

# Precast Concrete Septic Tanks

## STRUX® 90/40 Synthetic Macro Fiber Reinforcement

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### Product Description

STRUX® 90/40 is a synthetic macro fiber reinforcement designed to provide enhanced structural properties to concrete.

### Product Applications

STRUX 90/40 can be used as a direct replacement for welded wire mesh, in precast septic tanks, when used as outlined in the dosage table.

It is recommended that steel bars not be removed from the tank lids.

### Benefits of Using STRUX 90/40

- No labor required to manufacture and place cages
- Improved cycle times – no waiting for placing of cages
- Reinforcement is distributed throughout the unit resulting in:
  - better control of cracking
  - improved impact resistance
  - less damage during transit and handling
- Elimination of rejects or shadowing caused by incorrect placement of the welded wire mesh cage
- STRUX 90/40 will not corrode
- STRUX 90/40 is safe and easy to handle

### Testing

Septic tanks reinforced with STRUX 90/40 should be tested to ensure compliance with local codes and regulations.

### Dispensing

STRUX 90/40 is available in 1 and 5 lb concrete-ready bags that can be added directly to the concrete mixer.

### Dosage Rates

The recommended dosage rate for STRUX 90/40 can be determined from the dosage table.

Information on the engineering calculations used to derive this table are contained in the Engineering Bulletin titled: *"A guide to specifying the use of synthetic macro fibers, as an alternative to welded wire mesh, in precast concrete septic tanks."*



### STRUX 90/40 Fiber Reinforcement Dosage Rate Table ( $f_c' = 4,000$ psi)

Average residual strength, ARS, to match performance of steel mesh

6 in. x 6 in.

W1.4

Gauge: 10/10

As (in.2/ft): 0.028

WALL THICKNESS (IN.)	STEEL RATIO	ARS (PSI)	STRUX 90/40 WF (LB/YD <sup>3</sup> )
2.00	0.12%	168	3.75
2.25	0.10%	150	3.50
2.50	0.09%	150	3.50
2.75	0.08%	150	3.50
3.00	0.08%	150	3.50
3.25	0.07%	150	3.50
3.50	0.07%	150	3.50
3.75	0.06%	150	3.50
4.00	0.06%	150	3.50

**W2.9**

Gauge: 6/6

As (in.2/ft): 0.058

WALL THICKNESS (IN.)	STEEL RATIO	ARS (PSI)	STRUX 90/40 WF (LB/YD <sup>3</sup> )
2.00	0.24%	348	10.00
2.25	0.21%	309	8.25
2.50	0.19%	278	7.00
2.75	0.18%	253	6.00
3.00	0.16%	232	5.50
3.25	0.15%	214	5.00
3.50	0.14%	199	4.50
3.75	0.13%	186	4.25
4.00	0.12%	174	4.00

**W2**

Gauge: 8/8

As (in.2/ft): 0.040

WALL THICKNESS (IN.)	STEEL RATIO	ARS (PSI)	STRUX 90/40 WF (LB/YD <sup>3</sup> )
2.00	0.17%	240	5.75
2.25	0.15%	213	5.00
2.50	0.13%	192	4.25
2.75	0.12%	175	4.00
3.00	0.11%	160	3.75
3.25	0.10%	150	3.50
3.50	0.10%	150	3.50
3.75	0.09%	150	3.50
4.00	0.08%	150	3.50

**W4**

Gauge: 4/4

As (in.2/ft): 0.080

WALL THICKNESS (IN.)	STEEL RATIO	ARS (PSI)	STRUX 90/40 WF (LB/YD <sup>3</sup> )
2.00			
2.25			
2.50			
2.75	0.24%	349	10.25
3.00	0.22%	320	8.75
3.25	0.21%	295	7.50
3.50	0.19%	274	6.75
3.75	0.18%	256	6.25
4.00	0.17%	240	5.75

As = area of steel, in.2/ft

ARS = the average residual strength (psi), when tested in accordance with ASTM C1399, to match the corresponding steel ratio wf = weight of STRUX 90/40 in lbs per cubic yard of concrete

Note: The fiber reinforced concrete’s required minimum average residual strength of 150 psi provides equivalent performance to that of concrete with a steel ratio of 0.10%, where the steel is located at the mid plane of the section. This is the minimum steel ratio recommended by ACI-318-02, Chapter 16 section 16.4.2 for precast nonprestressed walls.

It is therefore recommended that the minimum average residual strength, ARS, of the concrete mix designs used to manufacture septic tanks with STRUX 90/40 shall not in any case be less than 150 psi when tested in accordance with ASTM C1399.

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