



**Simplex Castings Ltd.**

[www.simplexcastings.com](http://www.simplexcastings.com)

**SUCKER ROD PUMPING UNIT**





**SIMPLEX** with its 65 years of industrial background, especially 25 years in making of SRP Surface Units, has placed Simplex in the front row of manufacturers of these Pumping Units.

**SIMPLEX** has several types of pumping units to offer such as Conventional, Beam Balanced, Flex Lift and Front Geometry with unique configurations which means the right pumping unit for the right artificial lift.

**SIMPLEX** Pumping Units are best in design, rugged in nature, more dependable, simple to operate and easy to maintain.

**SIMPLEX** a name in this field, makes a difference in quality, care, reliability, service, responsiveness, spare parts availability and customer satisfaction.

## **SUCKER ROD SURFACE PUMPING UNIT**

### **APPLICABLE STANDARDS & IMPORTANT FEATURES**

Sucker Rod Surface Pumping Unit with API monogram shall be designed, constructed and tested in accordance with concerned API applicable codes/standard listed but not limited to

- (i) API Specifications 11E (Eighteenth Edition) - 2008 The latest for Sucker rod pumping unit
- (ii) IS:2062 Standard for structural steel.
- (iii) ASTM-A-193/IS : 1367 - Specification for Studs.
- (iv) ASTM-A-194/IS : 1367 - Specification for Nuts.
- (v) ASTM-A-36/Fe410WA/WB, IS : 2062 - Structural Steel, testing and materials.
- (vi) API RP11L-RP for design calculation for Sucker Rod Pumping system (Conventional Type)
- (vii) AGMA - Applicable standard for Helical and Herringbone speed reducers for oil field pumping units.
- (viii) AWS D1-Structural steel welding code.

### **MASTER WEIGHTS :**

Master Weights will have counter balance effect for example 16000-18000 Lbs for C-320D Model and the Units will be complete with rack and pinion / set type counter weight shifting arrangement.

### **HORSE HEAD :**

Units will have Horse Head, which will swing horizontally to both sides of walking beam with the help of gear box to facilitate work over operations. Wire line for horse head will be supplied as per API RP 11E and that the Horse head will be attached to the walking beam in such a manner so as to prevent falling off due to high rod part or other sudden load changes.

### **ELECTRIC MOTOR BASE FRAME :**

Unit shall have suitable size motor base frame complete with screw type mechanism system for motor alignment and belt tightening arrangement at ground level (motor in client's scope).

### **CENTRE BEARING ASSEMBLY :**

Centre Bearing assembly, which fits on the Samson post, shall be provided with adjustment bolts for precision alignment.

### **LADDERS :**

Ladders shall be provided on Samson post for easy accessibility for repair / maintenance of horse head, Central Bearing etc.

**DOUBLE REDUCTION DOUBLE HELICAL HERRING BONE GEAR REDUCER :**

Units shall have Double Herring Bone (Double Helical) Reduction Gear Reducer as per APT-11E. Heavy duty herring bone double reduction (double helical) gear reducer having positive feed lubrication to all the bearings shall be built in accordance with API-11E standard and shall be capable of safely operating at 2-8 SPM with stated Electric motors. All sizes of taper lock bush / sleeve fit type motor pulleys / auxiliary pulleys for achieving 2 to 8 SPM will be supplied. Two sets of suitable belts in inch sizes with each units shall be supplied and that the Motor base shall be at ground level. Motor and gear pulleys shall have space saver groove of C section and suitable for V-belts. The gear reducer pulley shall be properly fitted with sleeve on the pinion gear shaft. The gear reducer housing shall be provided with Gear oil filling point, Gear inspection cover and gauge stick (with minimum-maximum marking) for checking gear oil level.

**BASE FRAME :**

Unit Base shall be sufficiently strong with heavy duty lifting eyes for easy loading and unloading.

**BRAKES :**

Pumping Unit Brakes shall have sufficient braking capacity to withstand a torque exerted by the cranks at any crank position with a maximum amount of counter balance torque designed for these Units and the braking torques will be effective with the pumping unit at rest, under normal operating condition with the well load disconnected. Regulating nuts of the brake will be of Stainless Steel and all other Brake linkages from brake unit of gear reducer to the hand locking lever shall be with anti corrosive paint/treatment.

