

QRS blue - Quick Repair Shell

Which application?

The QRS (Quick-Repair-Shell) offers an innovative solution for the repair of wells. The QRS is a combination of a simple, self-activated and self-repairing system, based on advanced compound technology. The QRS systems are suitable for Water wells, Energy (Cold-Heat) Storage wells and Chemical Disposal wells up to 500m deep. Common problems/applications which can be foreseen;

- Damaged or torn well filters and risers.
- External well leaks that cause pollution problems (redox).
- Damaged and unreliable wells that malfunctions due to sand deliveries.
- Preventive use by targeted critical pressure tests and service / maintenance activities.
- Protecting or sealing (critical) connections (glued and screwed).

How does this work? What is the background?

The QRS is able to repair wells permanent by its simple, durable and controlled characteristics. This tool is applicable to tube transitions and filter cracks in wells and will seal the damage or leakage. With the QRS it is possible to repair various well types through an accurate composed recipe. This recipe offers a swelling and sealing elastomer that is constructed on an inner core of Stainless Steel. The specific applied elastomeric compounds are chemical engineered for bonding and activation requirements at low-temperature applications (7°C — 24°C). This is done by many decades of experience with comparable compound technologies for high pressure and high temperature applications within oil and gas wells.

Why has this been developed?

- The current range of comparable well repair systems are mechanical complex, expensive and offer a limited application.
- Most current damages / leaks are not repaired with qualified solutions. Ruma Products is ISO certified (see footnote below).
- Many wells have become unusable for the intended purpose in case of leaks and or damages.
- Available existing (mechanical) repair systems offer restrictions on capacity, internal diameters and are unreliable.
- Many wells have to sacrifice efficiency or become unusable when leaking events occur and pollution starts.
- Within densely built environments the replacement or services of Energy Storage Wells are costly and not always possible.

Installation?

As soon as the QRS comes into contact with the fluid (water) it will swell, which will result in a swelling seal on the intended position. Of course, you have enough time to install the QRS system, the average required safe installation time (depending on the bridge or forming a bridge to bridge out connection) is approximately between 4 - 8 hours. The sealing time is up to 3 days. The standard QRS is suitable for applications in Sweet, Brackish and Salt water varying in quality from 150 mg CL-/l tot 20000 mg CL-/l and a temperature of 7°C — 24°C to a depth of 500m. The standard QRS is available for the most common well diameters 6,5" to 24" and is offered in a standard of 3 lengths of 1, 2, 3 meters. The QRS has a long lifespan and provides a suitable solution. Non-standard compositions and dimensions are available on request. For further details about the standard dimensions, please refer to our price overview.

Delivery?

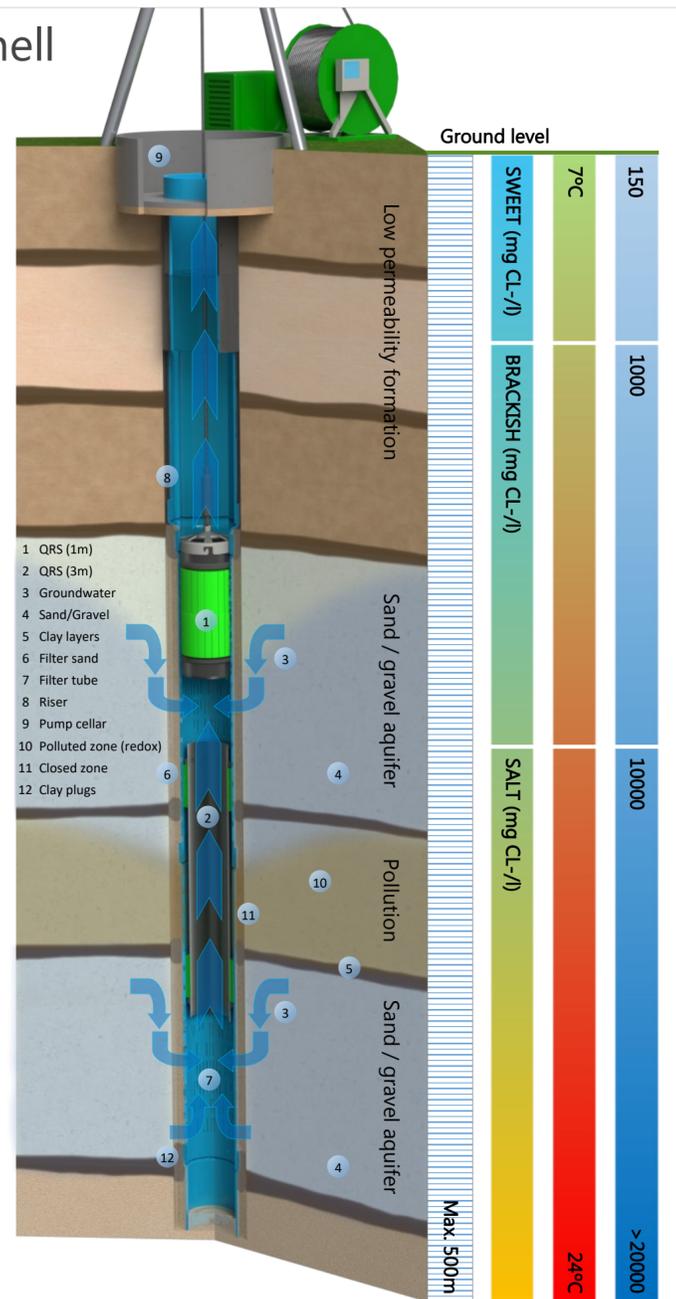
You receive a specified, lab tested and certified QRS. The QRS is easy to install and is supported with instructions. The application and working are guaranteed (within the above-indicated compositions)! Once the QRS is placed at the intended position, the system gives a carefree solution for the presented damages and leakages. The QRS is protected with an UV-resistant film and is delivered in a wooden crate. See the contact details below for (price) requests and information.

