Reinforcement required to meet 62-6.013(5)(b) February 28, 2022

(supersedes version of April 15, 2005)

Please be reminded that all Onsite Sewage Treatment Receptacles permitted and installed after March 22, 2002 must have new approval numbers indicating that the tank design has been successfully structurally tested and meets all of the requirements of Chapter 62-6.013 of the Florida Administrative Code (FAC). In addition to the structural testing, the tanks require crack control reinforcement in accordance with applicable ACI Codes. The reinforcement requirements are as noted below.

Minimum Reinforcing Requirement:

62-6.013(5)(b) defines the minimum reinforcement for temperature and shrinkage crack control in concrete receptacles for Onsite Sewage Treatment and Disposal Systems. The April 15, 2005 edition of this policy required a minimum ratio of reinforcement of 0.0010 in accordance with Chapter 16 of ACI 318-99 for precast concrete walls. Table 11.6.1 of ACI 318-19 continues this specification. **Therefore, the minimum temperature and shrinkage crack control ratio will be 0.0010 times the gross concrete area in the vertical and horizontal direction.**

To achieve the minimum reinforcing the manufacturer has the choice of steel rebar, welded wire mesh, or steel and synthetic fibers.

Welded Wire Mesh:

If you elect to use welded wire mesh, it is required that the mesh be included in the four walls and the bottom of the tank. The minimum amount of wire required depends on the wall thickness. Attached is a copy of the Welded Wire Conversion Table indicating the mesh required to meet the 0.0010 requirement for various wall thicknesses. Note that the 6 x 6-10/10 wire mesh is adequate for the 2" wall thickness, the 6 x 6-8/8 is adequate for the 2.5" and 3.0" wall thicknesses, and the 6 x 6-6/6 is adequate for the 3.5" and 4.0" wall thicknesses. **Use of these meshes in the noted wall thicknesses will satisfy 62-6.013(5)(b).**

Steel Reinforcing:

The use of reinforcing bars alone does not satisfy the temperature and shrinkage crack control requirement due to the spacing of the bars. The spacing of temperature and shrinkage reinforcement shall not exceed 5 times the wall thickness nor 18 inches to be effective for crack control, according to the ACI code. Chapter 62-6.013 is silent on this ACI requirement. **Therefore, the maximum spacing for reinforcing bars shall be as noted on the Welded Wire Conversion Table (attached) to achieve the 0.0010 minimum requirement**.

Steel and Synthetic Fiber Reinforcing:

The use of fiber reinforcement in lieu of continuous steel reinforcement for temperature and crack control can be achieved by using the following equations:

Recommended fiber reinforcement (lbs per cubic yard)

4.48 x specific gravity of the fiber

Minimum fiber reinforcement (lbs per cubic yard)

4.48 x specific gravity x 60,000
tensile strength of the fiber (psi)

EXAMPLE

For a fiber with a specific gravity of 0.90 and a tensile strength of 90,000 psi the recommended fiber reinforcement is 4.48 x 0.90 = 4.0 lbs per cubic yard and the minimum fiber reinforcement is 4.48 x 0.90 x 60,000/90,000 = 2.7 lbs per cubic yard.

The 4.0 lbs per cubic yard represents the volumetric equivalent of wire mesh at .0010 x the gross concrete area. The 2.7 lbs per cubic yard is the volumetric equivalent adjusted by the ratio of the tensile strength of the wire mesh divided by the tensile strength of the chosen fiber, or 60,000/90,000. It is suggested to use the recommended value, since this provides more fiber pieces to insure proper overlapping of the fiber strands.

Utilizing the equations above will satisfy the reinforcement requirements of 62-6.013(5)(b).

Fiber Material Qualification:

Qualification of a fiber for use in the above equations shall be the responsibility of the fiber manufacturer. The tank manufacturer will not be required to qualify the fiber matrix. The fiber manufacturer must provide evidence to the Onsite Sewage Program Office that the desired fiber matrix meets or exceeds minimum average residual strength (ARS) of 150 psi when tested in accordance with ASTM-C1399. A certified concrete testing facility shall conduct the testing. Once the fiber manufacturer receives the approval, the manufacturer may use this approval as proof of achieving the temperature and shrinkage crack control requirement. The Onsite Sewage Program Office will post the approved manufacturer's design matrixes along with the ARS values on the Program Office internet web site.

The approved supplier list is also posted on the Internet. Go to floridadep.gov/water/onsite-sewage. Scroll down the subject list to Product Listings and Approval Requirements and select that. Click on Fibers for Concrete Receptacles. This list is updated as new suppliers qualify their product.

F/n: Reinforcement requirements-2-28-2022.doc

Welded Wire Conversion Table-6x6 mesh

wire gauge	wire size W-no.	Nominal diameter (in.)	Nominal Area $(in.)^2$	Nominal weight (lb/ft)	Maximum spacing @ 0.0010 X A_c				
				wall thickness (in.) =	2	2.5	3	3.5	4
4	W4	0.2253	0.0399	0.1354	19.93	15.95	13.29	11.39	9.97
6	W2.9	0.1920	0.0290	0.0983	14.48	11.58	9.65	8.27	7.24
8	W2.1	0.1620	0.0206	0.0700	10.31	8.24	6.87	5.89	5.15
10	W1.4	0.1350	0.0143	0.0486	7.16	5.73	4.77	4.09	3.58
	#3 rebar	0.3750	0.1104	0.3760	55.22	44.18	36.82	31.56	27.61
	5/16" rebar	0.3125	0.0767	0.3760	38.35	30.68	25.57	21.91	19.17
				5 x wall thickness=	10.00	12.50	15.00	17.50	20.00

Vertical and horizontal reinforcement shall not be spaced farther apart than five times the wall thickness, nor 18 inches.