**PAINT :**

Units shall be synthetic enamel painted (one coat primer plus two finish coats) after adequate surface preparation and all machine parts and fasteners etc. Shall be coated with rust preventive paint. Client will inform colour scheme for the paint requirement. Otherwise following paint color will be observed :

- A. Support : Light Green
- B. Moving Parts : Light Yellow,
- C. Parts with Danger : Red
- D. Marks : Black

**WALKING BEAM :**

Following equation shall be used for rating conventional walking beams as shown in figure 1 of API-11E:  $W = f_c b S_x / A$  where :  $W$  = Walking beam rating in pounds of polished rod load.  $f_c$  = Compressive stress in bending in pounds per square inch (maximum allowable stress will be as per table 1 of API - 11E.)  $S_x$  = section modulus in cubic inches. The gross section of the rolled beam will be used except that holes or welds will not be used on the tension flange in critical zone as indicated on the drawing in API-11E figure - 1.  $A$  = distance from centre line of saddle bearing to centre line of well in inches as per figure-1 of API - 11E  $C$  = distance from centre line of saddle bearing to centre line of equalizer bearing in inches as per figure-1 of API-11E.

**NOTE :**

The equation given above is based on the conventional beam construction using a single rolled section. With unconventional construction or built up section, due regard shall be given to change in loading, to checking stresses at all critical sections and to the existence of stress concentrating factors.

**MATERIALS :**

Material of construction shall be ASTM A-36/Fe 410 WB, IS 2062 Structural Steel.

**TYPE OF LUBRICATION OF BEARINGS :**

Auxiliary reduction shall have oil/grease bath type lubrication of bearings.

**FOUNDATION BOLTS :**

12 Nos. suitable foundation bolts shall be supplied with hold down channels for each unit.

**BEARINGS :**

Bearings of the pumping unit gear reducer, Central bearing, Equalizer bearing, Pitman bearing and any other bearings used in the unit shall be of best industry standard as per API specification 11 E.

**FASTENERS :**

Fastener bolts and nuts of sucker rod pumping unit shall be provided with plain and spring washers and lock nuts.

**SPANNERS/WRENCHES :**

Surface unit shall be provided with one complete set of spanners/wrenches to fasten all the nuts bolts of the SRP Surface Unit.

**INTERCHANGEABILITY OF PARTS :**

All the parts of one set of surface sucker rod pumping unit shall be interchangeable with another set of surface unit of the same specification supplied.

**STROKE COUNTING METER :**

Mechanical stroke counting meter shall be provided with each SRP Surface Unit for recording the total number of strokes of the unit run.

**SHIPMENT & PACKING :**

Shipping of all components of each individual unit shall be done together, secured in a single lift metallic framework consentment so that inter mixing of parts should be avoided. Packing list shall be provided separately with each unit.

All the loose items like fasteners shall be properly packed in the plastic/polythene sheets and suitable wooden boxes to avoid weather exposure during stocking.

**CARRIER BAR :**

Carrier bar shall be designed and manufactured in three pieces to hold the wire lines and polished rod separately to facilitate removal of polished rod independently.

**HORSE HEAD PIN :**

Provision will be made for fitting and removal of horse head pin with operational ease with proper Lubrication system.

**AVOIDANCE OF OVER TIGHTENING & STRAINING OF FASTENERS :**

Special care shall be taken for Sampson post assembly (legs) dimensions and up down marking so that site assembly can be made without any over tightening and straining of the fasteners.

**LIFTING LUGS FOR SAFE HANDLING OF HORSE HEAD & WALKING BEAM :**

Horse head and walking beam shall be provided with two lifting lugs for safe and balanced handling at the site

**INSPECTION COVER :**

Access steps shall be provided to facilitate approach to Gear reducer top inspection cover.

**BELT GUARD :**

Belt guard support channels shall be detachable type to facilitate easy removal during maintenance.

**TECHNICAL MANUALS :**

- (A) Required sets of following technical manuals and catalogues will be supplied for each rating type of SRP Surface Units without any extra cost :
1. Installation and Commissioning manual.
  2. Foundation Plan of SRP Unit Base.
  3. Operation and maintenance manual including lubrication instruction. Stroke & Torque Factor table as per approved data form A2 of API-11E
  4. Crank counter balance tables as per approved data form A1 of API-11E.
  5. Gear Reducer data sheet as per figure-14 of API-11E.
  6. Pulley combination table.
  7. General Arrangement drawings giving part details of Gear reducer, centre bearing assembly (rear) tail-equalizer bearing assembly and crank pin bearing assembly with respective bearing identification numbers will be provided.
- (B) Two sets of latest editions of API-11E authenticated copies of API publications related to SRP Surface Units will be supplied.

