

Agri-screen — Producing more water longer and cutting pumping and maintenance costs

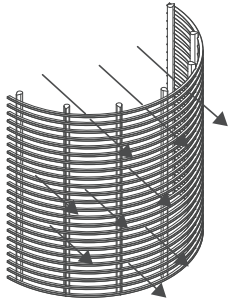


Irrigators face serious problems. The costs of energy and pump repair or replacement continue to rise. Falling water levels in many areas make improving well efficiency an urgent matter.

The cause of these problems often lies at the bottom of the well. Pumps, motors and visible parts of the well receive careful attention, but vital downhole aspects of the well, such as the screen, are often overlooked. The consequence is that many wells are far less efficient - and much more costly - than they should be.

The function of screens is critical in a properly designed water well. Placed through each water bearing formation, the screen must admit the water and hold back the gravel pack or formation. This appears to be a simple matter and simple products have often been used as screens. The fact is, however, that ground-water movement and well hydraulics are complex and only a carefully engineered screen can take full account of the many variables involved. Such a screen is the Johnson Screens Agri-screen, which has several vital design advantages.

Agri-screen has more open area

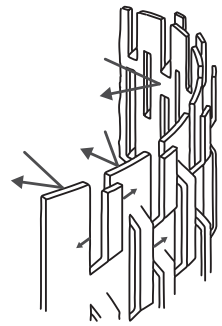


Johnson Screens
Agri-Screen

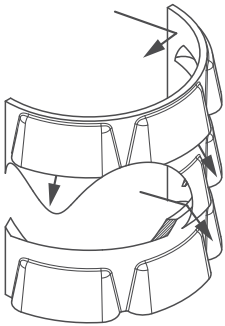
The amount of open inlet area in the screen directly affects the volume of water that the well can produce. Clearly, the well can yield no more water at the pump discharge than can enter the screen.

Comparing various screen types of the same diameter and slot opening (left) shows that Agri-screen has vastly greater open area, permitting more water to enter more easily. The Agri-screen has between 3 and 15 times more open area than other conventional well screens.*

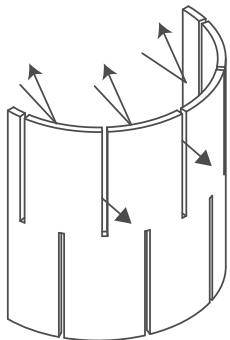
*Based on .125 inch slot size.



Bridge-Slot Screen



Louvered Screen



Slotted Pipe

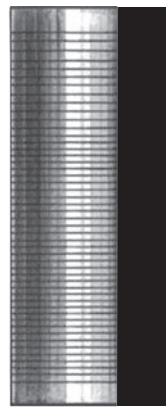
Of the four screens illustrated above, Agri-screen provides the best access to the formation for optimum well development.

