ARTIFICIAL LIFT SYSTEMS

Evolution Oil Tools Inc

www.eotools.com

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GAS SEPARATORS

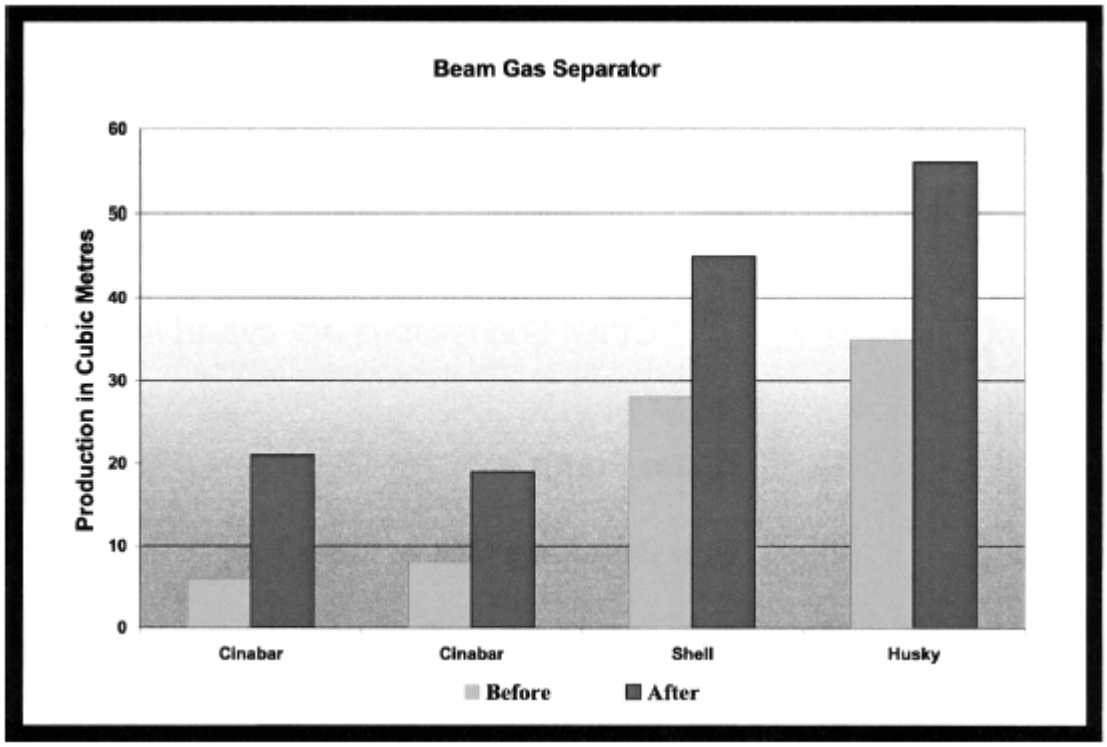
NO TURN TOOLS & TORQUE ANCHORS

TUBING ROTATORS & ACCESSORIES

MISCELLANEOUS TOOLS

BEAM PUMP DOWNHOLE GAS SEPARATOR

The Beam Pump Downhole Gas Separator was designed to provide a method of allowing gas to separate out of the solution and migrate up annulus, preventing gas locking of the downhole pump, thus increasing both pump efficiency and production.



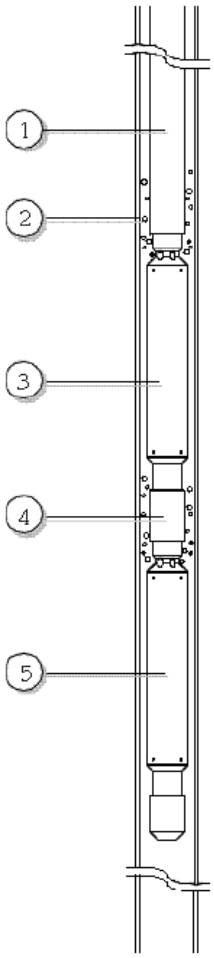
CASE HISTORY

Case	Dates	Pump Efficiency Increase	Production Gain
2	1-Nov-95	37%	23/BPD 3.7 m3/day

CASE 1
Pump efficiency has been increased from 36% to 73%. The extra production was obtained with a 38 mm pump that replaces the 51 mm pump used before. At the same time, operating costs were reduced by decreasing the equipment loading as well as the number of cycles.
Capital expenditures on equipment (i.e. jacks, rods, motors, etc.) can be significantly reduced, as smaller pump sizing is possible.

Note: Evolution can also offer you stainless Beam Pump Gas Separators

BEAM PUMP DOWNHOLE GAS SEPARATOR



Beam Pump Downhole Gas Separator Specifications

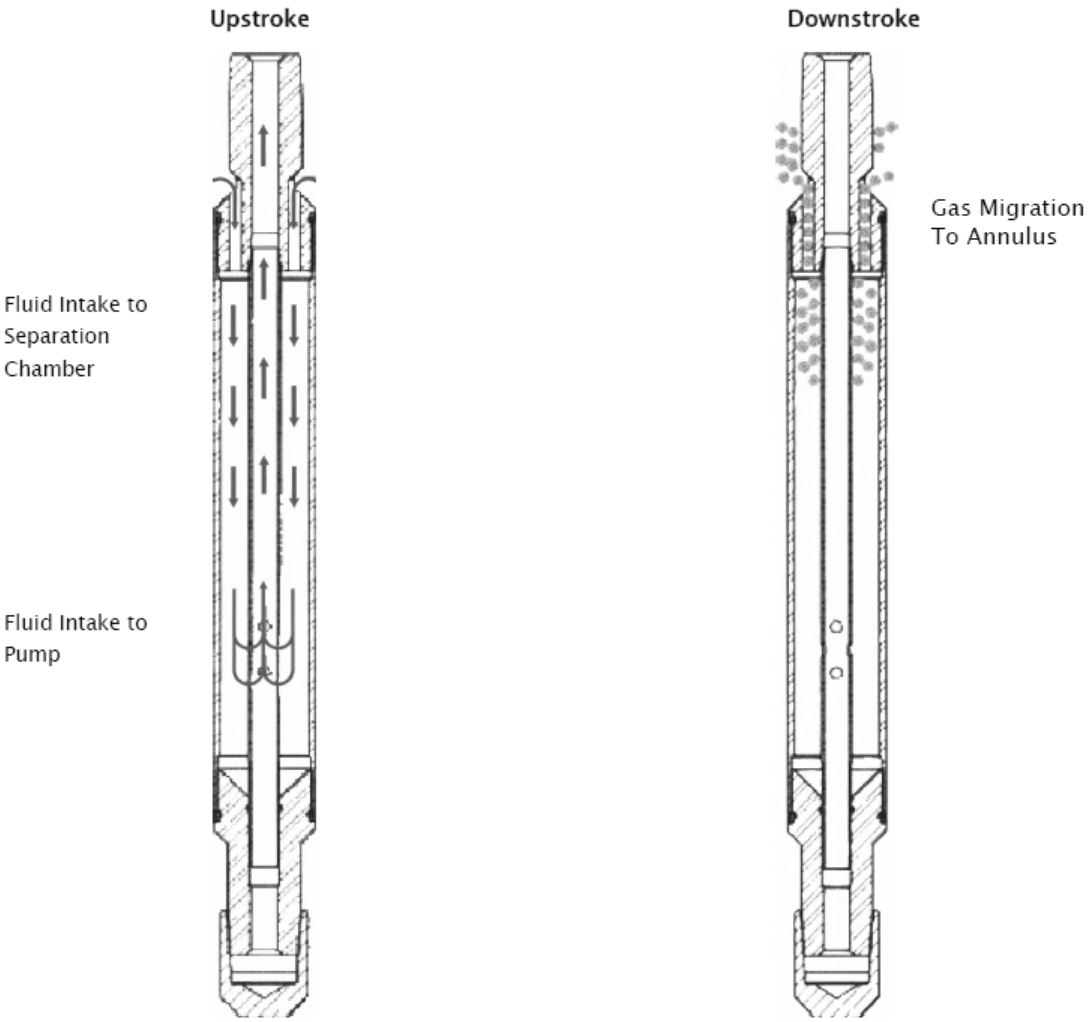
Casing OD		Product Number	Tool OD		Tool Length		Connections	Daily
inch	mm		inch	mm	inch	mm	inch	
4-1/2	114.3	221-10-4523-00	3.25	82.6	89.4	2271	2-3/8 EU	20
5-1/2	139.7	221-10-5527-00	4.25	108	89.4	2271	2-7/8 EU	40
7	177.8	221-10-7035-00	5.25	133.4	89.4	2271	3-1/2 EU	60

NOTE: Larger daily production can be produced by stacking multiple separator units.

Other Connections are available upon request

1. Beam Pump
2. Gas Breaking Out of Solution
3. Beam Pump Gas Separator
4. Standard Collar
5. Second Separator in Tandem

BEAM PUMP DOWNHOLE GAS SEPARATOR



The theory of this design is to provide a quiet chamber within the separator with a suction tube at the bottom of the quiet chamber, ported in such a way to allow fluid entering the separator to reach a predetermined fall rate, which allows time for the gas to migrate out of the solution on the down stroke of the pump and migrate up the annulus.

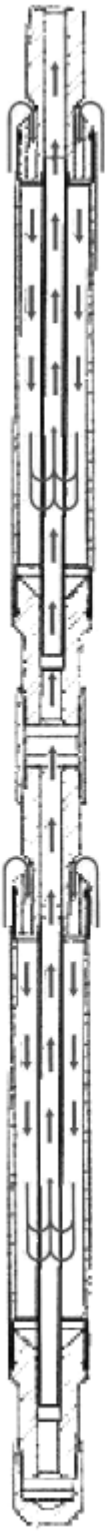
SERIES
CONFIGURATION

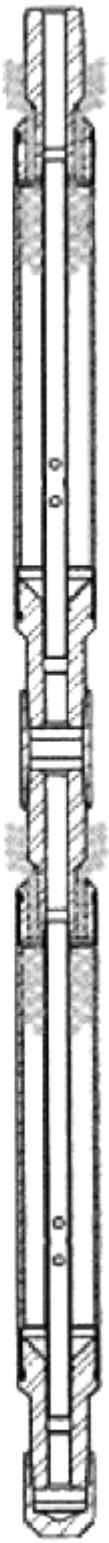
Fluid Intake to Separation Chamber

Fluid intake to pump

Fluid intake to Separation chamber

Fluid intake to pump





Gas migration to annulus

Gas migration to annulus

P.C. PUMP GAS SEPARATOR

The P.C. Pump Gas Separator has been designed as a continuous flow downhole gas separator to be used in conjunction with progressive cavity pumps. They use centrifugal forces to separate the gas from the produced liquids, before they enter the pump. Liquids will be carried through into the pump suction while the separated gases are forced to migrate up the annulus.

Eliminating the associated gases before entering the pump has definite advantages:

- The Pump efficiency and pump rates will be increased.
- Elimination of CO^2 and H^2S gases before they enter the pump will enhance pump performance as well as increases its run life.

