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# ENVIRONMENTAL Fact Sheet

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## Secondary Well Seals and Liners

Secondary well seals, also known as seal packers, well packers, Jaswell-type seals, or Jaswell seals, are flexible rubber cylindrical-shaped inserts with circular rings designed to provide a water-tight seal that prohibits surface water, poor quality groundwater, sediment, or broken rock from entering the well by sealing off unwanted water-bearing or sediment-producing zones. Shale packers or shale traps are flexible rubber cone-shaped packers designed to prevent above material from passing into the well. Shale packers are most commonly used as a tool to provide a secondary bridge to prevent sediments or rocks from entering the well by sealing off intervals of weathered or unstable bedrock formations.

### Applications

- Sealing poor water quality zones (example: arsenic, iron, sodium, chloride).
- Sealing weathered rock fractures contributing sediment to a well.
- Sealing off intervals of weathered or unstable bedrock formations (caving conditions).
- Sealing existing wells with failed primary seals (not applicable for new construction).
- Repairing wells damaged by earth movement (frost action, earthquake, blasting, etc.).
- To create a primary seal in cable tool construction, when additional casing and grout is required.

A primary seal (well casing, either steel or plastic) is required to be used in bedrock well construction. Regulations adopted by the New Hampshire Water Well Board require that well casings be sealed at least 10 feet into competent bedrock to prevent groundwater in the overlying unconsolidated materials from entering the well. In order to accomplish this, a larger-diameter hole must be drilled into bedrock to an appropriate depth to accept the casing and provide a seat, or socket, for the drive shoe or seal tip. Steel casing and a hardened steel drive shoe are most commonly. The only exceptions to the use of a drive shoe seal are for cable tool construction and when plastic well casing is used. In these applications, a Jaswell seal or Jaswell-type seal may be used for the primary seal.

The Water Well Board has adopted a policy that secondary well seals are useful tools when used properly and for the correct application. Downhole video cameras are available to the water well industry and have proven to be useful tools in diagnosing well problems. These tools are also very helpful in determining where to install a secondary seal in the well to achieve the desired result. Properly installed, they can make the difference between a potable water supply and no water at all. However, **secondary well seals are not considered an appropriate repair or substitute for a properly installed primary seal in new well construction.**

## Installation of Secondary Seals

Any work to the structure of a well shall be performed by a licensed water well contractor. Most water well contractors use 4-inch PVC casing for the well liner. However, PVC casing is sometimes not rugged enough for the application. In circumstances where the well has a caving condition, the well is not straight, or the installation will be very deep, steel casing may be the best choice for the job.

The seal is threaded onto a smaller diameter well casing, usually 4 or 5 inches for domestic applications, and installed into the well, seal end first. The assembly is pushed into position approximately 10 or more feet below the suspected problem area. Once installed, water or sediment entering above the seal is trapped within the annulus between the inner casing and the larger well bore.

Some contractors install the seal on both ends of the inner casing or seal the annular space with cement or bentonite grout to avoid the entrance of unwanted water spilling over the top of the inner casing and back into the well. In temporary installations the use of grout may not be necessary or desirable. For permanent installations, it is recommended that the annular space be sealed with cement or bentonite grout or chips.

## Disadvantages of Secondary Seals

1) **Not always reliable.** Secondary well seals are designed to be installed in a smooth round hole. Well bores are not always round and are rarely smooth. Sometimes it is difficult to seat the seal properly so that it will not leak.

2) **May shut off water.** When seals are installed to seal off unwanted poor quality water or to repair a sediment problem, the well owner always runs the risk of sealing off the primary water bearing zone to the well; essentially shutting off the water supply.

3) **Pump retrieval may be difficult.** Submersible pumps are usually slightly less than 4 inches in diameter. The installation of the pump into a 4-inch casing is a tight fit. Removing the pump from the well at a future date may prove to be a challenge.

4) **Torque arresters cannot be installed** in conjunction with a secondary well seal installation. When secondary well seals are installed, double jacketed wire or a wire sleeve is required to be used.

For additional information, please contact the Drinking Water and Groundwater Bureau at (603) 271-2513 or the Water Well Board at (603) 271-1974 or visit our website at [des.nh.gov](http://des.nh.gov).