**Johnson
Agri-Screen**

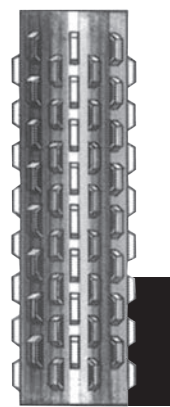
Bridge-Slot

**Louvered
Screen**

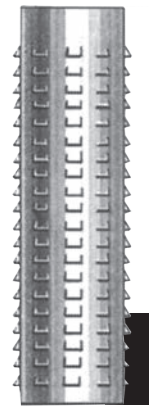
**Slotted
Pipe**



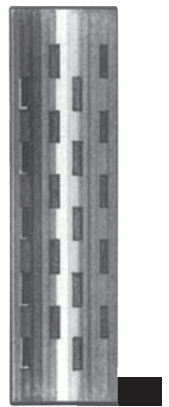
**37%
Open area**



**12%
Open area**



**8%
Open area**



**2.5 %
Open area**

More open area makes better well development possible

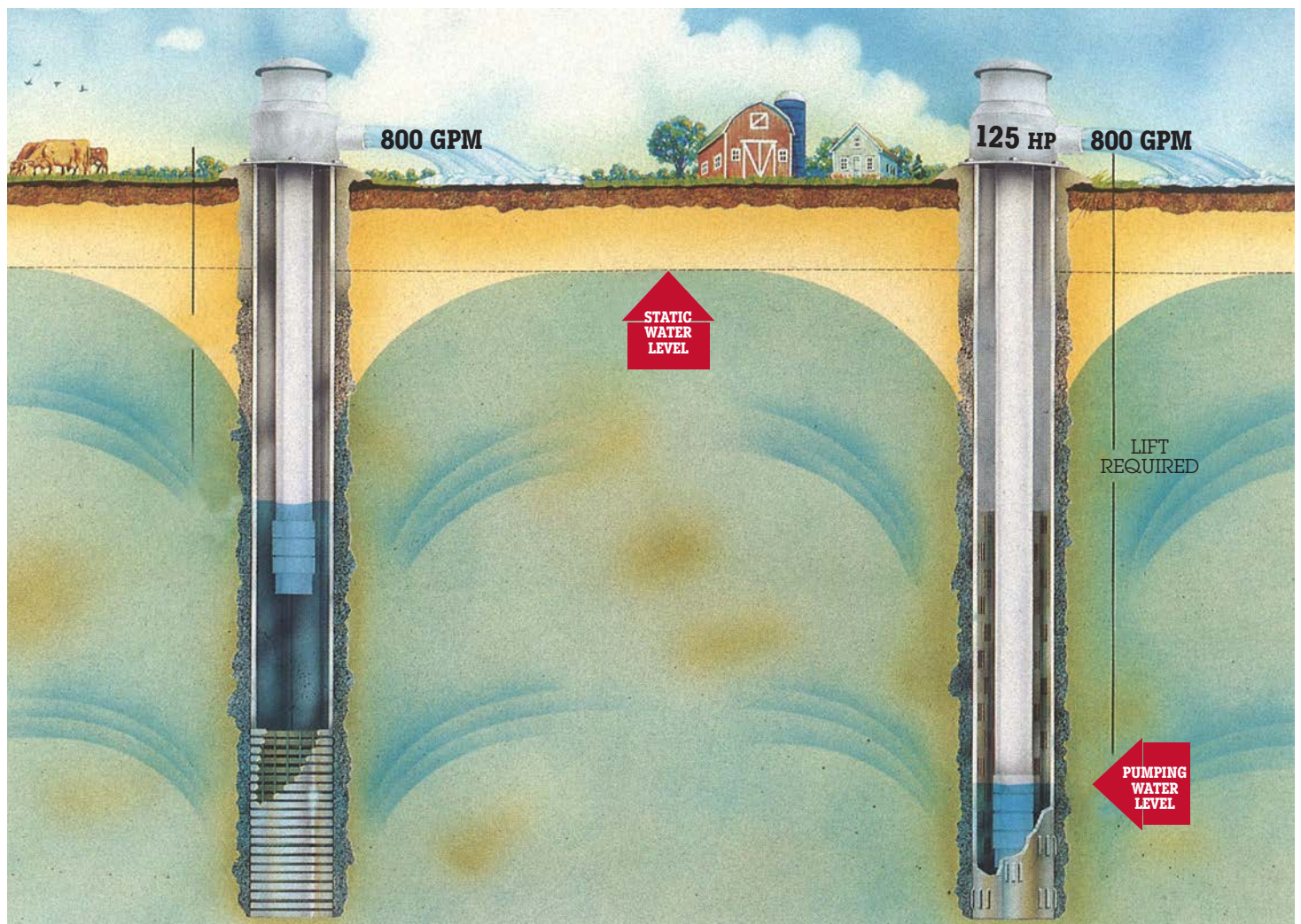
Of the four screens illustrated above, Agri-screen provides the best access to the formation for optimum well development.

High open area is essential for thorough development or clean-up after drilling. When any well is drilled, damage occurs to the aquifer when the permeability in the vicinity of the borehole is reduced by the invasion of fine silt and clay and by the mixing of the formation particles by the action of the drill bit. Unless this damage is repaired, the well cannot function efficiently.

Development is done by surging, water jetting or some other mechanical means of removing the fines from the formation around the screen.

The effectiveness of this process is directly related to the open area of the screen, since the development tools must have access to the formation and the gravel pack. Wells completed with Agri-screen are more easily and thoroughly developed than wells using slotted pipe, bridge-slot screen or louvered screen because of the greater open area of Agri-screen.