There are two configurations of the P.C. Pump Gas Separator

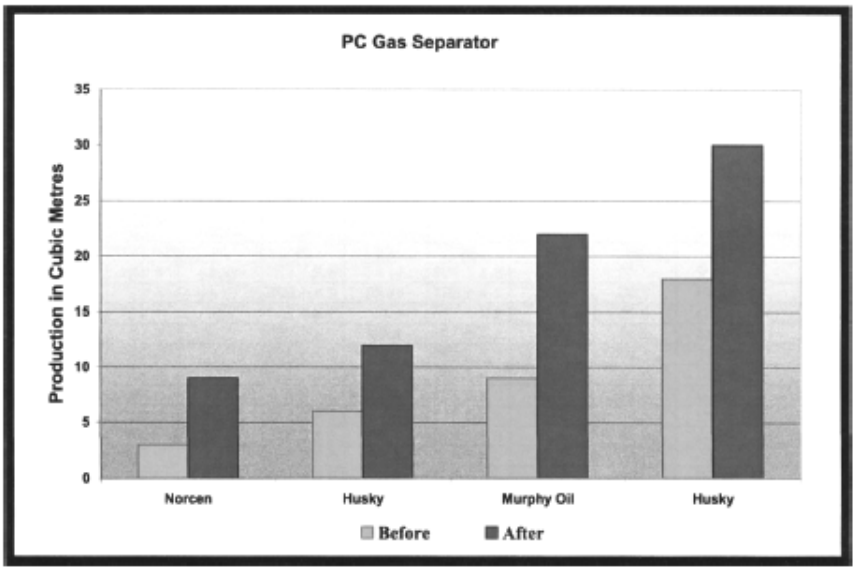
- Light Oil configuration for oil 24˚ API and greater.
- Heavy Oil configuration for oil less than 24˚ API.

The Heavy Oil P.C. Pump Gas Separator is designed to generate more intense separation forces to “shear” the gas out.

Installation

1. The P.C. Pump Gas Separator must be installed in the string below the pump.
2. When the pump is landed in the well, the P.C. Separator should be above the perforations.

If it is desired or necessary for the fluid intake to be below the perforations, tubing may be ran below the P.C. Separator (tail joints).



Patent Information: Canadian: #2,207,770 – US: #5,902,378

SPECIFICATIONS

For Heavy Oil P.C. Separator

Casing OD		Product Number	Tool OD		Tool Length		Top Connections	Bottom Connections
	mm		inch	mm	inch	mm	inch	inch
5-1/2	139.7	222-10-5527-00	4.25	108.0	45.0	1143	2-7/8 EU	2-7/8 EU
5-1/2	139.7	222-10-5535-00	4.50	114	45.0	1143	3-1/2 EU	3-1/2 EU
7	177.8	222-10-7035-00	5.25	133.4	55.5	1409.7	3-1/2 EU	3-1/2 EU
7	177.8	222-10-7045-00	5.50	139.7	55.5	1409.7	4-1/2 EU	3-1/2 EU
7	177.8	222-11-7045-00	5.50	139.7	55.5	1409.7	4-1/2 EU	4-1/2 EU
9-5/8	244.5	222-10-9545-00	7.00	177.8	69.4	1762.8	4-1/2 EU	4-1/2 EU

For Light Oil P.C. Separator

Casing OD		Product Number	Tool OD		Tool Length		Top connections	Bottom Connections
inch	mm		inch	mm	inch	mm	inch	inch
4	101.6	223-10-4023-00	3.25	82.6	28.13	714.5	2-3/8 EU	2-3/8 EU
4-1/2	114.3	223-10-4527-00	3.625	92.1	29.76	755.9	2-7/8 EU	2-7/8 EU
5	127.0	223-10-5027-00	4.00	121.9	38.00	965.2	2-7/8 EU	2-7/8 EU
5-1/2	139.7	223-10-5527-00	4.25	108.0	38.00	1143.0	2-7/8 EU	2-7/8 EU
5-1/2	139.7	223-10-5535-00	4.50	114.3	37.80	1143.0	3-1/2 EU	3-1/2 EU
7	177.8	223-10-7035-00	5.25	133.4	39.48	1409.7	3-1/2 EU	3-1/2 EU
7	177.8	223-10-7045-00	5.50	139.7	39.48	1409.7	4-1/2 EU	3-1/2 EU
7	177.8	223-11-7045-00	5.50	139.7	39.18	1409.7	4-1/2 EU	4-1/2 EU
9-5/8	244.5	223-10-9545-00	7.00	177.8	49.65	1762.8	4-1/2 EU	4-1/2 EU

Flow_Areas

Size	Config.	Tool Length	Tool O.D.	Tool I.D.	Inlet Ports Size	Inlet Flow Area	Outlet Ports Size	Outlet Flow Area	Connections	
									Top	Bottom
Units		in	in	in	in	in	in	in	EU Box	EU Box
9-5/8"	Light Oil	49.62	7.00	6.25	8 x 1.500	14.60	6 x 1.625	12.44	4-1/2"	4-1/2"
	Heavy Oil	69.40	7.00	6.25	8 x 1.500	14.60	6 x 1.625	12.44	4-1/2"	4-1/2"
7"	Light Oil	40.10	5.25	4.25	8 x 1.125	8.00	6 x 1.250	7.37	3-1/2"	3-1/2"
	Light Oil	39.48	5.50	4.25	8 x 1.125	8.00	6 x 1.250	7.37	4-1/2"	4-1/2"
7"	Heavy Oil	56.10	5.25	4.25	8 x 1.125	8.00	6 x 1.250	7.37	3-1/2	3-1/2
	Heavy Oil	56.10	5.50	4.25	8 x 1.125	8.00	6 x 1.250	7.37	4-1/2"	4-1/2"
5-1/2"	Light Oil	38.00	4.25	3.25	8 x 0.813	4.16	6 x 0.875	3.61	2-7/8	2-7/8
	Light Oil	37.80	4.50	3.25	8 x 0.813	4.16	6 x 0.875	3.61	3-1/2	3-1/2
5-1/2"	Heavy Oil	45.00	4.25	3.25	8 x 0.813	4.16	6 x 0.875	3.61	2-7/8	2-7/8
	Heavy Oil	45.00	4.50	3.25	8 x 0.813	4.16	6 x 0.875	3.61	3-1/2	3-1/2
5"	Light Oil	38.00	4.00	3.25	8 x 0.813	4.16	6 x 0.875	3.61	2-7/8	2-7/8
4-1/2"	Light Oil	29.76	3.63	2.88	8 x 0.75	3.53	6 x 0.813	3.12	2-7/8	2-7/8
4"	Light Oil	28.13	3.25	2.63	8 x 0.594	2.24	6 x 0.625	1.86	2-3/8	2-3/8

P.C. PUMP GAS SEPARATOR

A P.C. Pump Gas Separator may be run into any P.C. well where you might suspect gas content to be affecting the production performance. There are 4 main reasons why you would want to install a Gas Separator in your well.

1. The efficiency of your P.C. Pump is low. This can be caused by significant gas content in the fluids you are lifting.

2. Your P.C. Pump's working life is short. High gas content can cause the stator to burn up and break apart due to friction without lubrication as the rotator turns inside it.

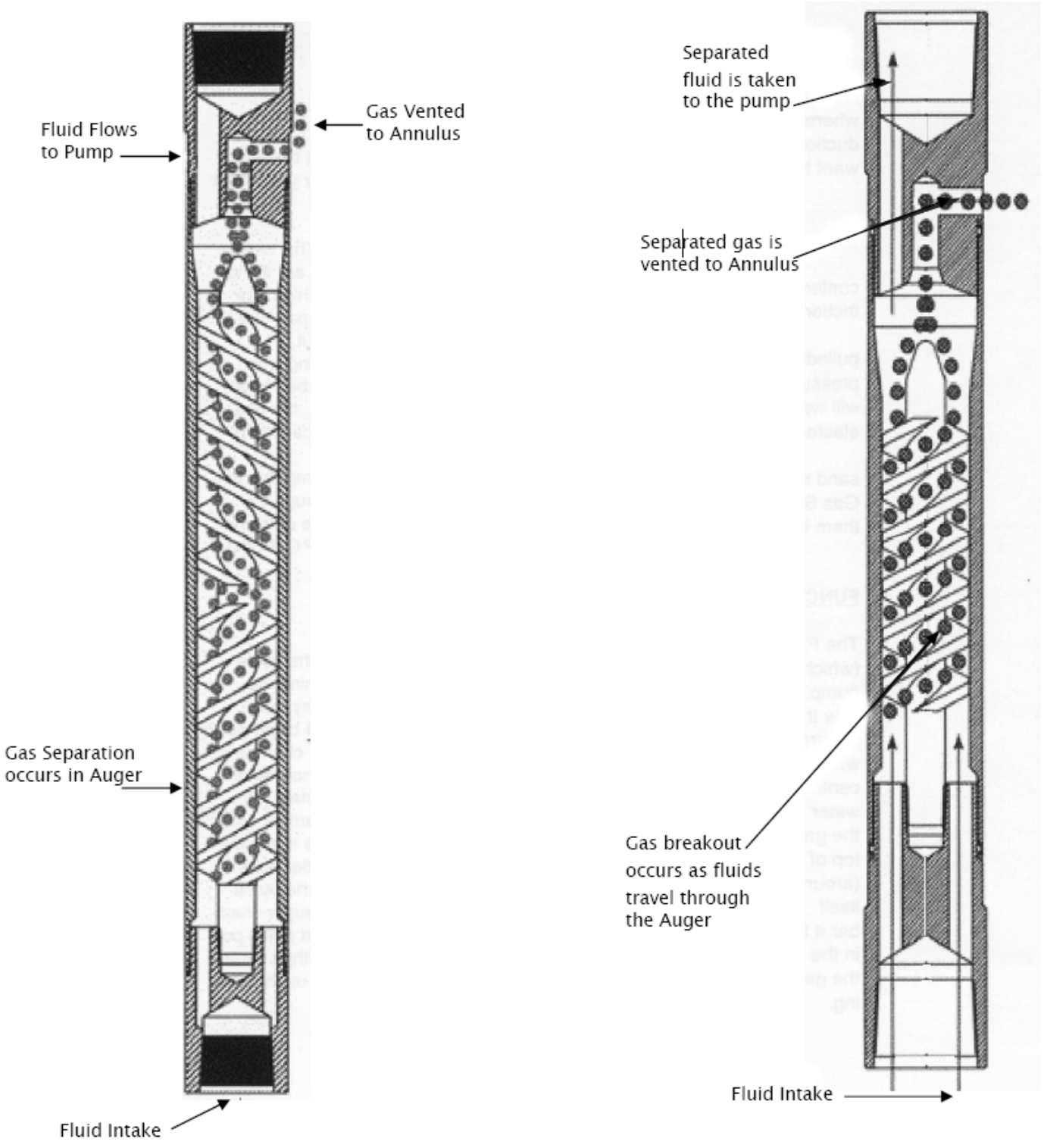
3. Your pump elastomer experiences blistering when pulled from the hole. Over time gas becomes absorbed under pressure into the elastomer. Upon pulling the pump, the gas will want to escape to the lower pressure. This will cause the elastomer of your pump to blister.

4. You have torquing problems with your pump due to sand content. As the fluids and sand are pulled through the Gas Separator the centrifugal forces they experience combine them into a slurry which is easily producible by the P.C. Pump.

FUNCTION OF P.C. PUMP GAS SEPARATOR

The P.C. Pump Gas Separator functions by forcing the fluids (which contain gases) to follow through it before reaching the pump. As the fluids first enter the Gas Separator they must flow through 8 intake ports which divide the flow and begin gas separation. The fluid then moves through the auger chamber, which subjects the fluid to centrifugal force. The principles of centrifugal force maintain that the more dense materials (e.g. water and oil) will be forced to the outside of the chamber while the gas will remain close to the middle. As the fluids reach the top of the auger chamber liquid is removed via 6 outlet ports (around the perimeter of the top sub) which lead to the pump itself. As the separated gas reaches the top of the auger chamber it flows along a tapered end which guides it to an outlet port in the center of the top sub. This central outlet port then vents the gas into the annulus, where it may then migrate up the casing.

P.C. PUMP GAS SEPARATOR



DYNAMIC TORQUE ANCHOR®
(DTA)

The Dynamic Torque Anchor has been developed to provide a simple and reliable solution for tuning back-off when progressing cavity pumps are used. The unique patented design allows for easy running and retrieval in a variety of downhole conditions including:

- Deep Wells
- Horizontal Wells
- Heavy Oil

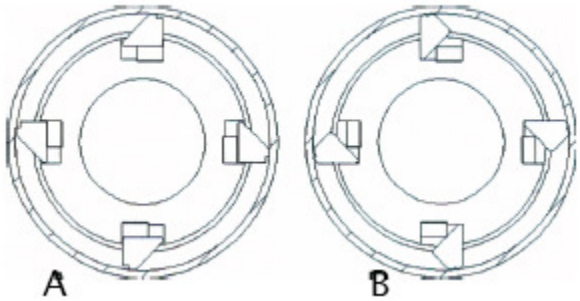
The Dynamic Torque Anchor® allows for full bore configuration, maximum bypass in the annulus and its function is not affected by the presence of produced sand.

