



REGENESIS

Hydrogen Release Compound (HRC[®]) Installation Instructions

(Pump Information)

RegenesiS has evaluated a number of pumps that are capable of delivering 20,000 centipoise HRC to the subsurface at a sufficient pressure and volumetric rate. Although a number of pumps may be capable of delivering the HRC to the subsurface at adequate pressures and volume, each pump has a set of practical issues that make it difficult to manage in a field setting. As a result of this evaluation, RegenesiS has determined that the R.E. RUPE Company Model ORC/HRC 9-1500 meets the pressure and volume requirements needed to successfully inject HRC in the field. When applying measured volumes of HRC via probe boreholes, it is useful to know the volume of a single pump stroke and the associated delivery system lines. The following additional information is provided for reference

HRC Physical Characteristics:

Density	1.3 g/cc or 10.8 lbs./gal.
Viscosity	Approx. 20,000 centipoise

Equipment Volume and HRC Weight per length

Equipment	Volume	HRC weight
1 inch OD; 0.625 ID hose (10 feet long)	0.2 gallon	1.8 lbs.
1.25 inch OD; 0.625 inch ID drive rod (3 feet length):	0.05 gallon	0.5 lbs.
1.25 inch OD; .625 inch ID drive rod (4 feet length):	0.06 gallon	0.7 lbs.

Before using the Rupe Pump, check the following:

- Fuel level prior to engaging in pumping activities (it's best to start with a full tank)
- Remote control/pump stroke counter LCD display; if no display is present, the electronic counter will need to be replaced (Grainger Stock No. 2A540)
- Monitor pump strokes by observing the proximity switches (these are located on the top of the piston)

Pump Cleaning after HRC Use:

For best results use a hot water (150-170 °F or 66-77 °C) pressure washer to clean equipment and rods periodically throughout the day. Internal pump mechanisms and hoses can be easily cleaned by circulating hot water and a biodegradable cleaner such as Simple Green through the pump and delivery hose. In order to maintain optimal pumping conditions, it is desirable to circulate pure glycerin through the pump after the pump has been thoroughly cleaned. A small volume of glycerin should be left in the pump works and hopper during storage or shipping. Further cleaning and decontamination (if necessary due to subsurface conditions) should be performed according to the equipment supplier's standard procedures and local regulatory requirements.

NOTE: The remote control/pump counter should be kept dry at all times, if it gets wet it will short-circuit and ill need to be replaced.

For direct assistance or answers to any questions you may have regarding these instructions, contact Regenesi s Technical Services at 949-366-8000.

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