ANOTHER LOOK AT THE V-WIRE SAND SCREEN

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ABSTRACT

We will look at the advantages of the vee-wire sand screen, which is a well known as well as popular in the filtration industry. It is easily adapted for down-hole rod pumps. We will look at it use on the Pump itself as well as it's use on the tubing. In rod pumps it is used in replacement of the gas anchor, which can reduce sand failures by eliminating the heavier frac sand from our production tubing. The Vee-wire screen can be manufactured in different lengths, sizes and slot sizes.

PRESENTATION

Sand becomes a problem in an artificial lift system when sand is produced through your down hole rod pump and into the production tubing. In **Figure 1** it shows that on each stroke more sand is being introduced into the production tubing, which is thousands of feet from the surface. This process will continue to worsen until the well shuts down. When this happens sand in the production tubing will act like a sump. The larger sand will fall back down on top of the pump. While the smaller finer sand has a greater chance of staying suspended in the liquid and will eventually be lifted to the surface. When the well is shut down, the sand will accumulate on top of the down-hole rod pump, so when the well comes back on, sand is driven between the plunger and the barrel, which causes sand cut plungers and scored barrels. Just as with sand paper the larger sand does the greatest damage to the down hole rod pump. This process continues until the pump is no longer efficient, and a well servicing unit is necessary to pull the pump, then the pump must be rebuilt or replaced. If something is not done about the sand, the same process will begin again. It is obvious that sand is costing you valuable time & money. #en calculating our cost of sand , we must look at what we are doing to our rods. Consider the amount of force it takes to sand cut a hardened plunger this causes a great amount of stress to your rods. This damage could be the most costly of all. We all know that rod failure is very expensive. In **Figure 2** it shows that during this process we encounter rod buckling, which causes rod on tubing wear, & irreversible gear box wear. Once the well is cleaned, and we replace the pump, the rods still have had their life shortened due to the stress and fatigue. This has the same principle of hot-roding a new car, you may not notice any problems at first but as the car gets older the earlier wear begins to show up. Sand costs can really add up. Besides the sand cut plungers and scared pumps sand greatly reduces the life of artificial lift equipment

Henry Johnson invented the V-Wire screen specifically for sand approximately 100 years ago. (illistration is shown in **Figure 3**)This unique screen is available in a variety of different sand sizes, and has become the industry standard. This screen is manufactured by wrapping a triangular wire around an array of supporting rods, giving a larger amount of square inch of opening.

The V-wire screen has the unique ability of allowing the smaller less damaging particles to pass thru the filter membrane into the production tubing where it stays emulsified in the liquid until it is eventually lifted to surface. Meanwhile, it filters out the larger more damaging sand particles.

Because one size does not fit all, the v-wire filter can be manufactured in different slot sizes or openings between the v-wire. This gives us the ability to customize a filter to meet your particular filtration needs. In **Figure 4** it shows that this V-wire screen can be used in place of the perforated sub. The screen jacket is mounted on a pipe based material and is placed below your seating nipple. This tubing screen is used in severe sand problems. **As** an additional benefit, the tubing screen also has the unique ability of thin-sheeting liquid, allowing solution gas to be separated. The tubing screen is manufactured in different lengths and sizes. We stock the most common sizes which are 2-3/8 x **8'** and 2-7/8 x **8'.** It also can be run at different areas of your tubing as shown in **Figure 5. A** Tubing screen is used in this configuration and is ran below the casing perforations. The tubing screen is screwed to the bottom of the seating nipple and a std bull plug is installed on the other end. **A 6'** gas anchor is ran inside the tubing screen which will allow the pump to draw out of the center of the screen. This design will maximize gas separation. In **Figure 6** tubing screen is used in this configuration and is ran above the casing perforations. The tubing screen is screwed to the bottom of the seating nipple and a joint of pipe with a bull plug installed is attached to the other end. **A** long gas anchor is ran so that it draws from the bottom joint

below the tubing screen. This allows the screen to be the opening in a standard gas separator. This will replace your perforated sub. This works well when you are trying to filter sand & gas. In **Figure 7** in shows that when the sand is not severe, we recommend you consider using a Pump guard screen. This screen is designed to be used in place of the gas anchor on the end of the down-hole rod pump. One advantage of this screen is that each time you pull your pump, the screen can be inspected. This screen also can be run in different configuration as shown in **Figure 8** the pump guard in this configuration is designed to be ran below your casing perforations in a cased hole. This design by adding a joint of tubing below our seating nipple will cause all the sand to U-Tube before it reaches the sand screen. This will allow a lot of the sand to fallout.

In **Figure 9** The pump guard in this configuration is designed to be ran above the casing perforations. The sand screen is mounted on a joint of pipe. The other end of the pipe is attached to the rod pump. This pipe is used in replacement of the gas anchor. The additional length allows the sand screen to be placed down into you separator. Which allows time for the gas to separate.

We know there are times when you need a filter between a gas anchor and a sand. The Pump guard in this configuration is designed to be ran above the casing perforations. The sand screen is mounted on a joint of pipe. The other end of the pipe is attached to the rod pump. This pipe is used in replacement of the gas anchor. The additional length allows the sand screen to be placed down into you separator. Which allows time for the gas to separate.