The Dynamic Torque Anchor® uses wedge shaped anchoring blocks which bite into the casing wall when right hand torque is generated in the tubing string. These anchoring blocks are spring loaded so that transfer of torque to the casing is immediate (clockwise) and the tubing string may be freely rotated to the left (counterclockwise). Due to the original design of the anchoring blocks, only a simple engaging and disengaging procedure is required.

The running procedure of the Dynamic Torque Anchor® is as simple as the design itself. The anchor is installed below the pump and can be run in and out of the well freely as shown in Figure 1A. When the anchor has reached the required depth, the application of approximately 300ft-lbs right hand torque, will securely engage the anchoring blocks to the casing wall, as illustrated in Figure 1B. The setting torque may now be locked in and the pump operation started.

To disengage the anchor, simply stop the pump operation and relax initial setting torque.

FIGURE 1



DYNAMIC TORQUE ANCHOR®
(DTA) SPECIFICATIONS

Casing OD		Product Number	Tool OD		Tool ID		Tool Length		Connections
inch	mm		inch	mm	inch	mm	inch	mm	inch
4-1/2	114.3	210-10-4523-00	3.63	92.20	2.00	50.8	24.0	609.6	2-3/8 EU
5	127.0	210-10-5027-00	4.00	101.60	2.44	62.0	24.0	609.6	2-7/8 EU
5-1/2	139.7	210-10-5527-00	4.25	107.95	2.44	62.0	24.0	609.6	2-7/8 EU
5-3/4	146.1	210-10-5727-00	4.50	114.30	2.44	61.98	24.0	609.6	2-7/8 EU
6	152.4	210-10-6027-00	4.75	120.65	2.44	61.98	24.0	609.6	2-7/8 EU
6-5/8	168.3	210-10-6527-00	5.25	133.35	2.44	61.98	24.0	609.6	2-7/8 EU
6-5/8	168.3	210-10-6535-00	5.25	133.35	3.00	76.2	24.0	609.6	3-1/2 EU
7	177.8	210-10-7027-00	5.63	143.00	2.44	61.98	24.0	609.6	2-7/8 EU
7	177.8	210-10-7035-00	5.63	143.00	3.00	76.2	24.0	609.6	3-1/2 EU
7	177.8	210-10-7045-00	5.63	143.00	4.00	101.6	24.0	609.6	4-1/2 EU
7-5/8	193.7	210-10-7635-00	6.25	158.75	3.00	76.2	26.0	660.4	3-1/2 EU
8-5/8	219.1	210-10-8535-00	7.25	184.20	3.00	76.2	26.0	660.4	3-1/2 EU
8-5/8	219.1	210-10-8545-00	7.25	184.20	3.00	76.2	26.0	660.4	4-1/2 EU
9-5/8	244.5	210-10-9535-00	8.25	209.60	4.00	101.6	28.0	711.2	3-1/2 EU
9-5/8	244.5	210-10-9545-00	8.25	209.60	4.00	101.6	28.0	711.2	4-1/2 EU
10-3/4	273.1	210-10-1045-00	9.25	235.00	4.00	101.6	28.0	711.2	4-1/2 EU

Tool Size (Casing OD)		Tool OD with Retaining Blocks Fully Collapsed		Torque Anchor Working Range (Casing ID)	
inch	mm	inch	mm	inch	mm
4-1/2	114.3	3.63	92.2	3.83-4.09	97.2-103.9
5	127.0	4.00	101.6	4.28-4.56	108.6-115.8
5-1/2	139.7	4.44	111.8	4.67-5.04	118.6-128.1
5-3/4	146.1	4.55	115.6	4.99-5.29	126.8-134.4
6	152.4	4.86	123.2	5.13-5.52	130.4-140.3
6-5/8	168.3	5.45	138.4	5.68-6.14	144.2-155.8
7	177.8	5.83	148.0	6.09-6.54	154.8-166.1
7-5/8	193.7	6.35	161.3	6.63-7.13	168.3-181.0
8-5/8	219.1	7.5	190.5	7.51-8.10	190.8-205.7
9-5/8	244.5	8.5	215.9	8.54-9.06	216.8-230.2
10-3/4	273.1	9.45	240.0	9.66-10.19	245.4-258.5

When not sure of the applications and/or running procedures, please contact Evolution Oil Tools Inc.

DYNAMIC TORQUE ANCHOR® WORKING RANGE

Important Notes:

- Do not set anchor across perforations or in collars.
- Setting the anchor below the perfs requires proper inspection procedures of the casing integrity and inside diameter.
- Never place the tongs around the anchoring blocks section of the anchor or on the retaining rings.
- Always replace anchoring blocks, springs and screws when redressing the anchor.

DYNAMIC TORQUE ANCHOR®
(DTA XB) – EXTRA BYPASS

The XB – Dynamic Torque Anchor® has been developed to provide extra bypass between the casing and the torque anchor. The extra by pass will allow for unrestricted flow and will avoid sand bridging around the tool.

The running procedures are the same as the Dynamic Torque Anchor®.

XB – Dynamic Torque Anchor® Specifications

Casing OD		Product Number	Tool OD		Tool ID		Tool Length		Connections
inch	mm		inch	mm	inch	mm	inch	mm	inch
4-1/2	114.3	211-10-4523-00	3.63	92.20	2.00	50.8	24.0	609.6	2-3/8 EU
5	127	211-10-5027-00	4.00	101.60	2.44	62.0	24.0	609.6	2-7/8 EU
5-1/2	139.7	211-10-5527-00	4.25	107.95	2.44	62.0	24.0	609.6	2-7/8 EU
5-3/4	146.1	211-10-5727-00	4.50	114.30	2.44	61.98	24.0	609.6	2-7/8 EU
6	152.4	211-10-6027-00	4.75	120.65	2.44	61.98	24.0	609.6	2-7/8 EU
6-5/8	168.3	211-10-6527-00	5.25	133.35	2.44	61.98	24.0	609.6	2-7/8 EU
6-5/8	168.3	211-10-6535-00	5.25	133.35	3.00	76.2	24.0	609.6	3-1/2 EU
7	177.8	211-10-7027-00	5.63	143.00	2.44	61.98	24.0	609.6	2-7/8 EU
7	177.8	211-10-7035-00	5.63	143.00	3.00	76.2	24.0	609.6	3-1/2 EU
7-5/8	193.7	211-10-7527-00	6.25	158.75	3.00	76.2	26.0	660.4	2-7/8 EU
7-5/8	193.7	211-10-7535-00	6.25	158.75	3.00	76.2	26.0	660.4	3-1/2 EU
8-5/8	219.1	211-10-8535-00	7.25	184.20	3.00	76.2	26.0	660.4	3-1/2 EU
8-5/8	219.1	211-10-8545-00	7.25	184.20	3.00	76.2	26.0	660.4	4-1/2 EU
9-5/8	244.5	211-10-9535-00	8.25	209.60	4.00	101.6	28.0	711.2	3-1/2 EU
9-5/8	244.5	211-10-9545-00	8.25	209.60	4.00	101.6	28.0	711.2	4-1/2 EU
10-3/4	273.1	211-11-1045-00	9.25	235.00	4.00	101.6	30.0	711.2	4-1/2 EU

CENTRALIZING DYNAMIC TORQUE ANCHOR® (CTA)

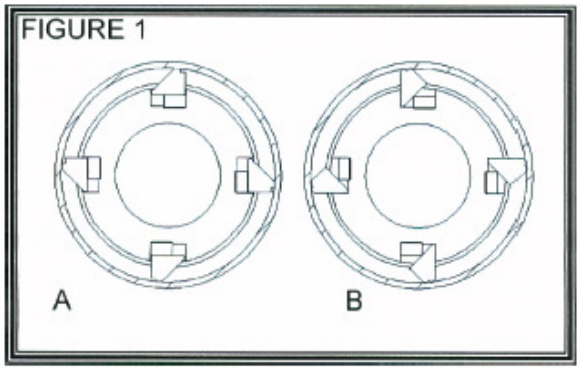
The Centralizing Dynamic Torque Anchor® has been developed to provide and reliable solution for tubing back-off when progressive cavity pumps are used. With the trend towards larger pumps being used for production, Evolution has developed the CTA to handle the increase vibration caused by these pumps. Its function in horizontal wells has also been significantly advanced by this new design. The unique patented design allows for easy running and retrieval in a variety of downhole conditions including:

- Deep Wells
- Horizontal Wells
- Heavy Oil

The Centralizing Dynamic Torque Anchor® allows for full bore configuration, maximum bypass in the annulus and its function is not affected by the presence of produced sand.

The Centralizing Dynamic torque Anchor® uses wedge shaped anchoring blocks which bite into the casing wall when right hand torque is generated in the tubing string. These anchoring blocks are spring loaded so transfer of torque to the casing is immediate (clockwise) and the tubing string may be freely rotated to the left (counterclockwise). In deviated wells, the centralizing blocks will prevent premature wear of the anchoring blocks during running in and out of the well. During the pumping operation, the centralizing blocks will attenuate the vibrations generated by the pimp and provide a soft contact between pump and casing. Due to the original design of the anchoring blocks, only a simple engaging and disengaging procedure is required.

The running procedure of the Centralizing Dynamic torque Anchor® is as simple as the design itself. The anchor is installed below the pump and can be run in and out of the well freely as shown in Figure 1A. When the anchor has reached the required depth, the application of approximately 300ft – lbs right-hand torque, will securely engage the anchoring blocks to the casing wall, as illustrated in Figure 1B. The setting torque may now be locked in and the pump operation started. To disengage the anchor, simply stop the pump operation and relax the initial setting torque.



CENTRALIZING DYNAMIC TORQUE ANCHOR® (CTA) SPECIFICATIONS

Alternate connections can be provided at customer's request

Casing OD		Product Number	Tool OD		Tool ID		Tool Length		Connections
inch	mm		inch	mm	inch	mm	inch	mm	inch
4-1/2	114.3	212-10-4523-00	3.63	92.20	2.00	50.8	30.0	762	2-3/8 EU
5	127.0	212-10-5027-00	4.00	101.60	2.44	62.0	30.0	762	2-7/8 EU
5-1/2	139.7	212-10-5527-00	4.25	107.95	2.44	62.0	30.0	762	2-7/8 EU
6-5/8	168.3	212-10-6527-00	5.25	133.35	2.44	61.98	30.0	762	2-7/8 EU
6-5/8	168.3	212-10-6535-00	5.25	133.35	3.00	76.2	30.0	762	3-1/2 EU
7	177.8	212-10-7027-00	5.63	143.00	2.44	61.98	30.0	762	2-7/8 EU
7	177.8	212-10-7035-00	5.63	143.00	3.00	76.2	30.0	762	3-1/2 EU
8-5/8	219.1	212-10-8535-00	7.25	184.20	3.00	76.2	32.0	812.8	3-1/2 EU
9-5/8	244.5	212-10-9545-00	8.25	209.60	4.00	101.6	34.0	863.6	4-1/2 EU

CENTRALIZING
DYNAMIC TORQUE ANCHOR®
EXTRA BYPASS (CTA XB)

The Centralizing XB Dynamic Torque Anchor® addresses the need for extra bypass required with large volume pumps and horizontal or deviated wells. The extra bypass will allow for more flow area and will avoid sand bridging around the tool.

