



Reserve at Duxbury Onsite System
ACME PRECAST CO., INC

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INTRODUCTION

The Reserve at Duxbury is a cluster of upscale homes with an onsite treatment plant. The first septic tank is a 14,000 gallon tunnel tank made in seven 10 x 8 sections. It cannot leak. Next in the treatment system is a 7,000 gallon septic tank which receives influent from the first chamber as well as aerated septage from the third chamber. In the third chamber a FAST treatment system is installed. Here, aeration and a fixed film bio-mat digest sewage. The third chamber flows by gravity to a pump chamber. There, depending on timed dosing, aerated effluent is returned to the second septic tank which provides a carbon source for nitrogen reduction, or a dose is sent to the drain field for dispersal.

Watertight structures are important. No system is designed to process rain water in addition to a normal sewage load. Concrete Sealants, Inc is the manufacturer of the butyl gasket used in each joint.

Components of the system are staged at the job site. Each joint of the tunnel tank sections is primed with Concrete Sealants Liquid Rubber Primer CS-50. It is a black primer that greatly enhances the adhesion of the butyl gasket, CS-102. Note that the white release film is still on the gasket. It will be removed just before the sections are placed.



CS-102 is securely glued to the outer portion of the ship-lap joint using the CS-50 primer. This preparation was done at the plant, eliminating a step for the guys in the field. Note that the two ends of the sealant are joined together by hand pressure. This prevents the two lengths from separating, a continuous gasket is important for water tight structures.



Acme's truck carries sections from the staging area to the crane.

As an extra gasket, Acme decided to use CS-235 Expanding Sealant on the inside joint of each tunnel section. CS-235 expands to 150% of original size overnight, once it contacts water. A slower version, CS-231 is better suited in cold joints in fresh poured concrete. It requires 60 days for 150% expansion. Here, a laborer, pounds the CS-235 against the CS-50 primer to insure good adhesion.





Corners are a challenge. Since CS-102 is a rubber compound, if it is stretched at the corners, it will rebound. This pulls the gasket away and ruins the water tight continuous gasket concept. This piece is a part of one of the septic tanks. The joints are brushed clean, but not primed. The ends of the gasket are kneaded together by hand to complete the gasket. Since the precast sections are stacked, the weight of each insures adhesion and water tight joints.



Using a spreader bar with cable slings, the 150 ton crane reaches out to place the base section of the pump tank. Note that it is lower than the other tanks. It is fed by gravity from the FAST treatment tank, shown here as the taller structure in the rear. The yellow level checked each piece to guarantee a good installation. Conesal CS-102 is in the white box ready to install before the next shim section is set.



Kenny Cleveland, of Acme Precast, communicates with the crane operator by hand signals to carefully lower the middle (shim) section of the pump tank.

The third section of the pump chamber is placed using CS-102 gasket. The top goes on later.

CS-55 black acrylic coating makes a hard, shiny, water resistant finish on the outside of each box. Red markings tell the crew which piece goes together and helps align them correctly.





Carefully, the first piece of the 14,000 gallon tunnel tank is placed. Stakes and marks on the level gravel base show where the sections belong. Each piece is checked for plumb and level installation. Using Acme's truck the sections are brought to the crane, which stands them up and delivers them to the hole. Lifters are PA Insert Pulling Irons. A 270,000 psi 1/2 inch cable encapsulated in injection molded plastic.

Hand signals and careful pressures bring the two first pieces together.





Chain binders connect the two pulling irons, with a heavy block of wood to keep pressures in line. As the crane supports most of the weight, the winch effect of the chain binders pulls the tops snugly together



Bolt pockets, top and bottom are used to draw together and hold the tunnel sections together. The crane supports most of the weight at this point. Note the squeeze-out of the gasket due to the compression.



Almost done.



Completed tunnel tank. The two missing tops on the pump chamber and the FAST chamber are set later.
Total elapsed time 6 hours,

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