We know there are times when you need a filter between a gas anchor and a sand screen. The 50 slot v-wire filter was designed specifically for this purpose, having four times the opening then our standard sand screen. The pump guard screen is stocked in sizes ¾ to 1-1/2" in diameters and in lengths 2' to **8'**

REFERENCES

Why Pump Sand? – Johnson Well Screens 1960

Making Good Wells Better - Edward E. Johnson 1954

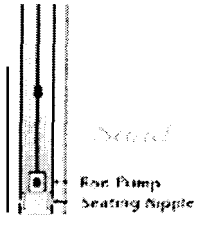
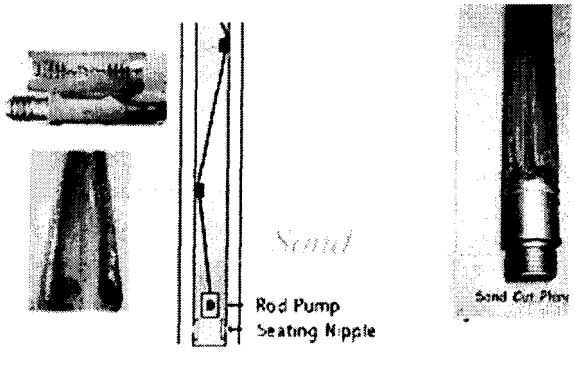


Figure **1**



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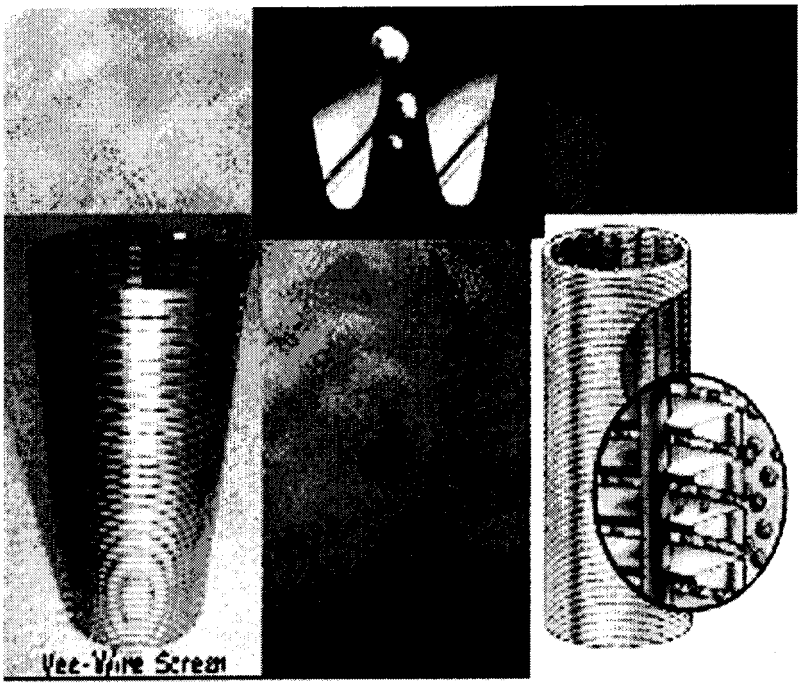

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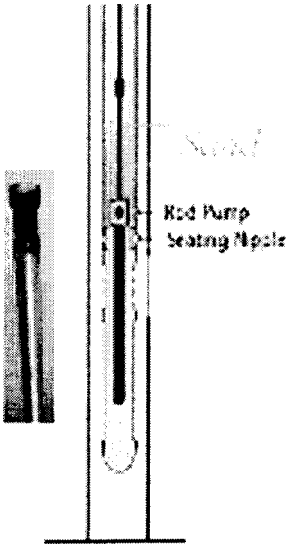

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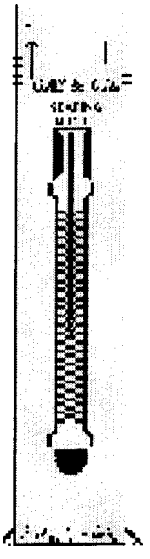

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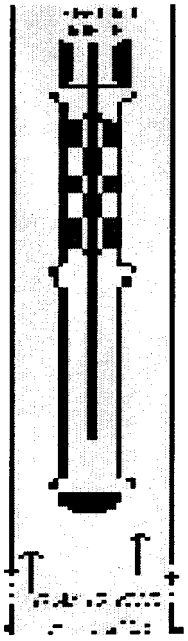

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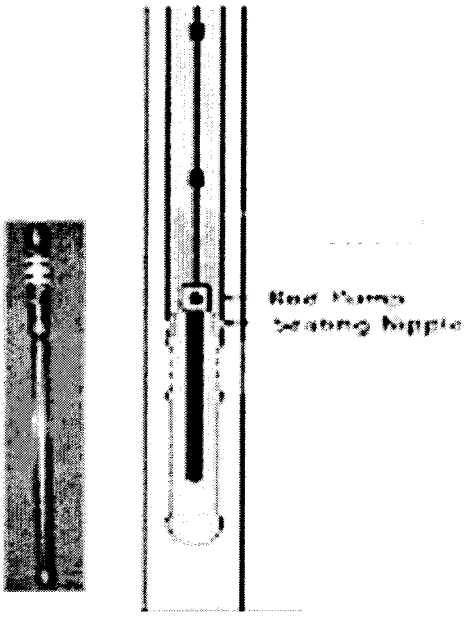

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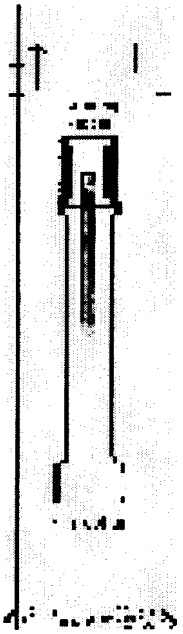

Figure 8

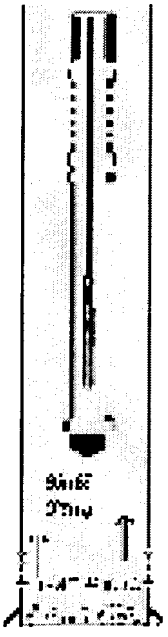

Figure 9