The running procedures are the same as the Centralizing Dynamic Torque Anchor®

CENTRALIZING XB-DYNAMIC TORQUE ANCHOR® SPECIFICATIONS

Casing OD		Product Number	Tool OD		Tool ID		Tool Length		Conn-ections
inch	mm		inch	mm	inch	mm	inch	mm	inch
4-1/2	114.3	213-10-4523-00	3.63	92.20	2.00	50.8	30.0	762	2-3/8
5-1/2	139.7	213-10-5527-00	4.25	107.95	2.44	62.0	30.0	762	2-7/8
6-5/8	168.3	213-10-6527-00	5.25	133.35	2.44	61.98	30.0	762	2-7/8
6-5/8	168.3	213-10-6535-00	5.25	133.35	3.00	76.2	30.0	762	3-1/2
7	177.8	213-10-7027-00	5.63	143.00	2.44	61.98	30.0	762	2-7/8
7	177.8	213-10-7035-00	5.63	143.00	3.00	76.2	30.0	762	3-1/2
8-5/8	219.1	213-10-8535-00	7.25	184.20	3.00	76.2	32.0	812.8	3-1/2
9-5/8	244.5	213-10-9545-00	8.25	209.60	4.00	101.6	34.0	863.6	4-1/2

Alternate connections can be provided at customer's request

CRTA ROTATING
TUBING ANCHOR CATCHER

The CRTA Rotating Tubing Anchor Catcher is designed to hold the tubing string in tension during rod pump operations. The mandrel of the CRTA is free to rotate through the tool in the set position with tension pulled into the tubing. This allows the entire tubing string, including all tail pipe, gas/mud anchor, and the seating nipple to rotate. The CRTA is ideal in applications where there is a great deal of tail pipe below the anchor point. It is also ideal for applications such as highly deviated or horizontal wells, the tubing is run into the deviation or the horizontal sections and the anchor point is in the vertical section of the well.

Description:
The CRTA is a full bore tubing anchor with opposing slips. The bearing system in the tool is engaged in the set position and allows rotation through the tool. The CRTA is set with ¼ turn left hand rotation and released with ¼ turn right hand rotation. The tool has an emergency shear release system. Straight tension pulled on the tubing string shears the shear system and allows the lower cone to move away from the slips. The entire tool can then be pulled from the wellbore.

Operations:
Setting Instructions

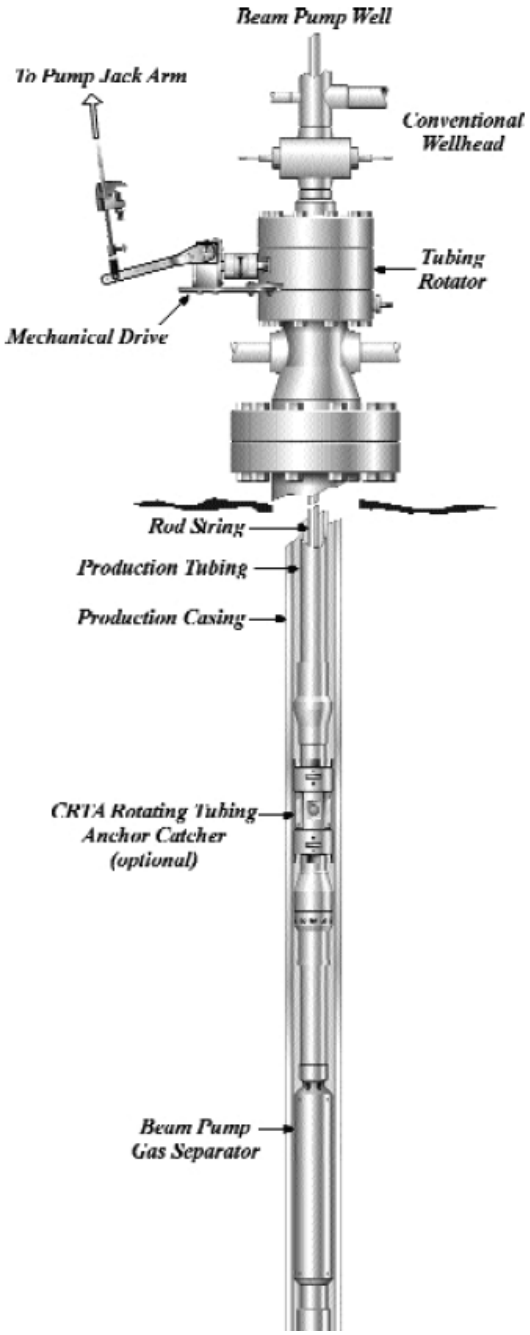
1. Determine the size of the anchor needed in relation to casing size, casing weight and tubing size.
2. Specify the shear vale desired (in 5,000 # intervals).
3. Function test anchor on surface, engaging and disengaging the C-Slot. Ensure the tool is placed back into the C-Slot (neutral position) before entering wellbore.
4. Make up tool onto tubing and run in slow through BOP's and wellhead.
5. After running in 3 or 4 joints, test the tool by disengaging the C-Slot and pull tension. If tool holds, engage back into neutral position and continue running in.
6. Run anchor to desired depth. To disengage from C-Slot, pull tubing 2 inches (at the tool), while holding left hand torque and continue to pull another 6 inches to engage the slips.

Release Instruction:

1. Lower tubing while rotating to the right. If the tubing goes into compression, you have missed the C-Slot. Pull up, rotating to the right and lower again.
2. If after a few tries this does not work, you can shear the tool by pulling tension on the tool exceeding the shear value in that specific tool.

Emergency Release
Application of tension will shear the screws in the tool. The lower cone bearing, and shear pin retainer will drop against the bottom sub where they will remain as the tool is pulled out of the well. The pick up shoulder on the mandrel will engage the slip ring and prevent the lower slips from contacting the lower cone. The slips will ride on the pick up shoulder.

CRTA TUBING ANCHOR
CATCHER WELL ASSEMBLY DIAGRAM



* **PATENT INFORMATION** U.S.:4,811,875 – 4,901,793 Canadian: 1,274,470

HALBRITE NO-TURN TOOL

SPECIFICALLY DESIGNED FOR PC PUMPS
The Halbrite No-Turn Tool patented cam-type slip was specifically designed to react to the torque loads created by a Progressive Cavity (PC) pump.
The more torque the pump generates, the harder the slips bite, ensuring the pump remains stationary.

RELAIBLE OPERATION AND RELEASE
The Halbrite No-Turn Tool's slip releases when the torque is released.
When set properly, in thousands of installations the Halbrite No-Turn Tool has never failed to release or let go while the pump is operating.

DESIGNED FOR ECONOMY AND STABILITY
The slips and drag blocks of the series NS No-Turn Tool have been incorporated into a single component, making the tool less expensive to overhaul and re-run. The longer slip face provides greater stability for the pump once the tool is engages.

SETTING AND RELEASE PROCEDURE

1. Make up No-Turn Tool on bottom of stator.
2. Run in to desired setting depth.
3. Land dognut.
4. Raise tubing two feet (0.6 meters)
5. Raise tubing to right and hold torque in tubing. (No Turn-Tool sets with 1 ¼ turn to right at the tool).
6. Maintain torque, lower tubing two feet (0.6 meters). Further rotation to the right will be required to maintain proper torque on tubing.
7. Maintaining torque, raise tubing two feet (0.6 meters).
8. Repeat steps 6&7 tow to three times (there will an increased weight on weight indicator).
9. Maintain torque, lower tubing and land dognut.
10. No-Turn Tool is set.

Working the torque down to the No-Turn Tool ensures a proper setting. All torque is trapped between the dognut and the No-Turn Tool, thus preventing movement in the tubing or pump.

To release the No-Turn Tool, release the torque.

HALBRITE NO-TURN TOOL

Introduced in 1988, the Halbrite No-Turn Tool was specifically designed to prevent the counter rotation of Progressive Cavity (PC) pump stators.

PERFORMANCE SPECIFICATIONS

TOOLS IN SERVICE: Over 10,000 sold in Canada, United States and Internationally.

SETTING MECHANISM: Rotational cam-type activator and slips which engage with right-hand torque.

RELEASE MECHANISM: Release right-hand torque- reliable release.

SLIP CHARACTERISTIC: Vertically cut slips for rotational engagement.

WELLBORE DEVIATION CONSIDERATIONS: none. Tool performance is unaffected by deviation. Performs the same at any angle, whether vertical or horizontal wells.

FAILURE FREQUENCY: Zero, when properly set.

DOWNTIME CAUSED BY FAILURE: None, when properly set.

MAXIMUM TORQUE: Unlimited.

Series NS No-Turn Tool – Mechanical Specifications

Casing OD		Tool OD		Tool ID		Tool Length		Thread Connection		Tool Weight	Setting Ranges	
inch	mm	inch	mm	inch	mm	inch	m	Inch EU	mm EU	kg	inch	mm
4-1/2	114.3	3.25	82.55	2.0	50.8	21.3	0.54	2-3/8	60.3	10.0 (22lbs)	3.66-4.15	92.96-105.4
5-1/2	139.7	4.50	114.3	2.5	63.5	22.5	0.57	2-7/8	73.0	18.9 (42lbs)	4.62-5.35	117.35-135.89
5-3/4	146.1	4.50	114.3	2.5	63.5	22.5	0.57	2-7/8	73.0	15.9 (35lbs)	4.990-5.290	126.75-134.37
6-5/8	168.3	4.50	114.3	2.5	63.5	22.5	0.57	2-7/8	73.0	20.3 (45lbs)	5.34-6.07	135.66-154.18
7	177.8	4.50	114.3	2.5	63.5	22.5	0.57	2-7/8	73.0	20.3 (45lbs)	5.34-6.07	135.66-154.19
7	177.8	5.70	144.8	3.0	76.2	23.5	0.60	3-1/2	88.9	30.2 (67lbs)	5.70-6.69	144.78-169.93
8-5/8	219.1	5.70	144.8	3.0	76.2	23.5	0.60	3-1/2	88.9	33.8 (75lbs)	6.60-7.59	167.64-192.79
9-5/8	244.5	5.70	144.8	3.0	76.2	23.5	0.60	3-1/2	88.9	35.6 (79lbs)	8.137-9.100	206.68-231.14

BASIC NO-Turn Tool

The basic No-Turn Tool incorporates a revolutionary new setting mechanism that is strong, reliable, economical to operate and service and has only one moving part.

Basic Tool Consists of:

- Female keyed mandrel
- Male keyed main slip
- Once piece cage

Features:

- Prevents tubing and stator back off
- Low maintenance
- No springs to break or change
- Superb flow characteristics in high sand and gas
- Ideal for heavy oil

Benefits:

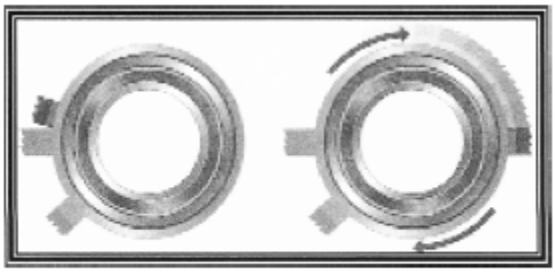
- Cost effective
- Maximize the pump life
- Simple to set and release

Recommended Setting Procedures

1. Make up Basic No-Turn Tool on bottom of Stator.
2. Run in to desire depth.
3. Install dognut.
4. Rotate tubing to the right until tool sets and hold torque in tubing.
5. Maintaining torque, lower tubing and land dognut.
6. Basic No-Turn Tool is set.