### Manufacturing Range of Conventional Pumping Units :

SL. No.	Model/Size	Gear Reducer Peak Torque Rating (Thousands of Inch Lbs)	Polished Rod/ Structure Load Rating (Hundred Lbs)	Max Stroke Length (inch)
▪	C-912D-470-240	912,000	47,000	240, 211, 181
▪	C-912D-427-216	912,000	42,700	216, 185, 155
▪	C-912D-427-192	912,000	42,700	192, 165, 138
▪	C-912D-305-192	912,000	30,500	192, 165, 138
▪	C-912D-365-168	912,000	36,500	168, 144, 121
▪	C-912D-305-168	912,000	30,500	168, 144, 121
▪	C-912D-427-144	912,000	42,700	144, 123, 102
▪	C-640D-305-192	640,000	30,500	192, 165, 138
▪	C-640D-305-168	640,000	30,500	168, 144, 121
▪	C-640D-365-144	640,000	36,500	144, 123, 102
▪	C-640D-305-144	640,000	30,500	144, 123, 102
▪	C-640D-256-144	640,000	25,600	144, 123, 102
▪	C-640D-305-120	640,000	30,500	120, 102, 84
▪	C-456D-305-168	456,000	30,500	168, 144, 121
▪	C-456D-305-144	456,000	30,500	144, 123, 102
▪	C-456D-256-144	456,000	25,600	144, 123, 102
▪	C-456D-365-120	456,000	36,500	120, 102, 84
▪	C-456D-305-120	456,000	30,500	120, 102, 84
▪	C-456D-256-120	456,000	25,600	120, 102, 84
▪	C-320D-256-144	320,000	25,600	144, 123, 102
▪	C-320D-256-120	320,000	25,600	120, 102, 84
▪	C-320D-213-120	320,000	21,300	120, 102, 84
▪	C-320D-305-100	320,000	30,500	100, 85, 70
▪	C-320D-256-100	320,000	25,600	100, 85, 70
▪	C-320D-213-86	320,000	21,300	86, 71, 56
▪	C-228D-213-120	228,000	21,300	120, 102, 84
▪	C-228D-173-100	228,000	17,300	100, 86, 72
▪	C-228D-246-86	228,000	24,600	86, 71, 56
▪	C-228D-213-86	228,000	21,300	86, 71, 56
▪	C-160D-173-86	160,000	17,300	86, 74, 62
▪	C-160D-200-74	160,000	20,000	74, 64, 54
▪	C-160D-173-74	160,000	17,300	74, 64, 54
▪	C-114D-143-74	114,000	14,300	74, 62, 51
▪	C-114D-173-64	114,000	17,300	64, 54, 44
▪	C-114D-143-64	114,000	14,300	64, 52, 40

## BEAM BALANCED PUMPING UNIT

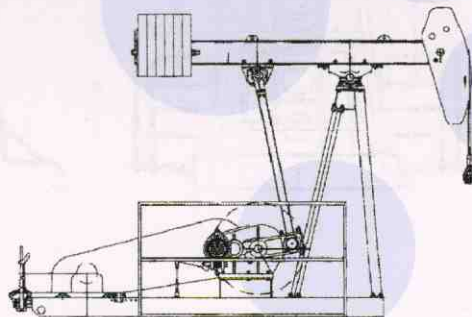


## "B" SERIES BEAM BALANCED PUMPING UNIT HAS VARIOUS MODELS

- It is Walking Beam Pumping Unit.
- It is highly reliable, simple to operate and easy to maintain with a longer service life.
- It ensures smooth and reliable operation due to Gear reducer being involute herring-bone gearing.
- It is foldable and light in weight
- It is simple to install and convenient to transport.

