

NEW WATER WELL COMPLETION SYSTEM FROM AGE DEVELOPMENTS

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Two problems that often occur during completion of deep production water wells using telescopic screens are:

- 1) releasing the screen without damaging it;
- 2) sealing the screen to the casing.

Usual methods of release such as a J-latch leave some doubt in the Driller's mind as to whether or not it is properly released. Failure to release may lead to accidental lifting of the screen or screen damage in the case where it's already gravel packed. Many J-latch systems do not permit pushing which limits installation options. Sealing of the screen to the casing is fundamental to producing an effective well. Failure of the seal will lead to sanding of the well and/or loss of gravel pack.

AGE Developments, the Australian inflatable packer manufacturers, introduced a water well completion system that addresses both of these areas and completely eliminates the associated problems. Originally developed in the mid '80s this system is now mature technology having been used in well over 100 municipal water production bores as well as many private bores. The basic operating stages are shown on the attached illustration.

Stage 1 shows the final step of screen installation. An AGE Grab-Packer was run into the top of the screen on surface and inflated to form a strong yet gentle friction anchor to the top of the screen. Drill pipe connection to the Grab-Packer then allowed the screen to be lowered into the position shown.

The Grab-Packer includes a deflector type cross-over which sits in the top of the screen and prevents gravel from entering. This allows gravel packing while the screen is suspended in the correct location as shown in Stage 2. The Grab-Packer also has a central through pipe that allows pumping or reverse circulation through the rods to assist with gravel placement.

(AGE Grab-Packers are heavy duty inflatable packers with external, high tensile, carborundum coated, steel strips running the full length of the packer. When the packer is inflated in a screen or pipe the coated strips provide very high frictional anchoring capacity. AGE have run up to 500 metres of 8" screen with this system. Grab-Packers can also be used as straight fishing tools where pulling capacity in excess of 30 tonnes has often been demonstrated.)

At the completion of initial gravel packing after removal of the Grab-Packer running tool, how do you release the screen ? Simply deflate the packer and trip out. There is absolutely no danger of damaging or moving the screen.

A Slip-Over Packer is run in to sit over the top of the screen on a straddle packer assembly as shown in the Stage 3 sketch. For the Slip-over packer shown, the external packer is inflatable and the inside packer is an AGE internal M-packer that seals the top of the screen. A seal to the casing is made by inflating the external packer from the surface with a small bore hose that is hydraulically linked to a valve system on the Slip-Over assembly via the straddle packer running tool.

Stage 4 shows the completed installation with the running tool removed. This is not really the end of the story as the well is normally subject to further development after this step and the AGE Slip-Over packer can be retrieved at any time, for example, to check the gravel level after development. To retrieve, the external packer is deflated and the whole assembly is then pulled back to the surface using the straddle packer tool. After checking and re-packing as necessary, the slip-over is re-installed as per the same procedure as previously.

In the AGE system sealing of the top of the screen to the casing is accomplished using a Slip-Over Packers, contrary to the usual practice of using fixed "K-rubber" or similar packers. The AGE system offers three unique alternatives:

- A standard externally inflating packer and a special internally inflating packer.
- A standard externally inflating packer and an internal AGE M-packer.
- A standard AGE external "M-Packer and an internal M-packer.

These three alternatives are illustrated on the separate drawing of Slip-Over Packers attached.

So why would you use these pack-offs rather than a K-rubber packer? The simple answer is that K-rubber packers aren't reliable. They are subject to severe damage during running and retrieval - particularly in deeper wells; have very limited capacity to accept eccentricity between the screen and the casing; and are very limited in their pressure sealing capacity. These problems may be critical when using slip-over packers where the lack of seal strength and integrity has been known to allow the slip-over to be lifted off the screen simply by the pumping flow rate. Inflatable packers offer the most positive screen to casing sealing system yet devised. There is no comparison with static rubber seals like K-packers and the positive sealing and gripping afforded by the AGE inflatable slip-over packer. For shallow, low pressure systems, AGE developed the M-Packer. This is a mechanical sealing packer that is a quantum leap in front of standard K-packers. They feature a long flexible sealing section and are vulcanised to the underlying steel so you know they'll stay in place.

This system is suitable for all gravel packed, telescopic screen completions especially the deeper, large diameter water wells typically used for public water supply.

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