Release Procedure:

1. Rotate the tubing to the left to release torque (1 turn if possible).



BASIC NO-TURN TOOL
TOOLS SPECIFICATIONS

Casing OD		Product Code	Working Range		Tool ID		Tool Length		Connection
inch	mm		Lb/ft	Kg/m	inch	mm	inch	mm	inch
5-1/2	139.70	200-10-5527-00	14-23	20.83-34.23	2.44	62.0	24.25	616.0	2-7/8 EU
6-5/8	168.27	200-10-6527-00	20-32	29.96-47.62	2.44	62.0	24.25	616.0	2-7/8 EU
7	177.80	200-10-7035-00	17-32	25.30-47.60	3.00	76.2	24.50	622.3	3-1/2 EU
8-5/8	219.08	200-10-8535-00	24-36	35.71-53.57	3.00	76.2	18.00	457.2	3-1/2 EU
9-5/8	244.48	200-10-9535-00	36-53.5	53.57-79.60	3.00	76.2	23.00	584.2	3-1/2 EU

* **PATENT INFORMATION** U.S.:4,811,875 - 4,901,793 Canadian: 1,274,470

PRODUCT LIST
NO-TURN TOOLS AND TORQUE ANCHORS

5-1/2" -013lb ID = 5.044"		Total annular area (in²)
210-10-5527-00	Dynamic Torque Anchor	5.8
211-10-5527-00	Dynamic Torque Anchor XB	8.26
203-10-5527-00	Halbrite New Style No-Turn Tool	2.29
200-10-5527-00	Basic No-Turn Tool	7.38

6-5/8" -17lb ED = 6.135"		Total annular area (in²)
210-10-6527-00	Dynamic Torque Anchor	7.91
211-10-6527-00	Dynamic Torque Anchor XB	14.41
203-10-6527-00	Halbrite New Style No-Turn Tool	9.92
200-10-6527-00	Basic No-Turn Tool	14.72

7" -17lb ID = 6.538"		Total annular area (in²)
210-10-7027-00	Dynamic Torque Anchor	8.68
211-10-7027-00	Dynamic Torque Anchor XB	12.2
203-10-7035-00	Halbrite New Style No-Turn Tool	5.64
203-10-7027-00	Halbrite New Style No-Turn Tool	14.74
200-10-7035-00	Basic No-Turn Tool	16.77

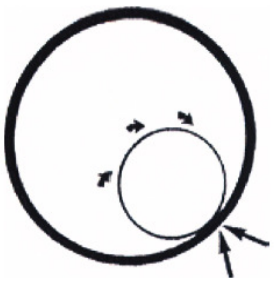
TUBING ROTATORS

The tubing in a rod pumped well represents the second largest investment in the well. Every day, every stroke on the pumping unit can cause wear in the tubing. On every stroke the rods move up and down in the tubing. The rods will always tend to lie on the downside of the tubing so on every stroke of the pumping unit the rods are wearing a path into the metal of the tubing, a path that will become a hole in the tubing.

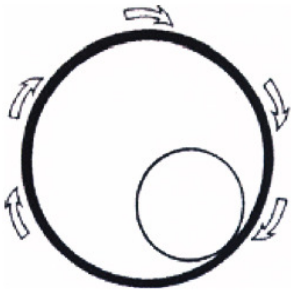
In a typical pumping well running at 10 strokes per minute, the rods will move against the tubing 14.400 times everyday. This wear will eventually cause a tubing failure. You are paying for a full 360°of tubing, yet because of the way the rods act in the tubing, you are only getting the use of 20° o f the tubing.

Rod rotators will reduce wear on the rods. Unfortunately the rods still lie in the tubing and wear away at the tubing.

There is a system that will give you the full use of the tubing you paid for. The Evolution Tubing Rotators use a very simple idea. Rotate the tubing. By rotating the tubing, the wear from the rod is equally distributed over the entire area of the tubing. The tubing will last longer and stay in the well where you want it to be.



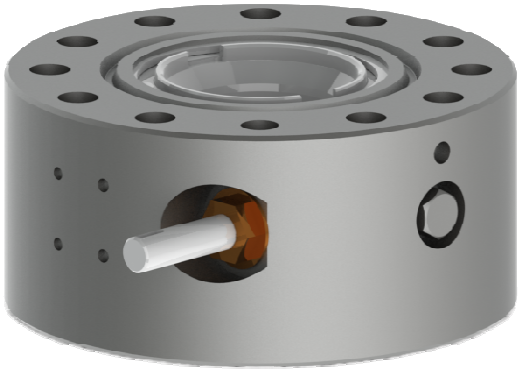
Rotating rods will wear in one spot on the tubing



Rotating tubing to utilize full tubing I.D.

CTR TUBING ROTATOR

The CTR Tubing Rotator was developed as part of a system primarily designed to extend the life of production tubing in beam pumping and P.C. pumping wells. The Eliminator Tubing Rotator was also designed to meet other important criteria. We believe safety to be of utmost importance.



OPTIONS
Should the operator also desire to shut off the tubing after the sucker rods have been removed, a back pressure check valve can be installed into the tubing hanger to totally shut off the well while installing into blowout preventer stack. The Eliminator Tubing Hanger can be easily run through a service B.O.P.

After the installation, The CTR Tubing Rotator can be operated through one of three methods:

Manually Driven
- Allows the operator to rotate the tubing on a daily basis.
- Simply crank on the handle to rotate the tubing.

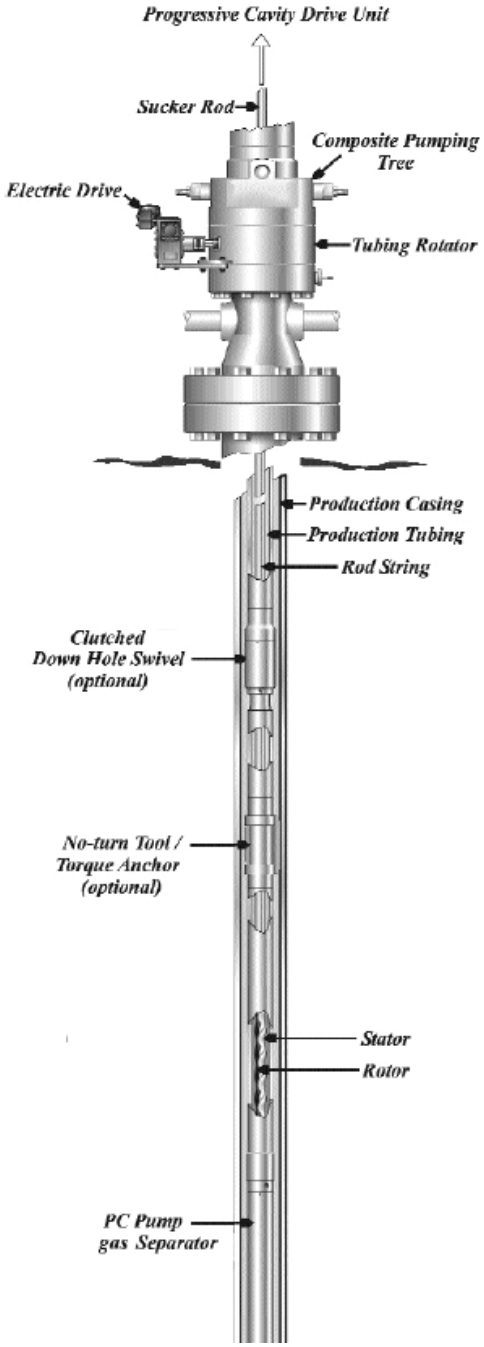
Mechanically Driven
- Connected to the walking beam of the pump jack.
- Drive transmission through cable, ratchet, or manual.

Electric Motor Driven
- Connects to on site power (3 phase) (single phase) or 12 volt.
- Uses high ratio speed reducer.

All options are provided with a shear mechanism to prevent over torquing of the tubing string.

CTR TUBING ROTATOR

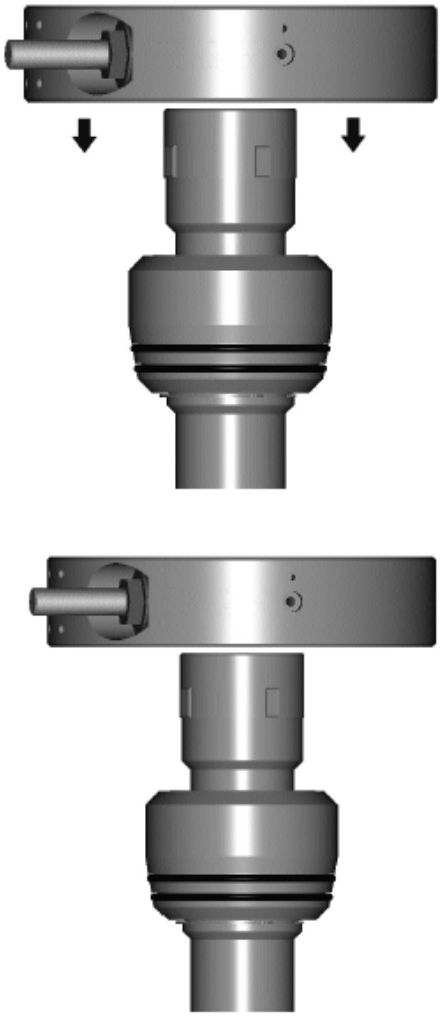
WELL ASSEMBLY DIAGRAM



* **PATENT INFORMATION** U.S.:4,811,875 – 4,901,793 Canadian: 1,274,470

"E" STYLE TUBING ROTATOR

The Eliminator was developed as part of a system primarily designed to extend the life of production tubing beam pumping and P.C. pumping wells.



- Simple installation and removal
- Adds 3.25" to Wellhead height
- Lower Ring Gasket can be pressure tested
- Virtually maintenance free
- Can be adapted for thermal applications up to 210°C
- Abnormal pump wear eliminated
- Enhances corrosion inhibitors
- Prolongs tubing life 6-10 times
- Paraffin build-up eliminated (in most cases)
- Rod hang-up eliminated (in most cases)
- Replaces the conventional hanger
- Maintains well control while stripping BOP's
- Can utilize manual, mechanical (pump jack) or electric (110V; 460V or 12 volt) drive systems

* **PATENT INFORMATION** U.S.:4,811,875 – 4,901,793 Canadian: 1,274,470

E-PLUS TUBING ROTATOR

The Eliminator was developed as part of a system primarily designed to extend the life of productions tubing bean pumping and P.C. pumping wells.

- **Complies with API 6A bolting requirement**
- Simple installation and removal
- Can adapt to an API wellhead in its range
- Lower Ring Gasket can be pressure tested
- Virtually maintenance free
- Can be adapted for thermal applications up to 210°C
- Abnormal pump wear eliminated
- Sand build-up in pump barrel eliminated
- Enhances corrosion inhibitors
- Prolongs Tubing life 6-10 times
- Paraffin build-up eliminated (in most cases)
- Rod hang-up eliminated (in most cases)
- Replaces the conventional hanger
- Maintains well control while stripping BOP's
- Can utilize manual, mechanical (pump jack) or electric (110V, 460V or 12 volt)

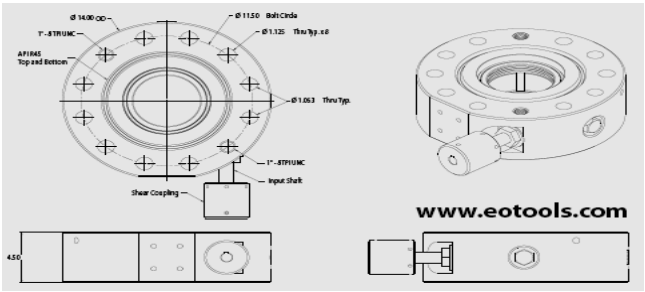
After the installation, the E-Plus Tubing Rotator can be operated through one of three methods:

1. **MANUALLY DRIVEN**
   - Allows the operator to rotate the tubing on a daily basis, simply crank on the handles to rotate the tubing

2. **MECHANICALLY DRIVEN**
   - Connected to the walking beam of the pump jack, drive transmission through cable, ratchet, or manual

3. **ELECTRONIC MOTOR DRIVEN**
   - Connects to on site power (3 phase) (single phase) or 12 volt, uses high ratio speed reducer

All options are provided with a shear mechanism to prevent over torquing of the tubing string.