## MANUFACTURING RANGE OF "B" SERIES BEAM BALANCED PUMPING UNIT

Sl. No.	Model/Size	Gear Reducer Peak Torque Rating (Thousands of Inch Lbs)	Polished Rod/ Structure Load Rating (Hundred Lbs)	Max Stroke Length (inch)
A.	B-80D-76-64	80,000	7,600	64,54
B.	B-80D-133-54	80,000	13,300	54,41
C.	B-80D-119-64	80,000	11,900	54,41
D.	B-80D-76-54	80,000	7,600	54,41
E.	B-80D-109-48	80,000	10,900	48,35
F.	B-57D-109-54	57,000	10,900	54,41
G.	B-57D-89-54	57,000	8,900	54.41
H.	B-57D-76-54	57,000	7,600	54,41
I.	B-57D-109-48	57,000	10,900	48,35
J.	B-57D-89-48	57,000	8,900	48,35
K.	B-40D-89-48	40,000	8,900	48,35
L.	B-40D-76-42	40,000	7,600	42,29
M.	B-25D-67-36	25,000	6,700	36,27

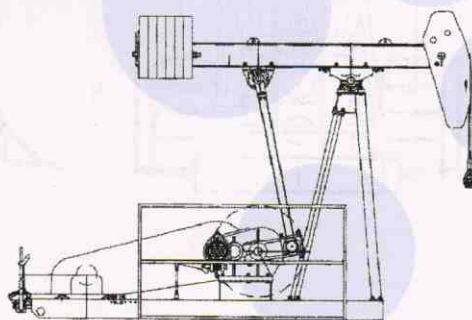


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A.	B-80D-76-64	80,000	7,600	64,54
B.	B-80D-133-54	80,000	13,300	54,41
C.	B-80D-119-64	80,000	11,900	54,41
D.	B-80D-76-54	80,000	7,600	54,41
E.	B-80D-109-48	80,000	10,900	48,35
F.	B-57D-109-54	57,000	10,900	54,41
G.	B-57D-89-54	57,000	8,900	54,41
H.	B-57D-76-54	57,000	7,600	54,41
I.	B-57D-109-48	57,000	10,900	48,35
J.	B-57D-89-48	57,000	8,900	48,35
K.	B-40D-89-48	40,000	8,900	48,35
L.	B-40D-76-42	40,000	7,600	42,29
M.	B-25D-67-36	25,000	6,700	36,27