Improved well efficiency results in less drawdown



The amount of lift required on wells using Agri-screen is substantially less than wells using slotted pipe, louvered or bridge-slot screen. As a result, properly designed wells using Agri-screen requires smaller pumping units and less energy to operate. Direct savings on pump and energy costs on an individual well can range from \$1000 to \$10,000 every season.

A properly designed and constructed well, thoroughly developed, will be an efficient well. Water will enter easily at lower velocities, which means fewer problems with corrosion (eating away of metal) and encrustation (build-up of mineral scale) which are associated with high-velocity water flow through the screens.

When a well is completed with bridge-slot screen (above right) or some similar screen, it can be difficult

for the water to enter. This causes severe drawdown, which means that the pumping water level is very deep and the water must be lifted higher, increasing pumping costs. The Agri-screen (left) in the same formation produces the same (or greater) yield with less drawdown. Since the pump need not "work as hard" the energy cost savings are substantial and continuing.

Agri-screen for shallow well applications

- Irrigation wells
- Dewatering wells for construction sites

Extra Strength Designs for Deep Well Applications

- Irrigation wells
- Mine dewatering
- Deep hole applications where extra strength is necessary

Saving \$280,000 on the life of the Well

Success showcase

Nebraska farmer Paul Heinrich understands first-hand why Johnson screens are the heart of his irrigation well.

"I wanted to irrigate another field with a new well but I couldn't afford to operate at the same costs," explained Heinrich. That's when the driller suggested the use of

Johnson Screens product and designed the well properly to assure maximum flow into the well.

After comparing the direct expenses of his old well with his new Johnson Screen product, he calculated an annual energy savings of \$6550 based on screen performance alone!

How are the cost savings calculated

Both Heinrich wells, the well using bridge slot screen and the well with a Johnson's screen, were drilled to the same depth and have the same static water level. Assuming the Johnson well used the same 65 psi irrigation system as the old well, energy savings based on screen performance alone amounts to \$6.65/hour at 1000 hours a year. The savings amount to \$6650 a year.

With proper well design and a 30 psi system on the new well, energy savings jumps to \$13.73/hour, \$13,720 per season, or \$274,600 over the 20 year life of the well!

In addition, the Johnson well reduced horsepower requirement for the new pump. A price comparison of the 1978 and 1985 pumping units shows a savings of \$5280.

Similar savings to a greater or lesser extent are possible in irrigation wells in other areas. The degree of savings is affected in part by the inherent productivity of the formation, but any well can benefit through the use of the most efficient screen available — Agri-Screen by the Johnson Screens product line.

*Based on an average 1000 hour season.

	Heinrich's New Johnson Well	Heinrich's Well Old Well
Year Drilled:	1985	1978
Depth:	380 ft.	380 ft.
Screen Footage:	70 ft. of Johnson's Agri-Screen (with 40% of open area)	120 ft. Bridge - slot screen (with 12% and 17% open area)
Pump Installed:	90 HP with 260 ft. pump column; 6 stage assembly 30 psi system	125 HP with 330 ft. pump column with 8 stage assembly 65 psi system
Static Water Level:	175 ft.	173 ft.
Yield:	800 GPM@ 217 ft. pumping level	800 GPM @ 293 ft. pumping level
Energy savings due to Johnson screen alone:	\$6.65/hr. x 1000 hrs. = \$6,650/season	
Total energy savings by using a Johnson's screen plus 30 psi system:	$\begin{array}{r} \$38.79/\text{hr. pumping costs}^{**} \\ \text{vs.} \\ \$25.06/\text{hr. pumping costs}^{**} \\ \hline \$13.73/\text{hr. x 1000 hrs.} = \$13,730/\text{season} \end{array}$	
Savings of pumping unit:	Unit cost: \$21,320 vs. unit cost: \$16,040 Savings = \$5280	
Total savings over 20 year well life	$\begin{array}{r} \$274,600 \text{ (pumping cost savings)} \\ +5,280 \text{ (pumping unit savings)} \\ \hline \$279,880 \end{array}$ <p style="text-align: center;">Saving over \$13,500 every year!</p>	

**Based on \$4.00 per gallon diesel fuel cost and 1000 hours a year operation

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