ROD-LOCK BOP & E-PLUS TUBING ROTATOR

Reduces Cost

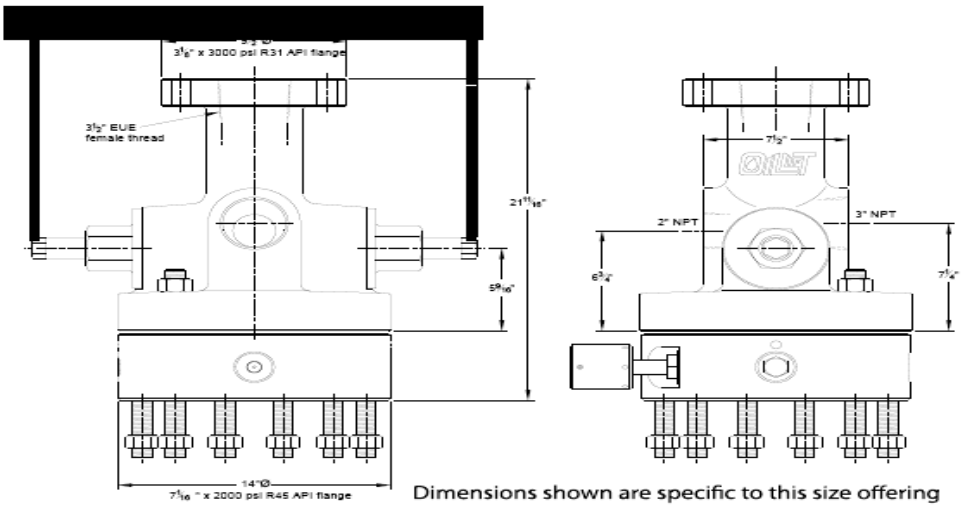
- A picker truck instead of a flush-by rig can replace a PC drive or service a PC drive stuffing box
- A top mounted stuffing box can be serviced by a man with a pick-up truck
- The service rig can space the pump, secure the polished rod and leave the drive installation for later, thus saving rig time

Specifications

- Complies with API 6A bolting requirement
- Features a reduced overall wellhead height of up to 12" compared to competitor packages
- Rated at 25,000 pounds of polished rod weight based on 800 ft-16 torque on clamp bolts. Proof load is 40,000 pounds without slipping
- Proof torque 1000 ft-16
- Pressure balanced for low actuating torque
- BOP seals rated at 3000 psi
- Through bore 3 1/8" inches
- Rams available for 1 ¼" or 1 ½" polished rod
- Top flange 3 1/8" x 3000 psi
  Bottom flange 7 1/16" x 2000 psi, 7 1/16" x 3000 psi, 9" x 2000 psi or 9" x 3000 psi
- For additional sizes contact Evolution Oil Tools Inc

Enhances Safety

- Eliminates having to suspend a PC drive on the winch line while holding the polished rod weight on the draw works line
- No need for someone to work under a suspended drive head to install or remove a hinged lock out clamp
- The polished rod is locked out and cannot move while someone is working on the drive system



Dimensions shown are specific to this size offering

CDHS CLUTCHED DOWNHOLE SWIVEL AND TWO-WAY TUBING SWIVEL

The CDHS Clutched Downhole Swivel is designed to be run in conjunction with the Evolution Tubing Rotator on pumping wells that utilize a progressive cavity pump and an anti-rotation anchor.

The CDHS has a shear release that allows the anti-rotation anchor to be set. In addition, the CDHS has a built clutch system that won't allow the swivel to free wheel if the anti-rotation anchor fails.

CDHS Swivel Specifications

Casing OD		Product Number	Tool OD		Tool ID		Tool Length		Connection
inch	mm		inch	mm	inch	mm	inch	mm	
5-1/2	139.7	262-10-2780-00	4.50	144.3	2.50	63.5	17.50	444.5	2-7/8 EU
7	177.8	262-10-3121-00	5.00	127.0	3.00	76.2	25.50	647.7	3-1/2 EU

The Two-Way Tubing Swivel provides a reliable rotating type connection in the tubing string when tubing rotators are used in conjunction with progressive cavity pumps, Torque Anchors and No-Turn Tools.

This Two-Way swivel has a shear mechanism that allows an anchor to be set. Once set, the swivels shear allowing rotation in either direction.

Two-Way Tubing Swivel Specifications

Casing OD		Product Number	Tool OD		Tool ID		Tool Length		Connection
inch	mm		inch	mm	inch	mm	inch	mm	
5-1/2	139.7	228-10-2875-00	4.20	111.8	2.44	62.0	19.00	483.0	2-7/8 EU
7	177.8	228-10-3500-00	5.00	127.0	3.00	76.2	20.50	508.0	3-1/2 EU

The Two-Way Tubing Swivel is now available in a Slim Hole configuration. The OD of this new Slim Hole swivel is 4.5" while still maintaining the ID of 3.0". This allows the swivel to be ran in 5 ½" casing with a 3 ½" connection.

Two-Way "Slim Hole" Tubing Swivel Specifications

Casing OD		Product Number	Tool OD		Tool ID		Tool Length		Connection
inch	mm		inch	mm	inch	mm	inch	mm	
7	177.8	228-11-3500-00	4.50	114.3	3.00	76.2	20.00	508.0	3-1/2 EU

BURST PLUG TUBING DRAIN

Benefits:

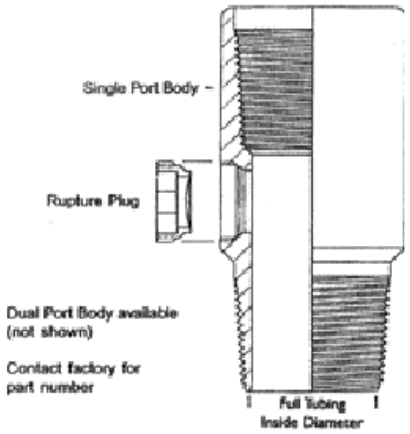
- Provides a positive indication of open drain
- Eliminates shear pin devices
- Provides the highest accuracy and reliability
- Corrosion resistant
- One plug, available in three pressures for all tubing sizes, means less inventory and cost.
- No mechanical parts
- No fragile o-rings to be damaged during assembly causing failure in the field

Description

The Hydraulic Tubing Drains provide a positive method to equalize the fluid level in tubing strings, without mechanical manipulation. Appropriate production practices should always include the Hydraulic Tubing Drain as standard equipment in all wells to eliminate the potential hazards associated with pulling wet tubing strings.

Typical Applications

- Tubing drains remove the hazard of handling stuck pumps, by pulling dry strings
- When tubing cannot be rotated or pulled to actuate mechanical draining devices
- Where corrosion build up restricts “S” drain from operating properly
- Provides a means to pump down the tubing to kill a gassy well before pulling
- Eliminates expenses and wasted time associated with wet jobs
- Allows producer to double traveling, and standing, valves operating, or none at all
- Drains tubing for submersible pumps equipped with a check valve and pumps in a high angle or straight hole
- Drains tubing above anchors and packers



Operation – The Burst Plug Tubing Drain is simple in design and utilizes applied hydraulic pressure to rupture the membrane which opens the fluid port to the casing annulus, with no restrictions. The Burst Plug Tubing Drain should be installed box up and pin down at the desired depth in the tubing string. For hydrostatic head at the drain, and determination of the proper disc pressure (psi), multiply .433 psi/ft by the drain depth. Then select the disc for 130% of the nominal fluid load.

Service – The Burst Plug Tubing Drain is best serviced by our local distributor to ensure proper disc preparation, assembly and testing. In applications where this is not possible, the Burst Plug Tubing Drain can be field serviced, with moderate care, and attention to detail.

Selection Guide

Nominal Size	Outside Diameter	Drift Diameter	Total Length
2-3/8" (60mm)	3-1/16" (78mm)	1.901" (48mm)	7" (178mm)
2-3/8" (60mm)	3-5/8" (92mm)	1.901" (48mm)	7-1/4" (178mm)
2-7/8" (73mm)	3-5/8" (92mm)	2.347" (60mm)	7-1/2" (191mm)
2-7/8" (73mm)	4" (102mm)	2.347" (60mm)	7-3/4" (197mm)
3-1/2" (89mm)	4-1/2" (114mm)	2.867" (73mm)	8-1/8" (206mm)
4" (102mm)	5" (127mm)	3.351"(85mm)	8-3/8" (213mm)
4-1/2" (114mm)	5-9/16" (141mm)	3.833" (97mm)	8-5/8" (219mm)

Burst Pressures – (All above sizes available in each of the following opening pressures)

Burst Pressure	Burst Pressure
1500 psi (102atm)	4500 psi (306atm)
2000 psi (136atm)	5000 psi (340atm)
2500 psi (170atm)	5500 psi (374atm)
3000 psi (204atm)	6000 psi (408atm)
3500 psi (238atm)	6500 psi (442atm)
4000 psi (272atm)	7000 psi (476atm)

Sizes

The Burst Plug Tubing Drain is available in the above standard nominal sizes, using standard API EUE tubing threads. Non-standard configurations are available on an engineered design basis. Full tubing inside diameters are standard on all nominal (stock) sizes.

Burst Pressure/Temperature Conversion Table –

This table is theoretical calculation of temperature vs. bust pressures

70°F	100°F	200°F	300°F	400°F	500°F
1500 psi	1488 psi	1428 psi	1410 psi	1395 psi	1407 psi
2000 psi	1984 psi	1904 psi	1880 psi	1860 psi	1876 psi
2500 psi	2480 psi	2308 psi	2350 psi	2325 psi	2345 psi
3000 psi	2976 psi	2856 psi	2820 psi	2790 psi	2814 psi
3500 psi	3472 psi	3332 psi	3290 psi	3255 psi	3283 psi
4000 psi	3968 psi	3808 psi	3760 psi	3720 psi	3752 psi
4500 psi	4464 psi	4284 psi	4230 psi	4185 psi	4221 psi
5000 psi	4960 psi	4760 psi	4700 psi	4650 psi	4690 psi
5500 psi	5456 psi	5236 psi	5170 psi	5115 psi	5159 psi
6000 psi	5952 psi	5712 psi	5640 psi	5580 psi	5628 psi
6500 psi	6448 psi	6188 psi	6110 psi	6045 psi	6097 psi
7000 psi	6944 psi	6664 psi	6580 psi	6510 psi	6566 psi

TUBING DRAIN VALVE

The Tubing Drain valve provides a simple method for draining the tubing string before tripping out. The Tubing Drain Valve has a shear pinned sleeve and it is activated by inside tubing pressure. The Tubing Drain valve is used with both rod pumps and progressing cavity pumps. The opening pressure can be adjusted by using the required number of shear screws.

Selection Guide

Tubing Size		Product Number	Tool OD		Tool ID		Tool Length		Connection
inch	mm		inch	mm	inch	mm	inch	mm	inch
2-7/8	73.0	220-10-2875-00	3.975	101.0	2.441	62.0	12.00	304.8	2-7/8 EU
3-1/2	88.9	220-10-3500-00	4.500	114.3	2.992	76.0	13.75	349.3	3-1/2 EU
4-1/2	114.3	220-10-4500-00	5.560	141.2	4.000	101.6	14.50	368.3	4-1/2 EU
4-1/2	114.3	220-10-4510-00	5.200	132.1	3.958	100.5	14.50	368.3	4-1/2 NU

MODEL "SC'1" ANCHOR CATCHER

The "SC'1" Anchor Catcher is a Retrievable Double Grip Tubing Anchor designed to anchor the Tubing String in tension or compression. When installed with the proper amount of tubing tension, this anchor prevents movement of the tubing String during rod pumping operations. This results in more oil production per pump stroke and in turn extends the life of the pump, rods and tubing decreases pumping costs.

This Anchor Catcher incorporates an emergency shear release which is easily adjustable in the field. Unless otherwise specified, anchors are furnished with a total of 22,000 daN (50,000 lbs) secondary release shears.