# SURFACE PUMPING UNIT

# CONVENTIONAL TYPE SRP

## EXAMPLE MODEL

C 640D - 305 - 192

CONVENTIONAL TYPE PUMPING UNIT

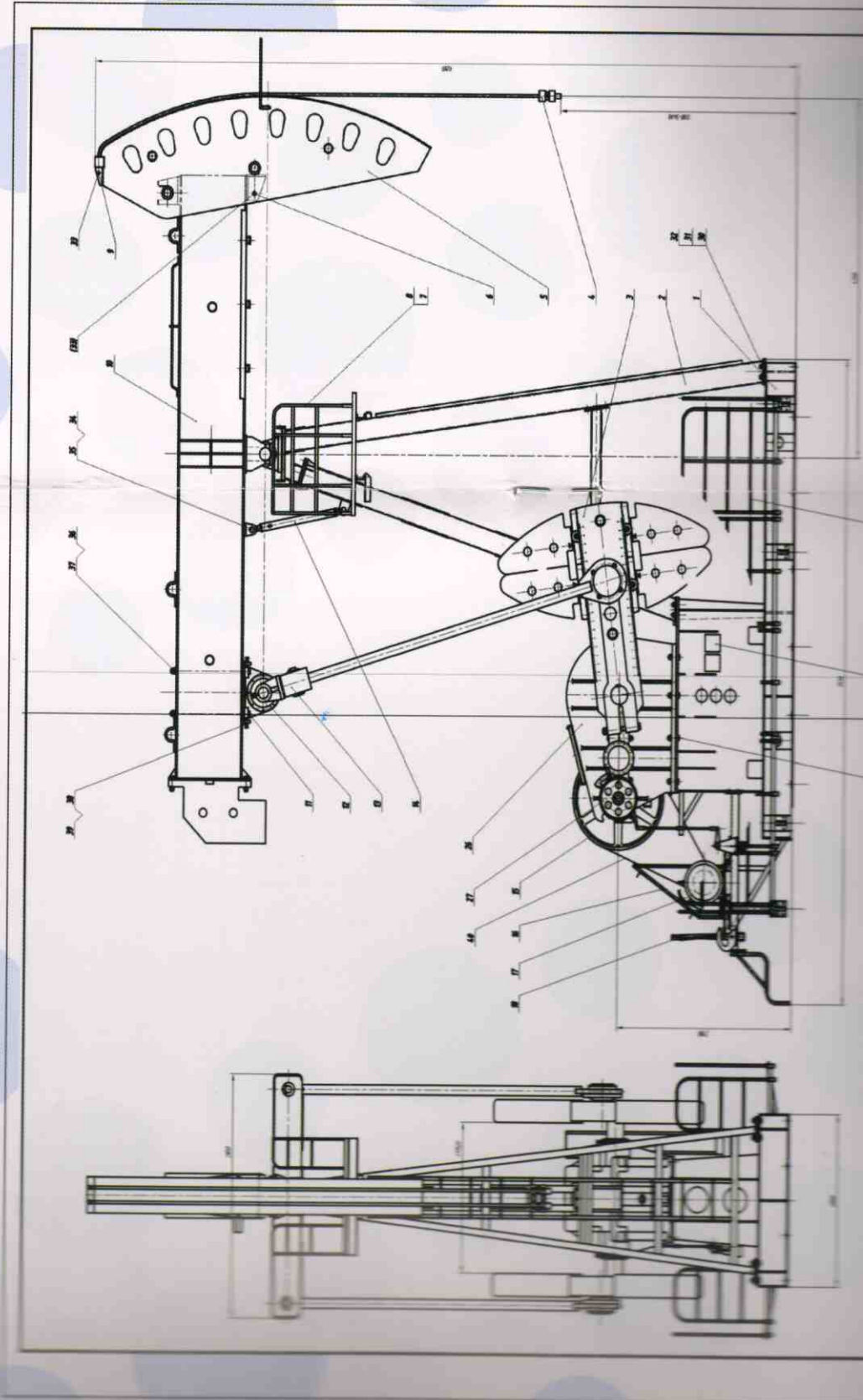
GEAR REDUCER PEAK TORQUE RATING (THOUSANDS OF INCH. LBS.)

DOUBLE REDUCTION GEAR REDUCER

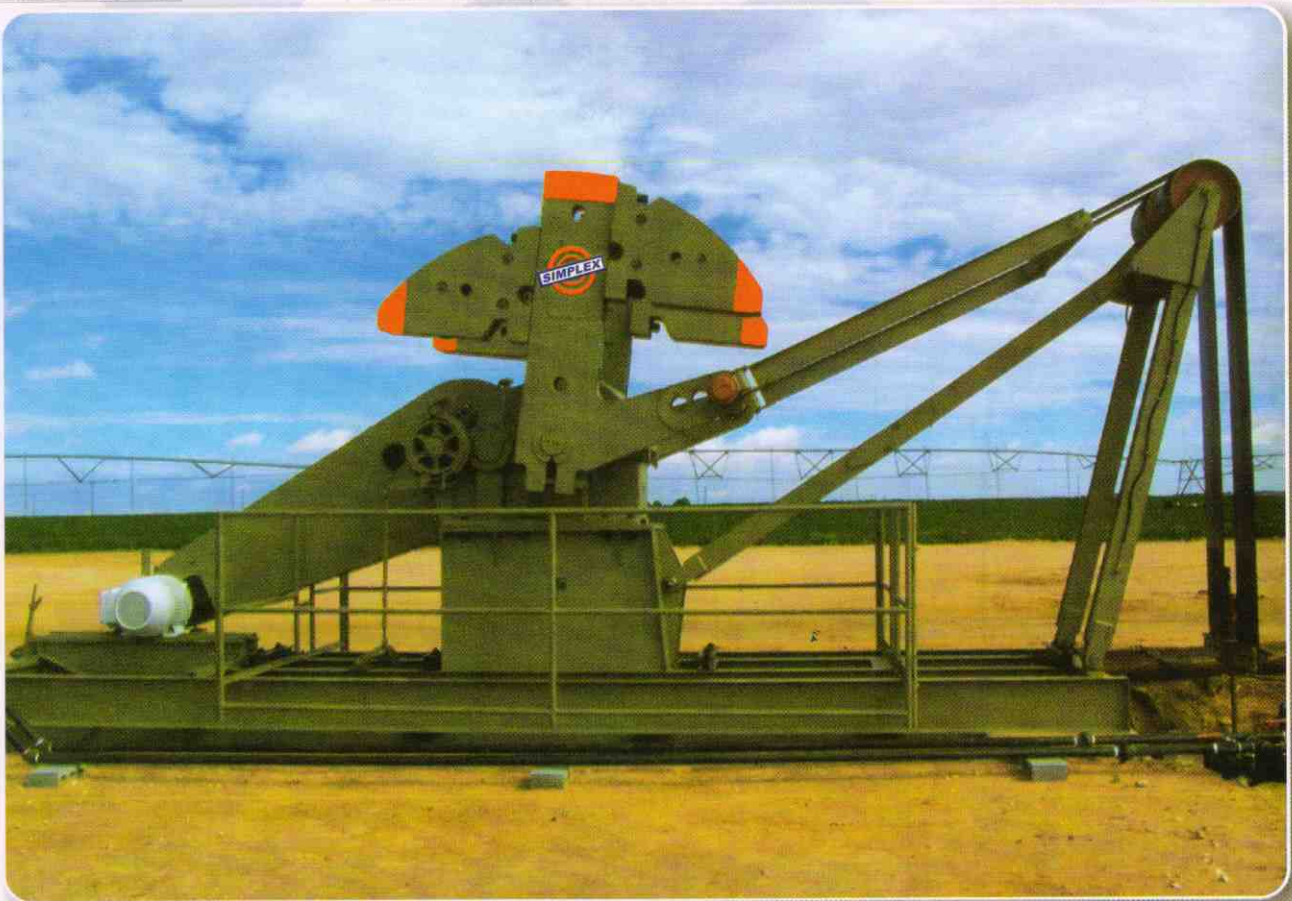
POLISHED ROD/STRUCTURE LOAD RATING (HUNDRED LBS.)