Contact

Distributor (since 2019); **Europe, United-Kingdom and Asia:** Boode Waterwell Systems | +31 (0) 180 - 632 744 | www.boode.com

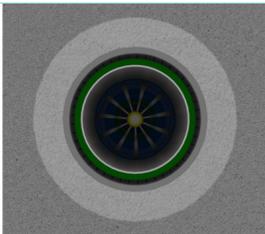
Distributor (since 2021); **Middle-East and Africa:** HP Well Screen and WellSlot | +31 (0) 546 - 577 908 | www.hpwellscreen.com

Development: Ruma Products & Scheper.Co | www.rumaproducts.com | www.scheper.co



INSTALLATION START

Installation of QRS in the well. There is enough space between the QRS and the well. Safe installation time 4 - 8 hours. Sealing time up to 3 days. The space between the tool and well is approx. 1 cm.

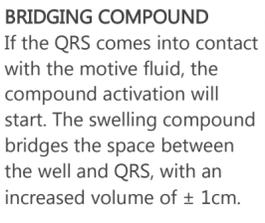


LENGTHS

By default, the QRS is available in lengths of 1, 2, 3 meters. Customization is possible! Think for instance about possibilities to connect 2 QRS systems, so longer lengths can be bridged. Or a QRS + 1 End-cap for bottom repairs.

OUTSIDE DIAMETER (OD)

The QRS measures a default outside-diameter (OD) before the installation is deployed. The inner-diameter / drift (ID) of the well is used as a reference. The compound is suitable for bridging the space between well and QRS. The QRS standards are suitable for 6" - 24" wells.



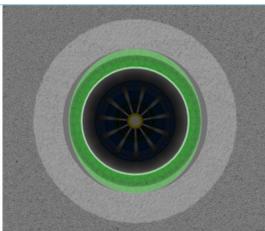
BRIDGING COMPOUND
If the QRS comes into contact with the motive fluid, the compound activation will start. The swelling compound bridges the space between the well and QRS, with an increased volume of ± 1cm.

INSIDE

The QRS can be compared with a kind of tube-sock, that still maintains a lot of space for transit inside, after installation. The internals are clean and there are no further obstacles such as constrictions, grooves, etc.

OVALITY OF WELLS

Ovality or Skew? The compound will rotate into a preferred position at the contact area. The QRS can be applied at wells with some ovality or some skew tubes. (compound remains active).



GUIDE RING

The QRS is equipped with 2 black Guide rings, which serve for centring and protecting the compound. The rings have a smooth surface, so there is less resistance during installation.