The "SC"1" Anchor utilizes drag blocks backed up by Inconel Leaf Springs which results in more positive drag, thus reducing repair costs by at least 50% of the cost for repairing older drag spring designs.

Operations:

To Set:
Install the Anchor Catcher in the tubing string just below or above the pump for the best results, although it may be installed at any point. Run to desired depth and rotate the tubing to the left to set the Anchor Catcher the number of turns required will depend on the casing weight. When the slips have set the tubing will torque up.

To ensure the anchor slips are solidly engaged with the casing, hold left hand torque on the tubing and set down 4,500-6,500 daN (10,000-14,500 lbs) of tubing weight. Pick up and set down several times to be sure the anchor slips are properly set in the casing. Pick up to install the dognut and land the tubing, making sure the tubing is in sufficient when landed.

To Release
To pull the "SC'1" Anchor Catcher lower the tubing to release the tension, and rotate to the right while working the tubing up and down slightly. When pulling care should be taken to ensure the tubing is not rotated with left hand torque or it may cause the anchor to reset.

Should the Anchor Catcher fail to release with normal procedures, an upward pull of the tubing string weight, plus the total value of the shear pins will release the anchor.

MODEL "SC'1" ANCHOR CATCHER SPECIFICATION GUIDE

Casing						
O.D.	**Weight**	**Min.**	**Max.**	Anchor **O.D.**	Anchor **I.D.**	EUE Connections
In-mm	Lbs/ft - **kg/m**	**In-mm**	**In-mm**	**In-mm**	**In-mm**	In-mm
4-1/2" 114.3	9.5-13.5 14.14-20.08	3.92 99.57	4.09 103.88	3.75 95.25	1.93 49.02	2-3/8" 60.33
5-1/2" 139.7	17-23 25.30-34.22	4.67 118.62	4.892 124.26	4.50 114.3	2.44 61.98	2-7/8" 73.00
	13.17 19.35-25.30	4.892 124.26	5.044 128.12			
7" 177.8	23-32 34.22-47.62	6.094 154.79	6.366 161.69	5.75 146.05		
	17-20 25.30-29.76	6.456 163.98	6.538 166.07			
	23-32 34.22-47.62	6.094 154.79	6.366		3.00 76.20	3-1/2" 88.90
	17-20 25.30-29.76	6.456 163.98	6.538 166.07			

PUMP STABILIZER & TUBING CENTRALIZER

With the trend towards larger pumps and multiple pumps being used for oil production, the significant vibrations and oscillating movement created by these pumps needs to be restricted and dissipated before it causes damage to the tubing string, downhole tools and production casing.

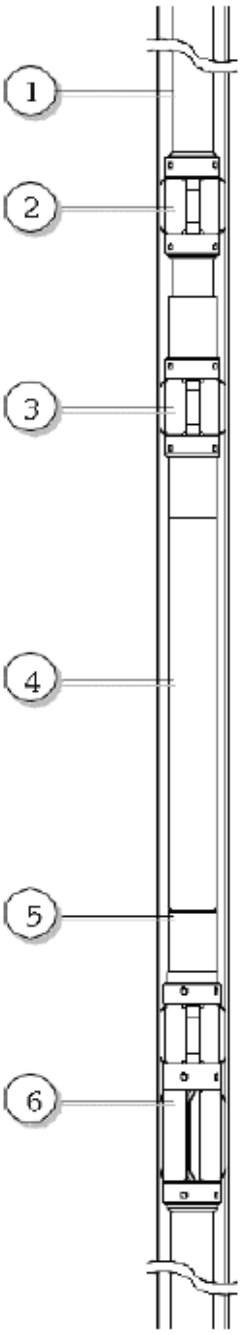
Pump Stabilizer

The spring loaded Pump Stabilizer is designed to be run directly above the pump to restrict the pump movement inside the casing, movement generated by the oscillating motion of the rotator inside the stator.
During the pumping operation, the spring loaded contact pads will attenuate the vibrations generated by the pump and provide a soft contact between the pump and the casing. The stabilizer will prevent premature wear of the pump, tubing and casing.

Tubing Centralizer

The Tubing Centralizer is run in the tubing string to prevent excessive oscillating movement of the tubing inside the casing, movement that will cause fatigue of the tubing joints. In deviated wells the Tubing Centralizers will prevent a direct and rigid contact between the tubing and the casing and will avoid premature wear of the tubing and casing.
The Pump Stabilizers and Tubing Centralizers provide a full bore configuration and maximum bypass in the annulus.

PUMP STABILIZER AND TUBING CENTRALIZER SPECIFICATIONS



Pump Stabilizer Specifications

Casing OD		Product Number	Tool OD		Tool ID		Tool Length		Connections
inch	mm		inch	mm	inch	mm	inch	mm	
5-1/2	139.7	219-10-5540-00	4.75	120.7	3.55	90.2	18.00	457.2	4" NU
7	177.8	219-10-7040-00	5.63	142.9	3.70	94.1	19.50	495.3	4" NU
8-5/8	219.1	219-10-8540-00	7.25	184.2	3.70	94.1	23.50	596.9	4" NU
9-5/8	244.5	219-10-9540-00	8.25	209.6	3.70	94.1	24.00	609.6	4" NU

Alternate connections can be provided at customer's request

Tubing Centralizer Specifications

Casing OD		Product Number	Tool OD		Tool ID		Tool Length		Connections
inch	mm		inch	mm	inch	mm	inch	mm	
4-1/2	114.3	217-10-4523-00	3.63	92.1	2.00	50.8	18.5	469.9	2-3/8 EU
4-1/2	114.3	217-10-4527-00	3.75	95.3	2.00	61.0	18.5	469.9	2-7/8 EU
5-1/2	139.7	217-10-5527-00	4.25	107.9	2.44	62.0	18.5	469.9	3-1/2 EU
5-1/2	139.7	217-10-5535-00	4.25	107.9	3.00	76.2	18.5	469.9	2-7/8 EU
7	177.8	217-10-7027-00	5.62	142.9	2.44	62.0	21.00	533.4	3-1/2 EU
7	177.8	217-10-7035-00	5.62	142.9	3.00	76.2	19.50	495.3	3-1/2 EU
8-5/8	219.1	217-10-8535-00	7.25	184.2	3.00	76.2	23.50	596.9	3-1/2 EU

Alternate connections can be provided at customer's request

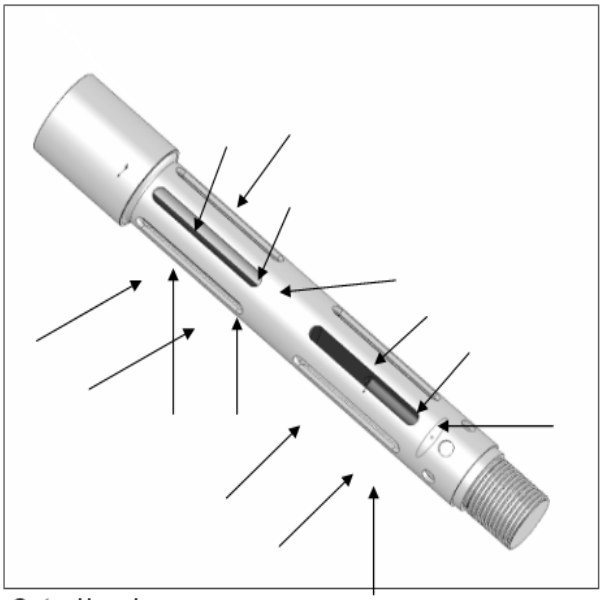
Diagram Legend

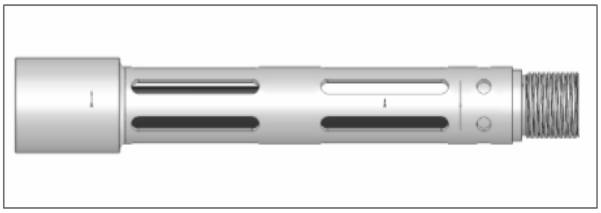
1. Tubing String
2. Tubing Centralizer
3. Pump Stabilizer
4. Progressive Cavity Pump
5. Tag Bar
6. Centralizing Dynamic Torque Anchor

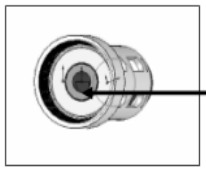
Eccentric Intake

Bottom feeder Intake (BFI) 2 phases gas flow separator for horizontal wells is a great alternative to open ended tubing or traditional gas separators where two phase gas flow is present.

Typically these separators are used on the bottom of Beam or Sucker Rod pumps and PC systems landed at a deviation greater than 71 degrees.







Intake Discharge:

The BFI discharges the gas free fluid to the inlet of the pump through the weight bar assembly and brass wear bushing.

Outer Housing:

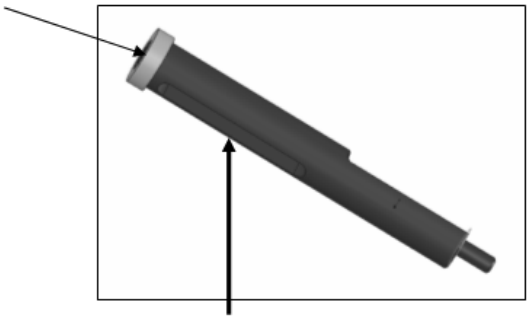
Flow enters outer housing from all directions
Orientation of outer housing has no bearing on the internal rotation of the intake
Bottom of tool is blunt ended and no flow is allowed to enter from this point

Brass wear bushing:

A brass wear bushing is attached to the discharge end of the separator

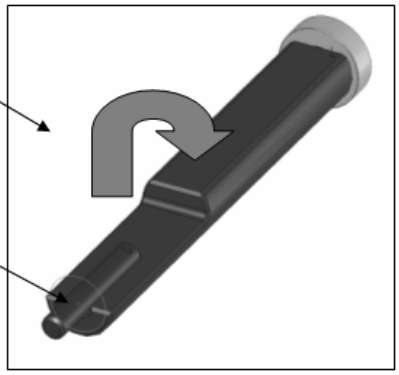
This provides the intake assembly a center point

The intake assembly is held in place with a snap ring ensuring it is not held tight to allow rotation



Intake inlet:

Intake inlet is found on the internal drop bar

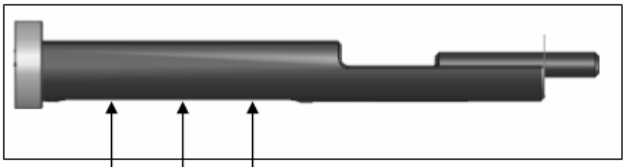


Weight Bar:

The weight bar is the mechanism to ensure the orientation of the drop bar is always in the proper location to draw fluid and not gas.

The weight bar is a solid piece of bar halved to provide ballast to the bottom.

The center pin is positioned of the end of the weight bar and is inserted into the outer housing and is free to rotate with little to no resistance

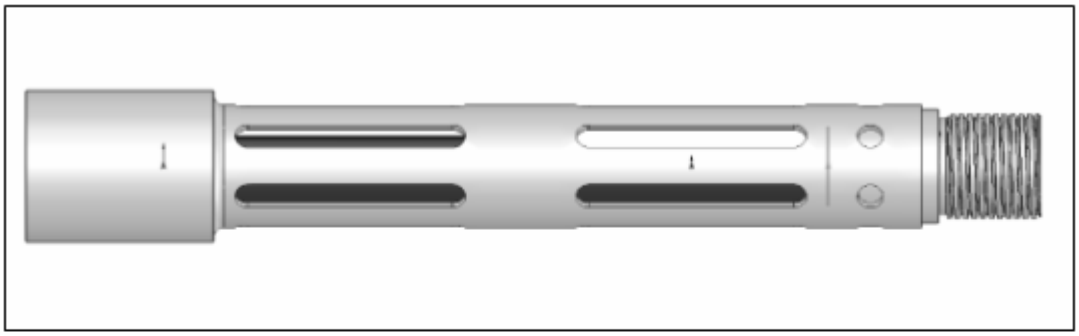


Drop bar inlet is on the bottom of the assembly so we draw from the fluid phase in the 2 phase flow regime

Configurations

Unit is ran on the bottom of pumping system trying to minimize the distance between the outlet of the separator and the inlet of the pump.

