	69.90	439.67	93.20	586.23

26 liter PTS Pump Volume Chart

Stroke Length (Feet)	Strokes Per Minute							
	1		2		3		4	
	m3/day	bbls/day	m3/day	bbls/day	m3/day	bbls/day	m3/day	bbls/day
1	3.11	19.56	6.22	39.12	9.33	58.69	12.44	78.25
2	6.22	39.12	12.44	78.25	18.66	117.37	24.88	156.50
3	9.33	58.69	18.66	117.37	27.99	176.06	37.32	234.74
4	12.44	78.25	24.88	156.50	37.32	234.74	49.76	312.99
5	15.55	97.81	31.10	195.62	46.65	293.43	62.20	391.24
6	18.66	117.37	37.32	234.74	55.98	352.11	74.64	469.49
7	21.77	136.93	43.54	273.87	65.31	410.80	87.08	547.73
8	24.88	156.50	49.76	312.99	74.64	469.49	99.52	625.98
9	27.99	176.06	55.98	352.11	83.97	528.17	111.96	704.23
10	31.11	195.68	62.20	391.24	93.30	586.86	124.44	782.73

37 liter PTS Pump Volume Chart

Stroke Length (Feet)	Strokes Per Minute							
	1		2		3		4	
	m3/day	bbls/day	m3/day	bbls/day	m3/day	bbls/day	m3/day	bbls/day
1	4.84	30.44	9.68	60.89	14.52	91.33	19.36	121.77
2	9.68	60.89	19.37	121.84	29.04	182.66	38.72	243.55
3	14.52	91.33	29.05	182.72	43.56	273.99	58.08	365.32
4	19.37	121.84	38.73	243.61	58.08	365.32	77.48	487.35
5	24.21	152.28	48.41	304.50	72.60	456.65	96.84	609.12
6	29.05	182.72	58.09	365.39	87.12	547.98	116.20	730.90
7	33.89	213.17	67.77	426.27	101.64	639.32	135.56	852.67
8	38.73	243.61	77.45	487.16	116.16	730.65	154.92	974.45
9	43.57	274.06	87.13	548.05	130.68	821.98	174.28	1096.22
10	48.41	304.50	96.81	608.93	145.20	913.31	193.64	1218.00

57 liter PTS Pump Volume Chart

Stroke Length (Feet)	Strokes Per Minute							
	1		2		3		4	
	m3/day	bbls/day	m3/day	bbls/day	m3/day	bbls/day	m3/day	bbls/day
1	5.47	34.41	10.94	68.81	16.41	103.22	21.88	137.63
2	10.94	68.81	21.88	137.63	32.82	206.44	43.76	275.25
3	16.41	103.22	32.83	206.50	49.23	309.66	65.64	412.88
4	21.88	137.63	43.76	275.25	65.64	412.88	87.52	550.50
5	27.35	172.03	54.70	344.06	82.05	516.09	109.40	688.13
6	32.82	206.44	65.64	412.88	98.46	619.31	131.28	825.75
7	38.29	240.84	76.58	481.69	114.87	722.53	153.16	963.38
8	43.76	275.25	87.52	550.50	131.28	825.75	175.04	1101.00
9	49.23	309.66	98.46	619.31	147.69	928.97	196.92	1238.63
10	54.70	344.06	109.40	688.13	164.10	1032.19	218.80	1376.25



ICI Artificial Lift Inc.

Box 21027
Lloydminster Alberta
T9V 2S1

Phone: 780.872-7470
Web: www.ici-solutions.ca