MAXIMUM STROKE LENGTH (INCHES)

- BRACKET
- GUARD ADJUSTER
- BRIDLE CARRIER
- BRACKET
- BRAKE ARRANGEMENT
- SAFETY LOOP
- PULLEY GUARD
- LADDER
- RAILING
- BRAKE DRUM
- ADJUSTING ROD (SMALL)
- ADJUSTING ROD (BIG)
- V-GROOVED PULLEY
- FIXING DEVICE
- REDUCER
- SAMSON POST REAR
- SAMSON POST FRONT
- COUNTER WEIGHT
- CRANK
- CRANK PIN ASSLY.
- PITMAN ARM
- EQUALIZER BEAM
- TAIL BEARING
- CENTER BEARING
- MOTOR BASE FRAME
- HORSE HEAD
- WALKING BEAM



## FLEXLIFT PUMPING UNIT



### "F" SERIES PUMPING UNIT HAS VARIOUS MODELS

- It is a Low Profile new kind on non-beam energy saving Pumping Unit for Flex Lift.
- This Pumping Unit has Roller and Belts to form flexible drive and improve impulsive load which prolongs service life of Gear Reducer.
- It is completely balanced due to abnormal design of Crank Arm.
- It ensures smooth and reliable operation due to Gear Reducer being involute herring-bone gearing.
- It is foldable and light in weight

### MANUFACTURING RANGE OF "F" SERIES FLEXLIFT (NON BEAM) PUMPING UNITS :

SL. No.	Model/Size	Gear Reducer Peak Torque Rating (Thousands of Inch Lbs)	Polished Rod/ Structure Load Rating	Max Stroke Length (inch) (Hundred Lbs)
A.	F-320D-256-120	320,000	25,600	120, 102, 85
B.	F-320D-256-100	320,000	25,600	100, 85, 70
C.	F-320D-246-86	320,000	24,600	86, 71, 56
D.	F-228D-256-100	228,000	25,600	100, 85, 70
E.	F-228D-246-86	228,000	24,600	86, 71, 56
F.	F-228D-213-86	228,000	21,300	86, 71, 56
G.	F-228D-246-74	228,000	24,600	74, 64, 53
H.	F-160D-173-86	160,000	17,300	86, 74, 62
I.	F-160D-200-74	160,000	20,000	74, 64, 53
J.	F-160D-173-74	160,000	17,300	74, 64, 53