No turn tools and anchors can be ran on the bottom of the tools as long as they provide sufficient flow through across the tool to not restrict inlet flow.



Diameters:

2 3/8”
2 7/8”
3 1/2”
4 1/2”

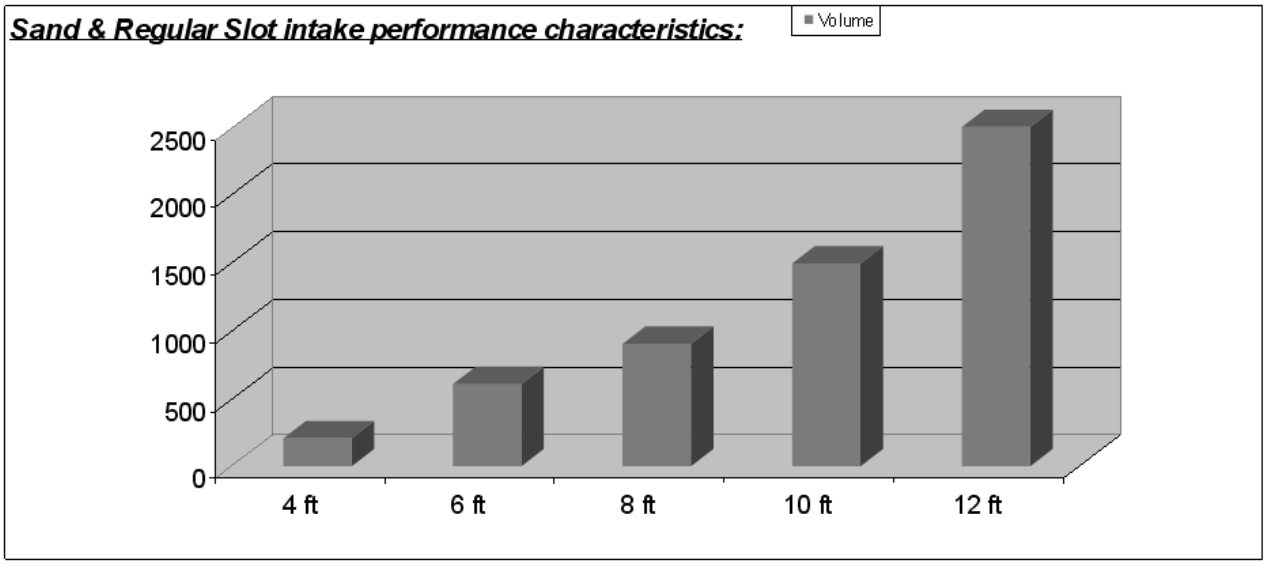
Lengths:

4 ft
6 ft
8 ft
10 ft
12 ft

Sand & Regular Slots (all diameters)	Volume (M^3/d)
4 ft	200
6 ft	600
8 ft	900
10 ft	1500
12 ft	2500

***Volume calculations are based on water as a base point, as viscosity will differ with each application and should be provided for intake sizing and expected performance.**

Sand & Regular Slot intake performance characteristics:

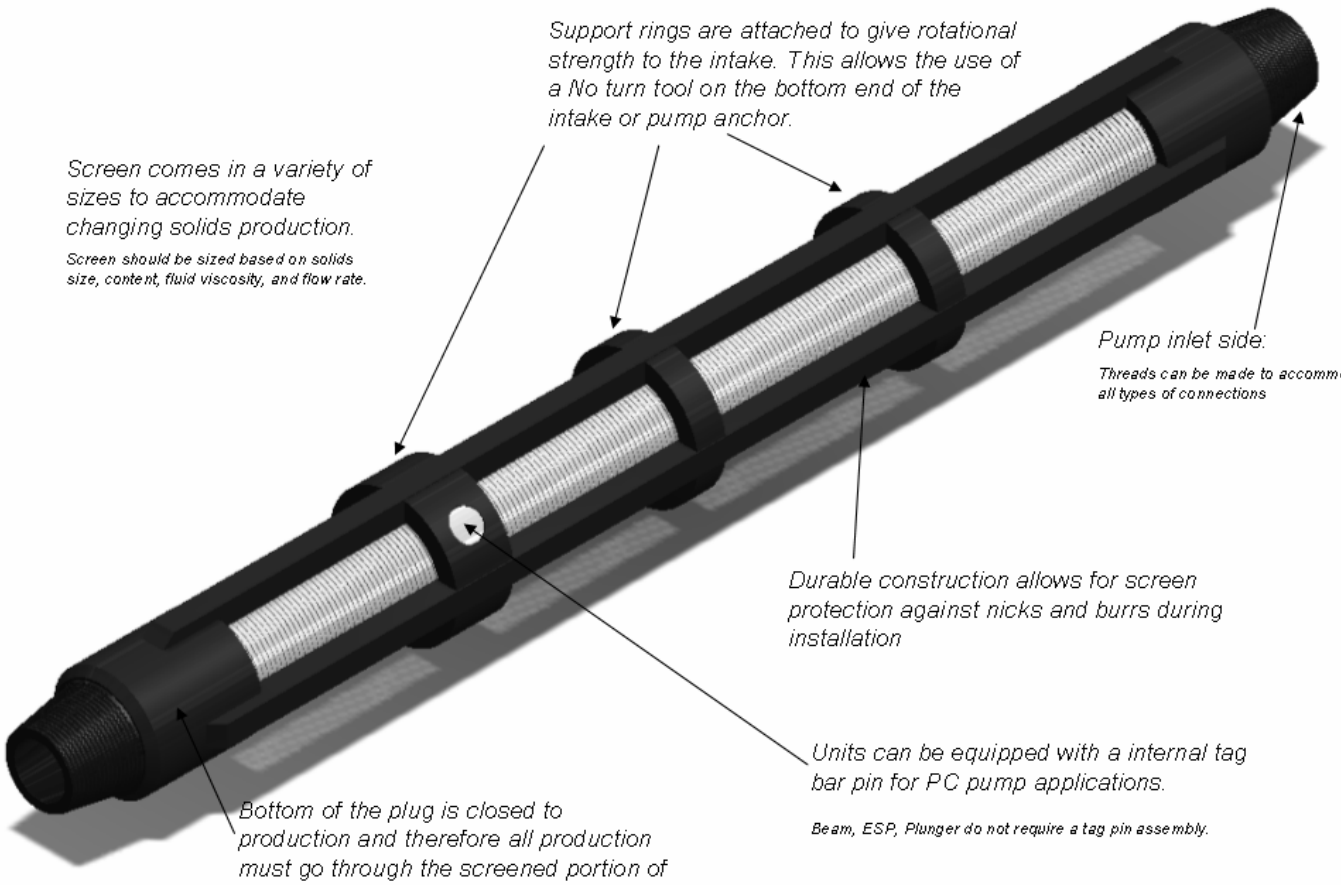


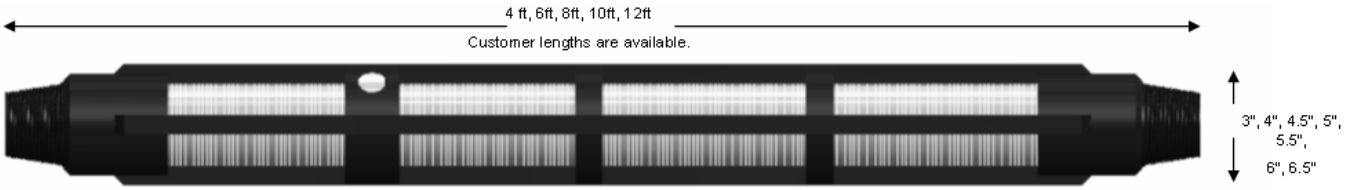
V-BACKED STAINLESS STEEL SCREEN PUMP INTAKES

The following Evolution Oil Tools Inc. product is a screen assembly to prevent large solids from entering pump assemblies:

Why screened pump inlet?:

- Pumps are susceptible to different solids production a well can deliver.
- ***Screens typically in the past have created flow restrictions at pump inlet's. With advances in screen technology this is no longer the story.***
- Solids differ in size from well to well and can even differ in the same well.
- Some solids are produce able and others are not. What does this mean?
  - Some solids will remain suspended in the production. (Oil carries solids better than waste)
  - The heavier the oil, the better the suspension, meaning the solid will carry.
  - The lighter the oil, the more water cut, the heavier the sand, the bigger the problem to carry the solid.
- Screen Pump Inlets can filter the larger un-suspended able solids and allow them to fail to the bottom of the well and not in the pump.
- Screened Pump Inlets provide the following benefits to downhole pumping scenarios where solids are present.
  - Limit amount of solids entering the pump and production string
  - Control the size of particles entering pump and production string
  - Increase run times between interventions due to plugged pump inlets, stuck pumps, or solids buildup in tubing creating a bridge
  - V-backed stainless steel screens are used in Horizontal cased holes for sand control
  - If screen is designed properly production will not be limited or restricted due to screen
  - Screen inlets are made for PC systems, beam pump systems, shrouded ESP systems, plunger lift systems
  - Limit flow back into pumping system of frac sand in stimulated reservoirs
  - Control formations sand from entering pumping system
  - Control coal fines from entering pumping system
  - Control large debris from entering pumping system
- Screened Pump Inlet can also be used with forms of backwashing systems such as:
  - Continuous circulation systems in wells with high solids
  - Hollow rod strings
  - Self perpetuating hollow rotor system
- *The Screen Pump Inlet is an excellent solution environments where pumping systems struggle to produce the solids effectively.*


Support rings are attached to give rotational strength to the intake. This allows the use of a No turn tool on the bottom end of the intake or pump anchor.
Screen comes in a variety of sizes to accommodate changing solids production.
Screen should be sized based on solids size, content, fluid viscosity, and flow rate.
Pump inlet side:
Threads can be made to accommodate all types of connections
Durable construction allows for screen protection against nicks and burrs during installation
Units can be equipped with a internal tag bar pin for PC pump applications.
Beam, ESP, Plunger do not require a tag pin assembly.
Bottom of the plug is closed to production and therefore all production must go through the screened portion of the tool.



Screened Intake sizes:	Casing size	Mesh Size
2 3/8" connections x 4 ft	4.5",5.5",7", 9 5/8"	10, 20, 30 thous
2 3/8" connections x 6 ft	4.5", 5.5", 7", 9 5/8"	10, 20, 30 thous
2 7/8" connections x 4 ft	5.5", 7", 9 5/8"	10, 20, 30 thous
2 7/8" connections x 6 ft	5.5", 7", 9 5/8"	10, 20, 30 thous
2 7/8" connections x 8 ft	5.5", 7", 9 5/8"	10, 20, 30 thous
3.5" connections x 4 ft	7", 9 5/8"	10, 20, 30 thous
3.5" connections x 6 ft	7", 9 5/8"	10, 20, 30 thous
3.5" connections x 8 ft	7", 9 5/8"	10, 20, 30 thous
3.5" connections x 10 ft	7", 9 5/8"	10, 20, 30 thous
3.5" connections x 12 ft	7", 9 5/8"	10, 20, 30 thous

4.5" connections are available upon request as tool designs for this type of volume needs to be designed properly

Screens of up to 60 slot are available and need to be sized based on production media.

Length of the tool will also depend on flow rate and open screen area required.

Units can be ran in deviated or Horizontal well bores to provide solids control down hole without compromising screen integrity.

Units equipped with Tag Bar assemblies are designed to accommodate rotor eccentricity and not make contact with tool.

Different pin positions are available based on manufacturers rotor offset.

Pin position can accommodate

- Reg rotors
- XL Rotors
- XXL Rotors
- XXXL Rotors
- Paddle Rotors
- Hollow Rotors