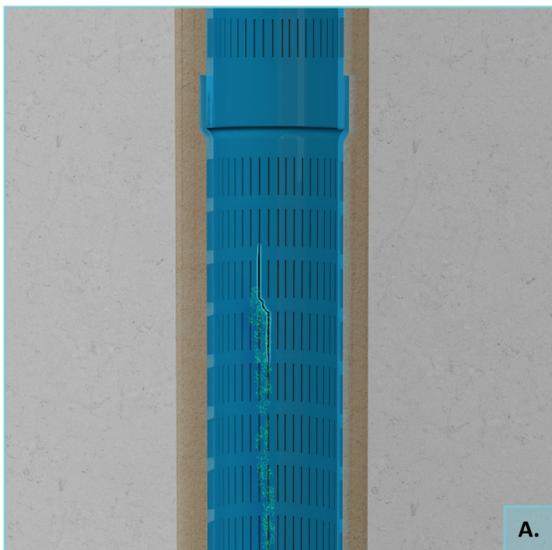
CONNECTIONS

The QRS most common method for connecting is by welding or a SS/PVC connection or a preferred left-tread connection, for easy installation. We can provide your preferred request.

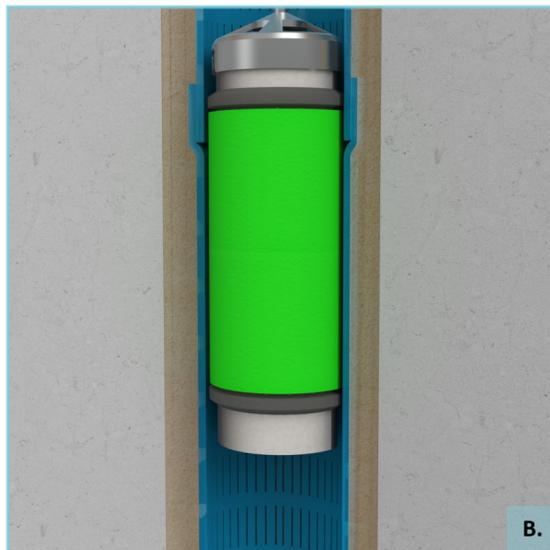
STAINLESS STEEL BASE + COMPOUND

The compound is constructed on a standard Stainless Steel tube [EN 10217-7 TC1 - 1.4301] with a wall thickness of 3mm. There are 3 optional types of compounds applied; standard W-04 (average swell-speed), optional W-06 (quick swell-speed) and optional W-07 (drink-water applicable seal, slow swell-speed). The overall differential pressure capacity is <25bar.

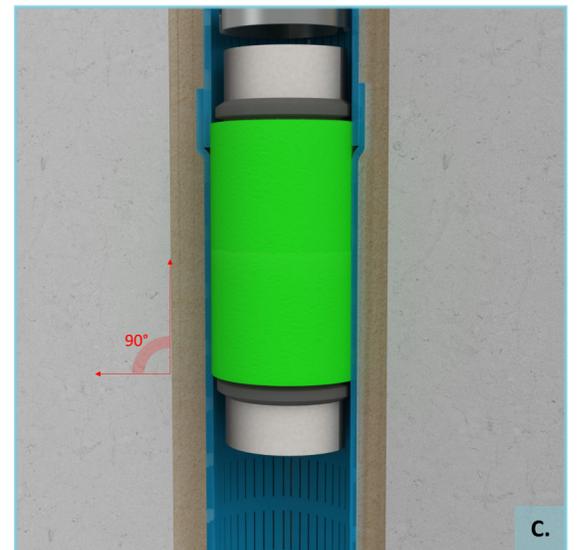
Example; Installation and Application QRS - Steps A. B. C.



A. A visible crack in the well filter causes unwanted sand delivery and contamination. This well has become unusable and unreliable. Before the QRS can be inserted, the repair position should be determined with the necessary QRS length. It is also useful to have a caliber measurement for the ovality of the well (see above tolerances).



B. Insert the QRS at the intended position with universal down-hole tools, supported by a winch or drilling-rig. The activation of the QRS starts when it comes into contact with the fluid. When the tool is at the damaged position, only some waiting time is required. The QRS will seal the position permanent, by the diffusion gradient between the QRS and motive fluid/water.



C. The QRS is placed over the crack and well (glue) connection. Unwanted sand deliveries and contaminations have now been remedied and the downhole tools can be retrieved. The installed QRS is aligned and placed at his right position. The system is repaired and ready for reliable use. The QRS is suitable for load forces about ± <5.000 kg (diff. pres. <25bar).