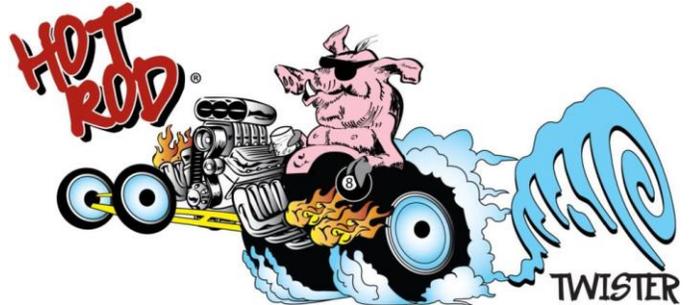


## Work Method – “Hot Rod” Twister

The “Hot Rod” Twister is designed for applications where the sludge level is above the manway, and thus prevents the manway cover from being removed for installation of a regular manway-mounted Twister. For details on effective use of the Twister, refer to our whitepaper “Using Twisters to Clean Black Oil Tanks – The Basic Approach”, available on request. Principles outlined for manway-mounted Twisters also apply to the Hot Rod version. In this paper, we won't address the broader issues of a facility's sludge management program, but rather focus on issues specific to successful use of the Hot Rod Twister.



## Hot Rod Installation Methods

**A- Hot Tap Method:** Requires an experienced contractor to Hot Tap (**Weld**) an 18” flange with fully open 18” gate valve onto a tank manway cover or on the sidewall of the tank. A re-pad may be necessary for the sidewall application if it is a permanent connection.

**B- Adaptor Plate Connector Method:** Adaptor plates are custom fabricated to fit the tank manway dimensions and bolt hole pattern. An 18” flange for mounting the 18” fully open gate valve is included. (**No site welding**) necessary. With this method the number of Hot Rod nozzles are limited to the number of manways available on the tank.

**Note: With both methods, boring the manway cover or sidewall is required.**

The size of the bore when the hot tap valve is installed is critical. An 18-inch fully open valve does not mean that there is an 18-inch bore through the valve body. The Hot Rod Twister requires at least a 16.75” and preferably a 17” bore, which means a non-standard cutter must be used by the contractor doing the hot tap or adaptor plate bore. Standard cutters are smaller diameter, but larger cutters are available and must be specified.

Depending on the size of the tank, from 1-4 Hot Rod Twisters may be recommended for the project.

For installation, the Hot Rod Twister can be set in place via either its forklift pockets or by a sling on its lift eyes, grounded via attached cables, and bolted to the 18" flanged gate valve and plumbed to an appropriate pump. Adjustable jack stands are used to level the unit. The gate valve is opened, and cutter stock is circulated through the Hot Rod Twister's discharge nozzle. As a cavern is opened in the sludge, the Hot Rod nozzle is hydraulically pushed into the tank until the nozzle fully penetrates the tank wall (27" to 36"). Once the nozzle is inside the tank, swivel rotation of the nozzle is manually controlled by the operator outside the tank through a full hundred 120°. After

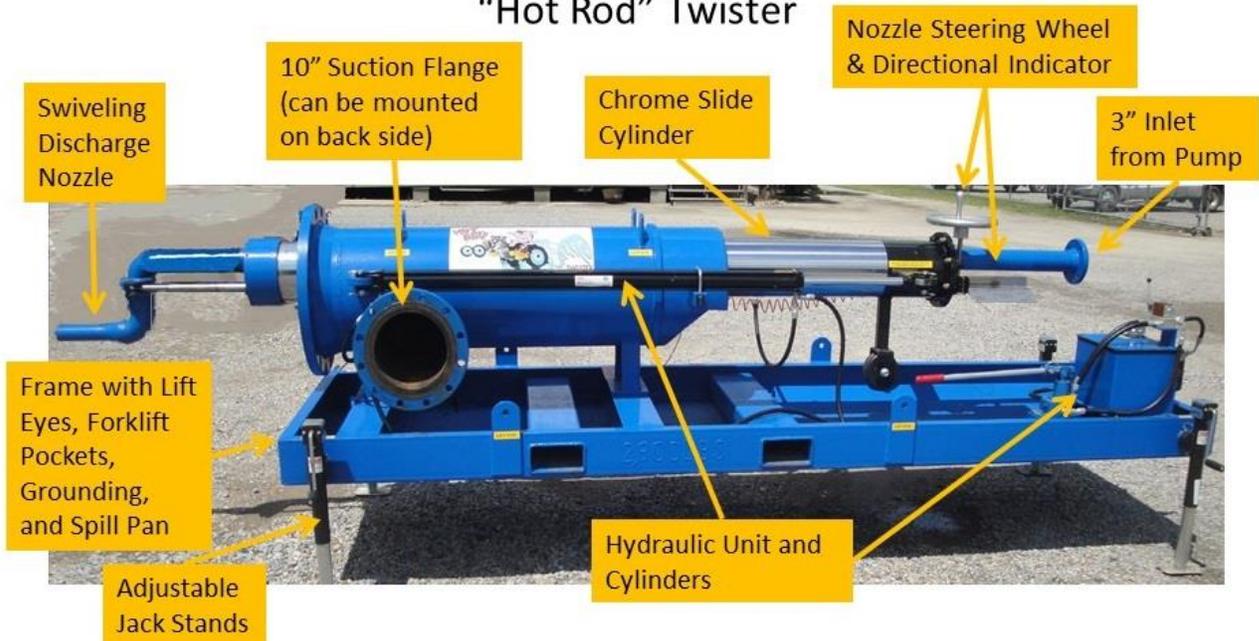


resuspension of the solids is finished and the recovered sludge is pumped off, the Hot Rod Twister is removed from the tank, and a regular Twister can be installed as a permanent fixture.

The cutter is typically pumped in from a vessel such as a tank or tote, using a pump like an 8" x 6" centrifugal pump. As a circulation loop is achieved, suction can be taken through the 10-inch flange on the side of the Hot Rod Twister if

desired. The operator can control the direction of the jet nozzle through 60° left and 60° right of center for a total of 120°. The operator varies the position of the nozzle through its range of motion to ensure a sufficient sweep of the tank. A graduated directional indicator shows him exactly where the nozzle is pointing. Depending on ratio of cutter stock used, tank sludge level, and other factors, after ~48-96 hours the solids are usually refluidized and can be pumped off centrifugal pump.

### "Hot Rod" Twister



The Hot Rod Twister is carefully designed to avoid any leaks. It uses a high pressure sliding seal assembly on the chrome tube, not a packing. This feature allows the Hot Rod to meet not only Class 150 pressure ratings on the pumping side, but also pressure testing of 225 lbs on the seal side, as requested by a major refinery's HaZop.

At that point, when the Hot Rod Twister is ready for removal from the tank, another critical issue emerges. The nozzle must be lined up in the straight-ahead position so that it can retract into the body of the Hot Rod. The Hot Rod Twister is then hydraulically withdrawn. The gate valve is closed, and the Twister is removed from the gate valve, and the valve blinded off. Alternatively, the valve itself can be removed and a regular manway-mounted Twister installed to avoid having to go through a tank opening in the future. That's when the real value of a Twister for online tank cleaning is unleashed....it is already installed and ready to go to work at any time, and allows a proactive sludge management program.

“Steering Wheel” and Directional Indicator for nozzle swivel



Steering Wheel and Directional Indicator

01/31/17