

High-performance, cementitious-based ink specially formulated for concrete 3D printing for marine applications



## Highlights

- Superior strength and durability for marine applications
- Highly pumpable and extrudable
- Holds shape, quickly stabilizes in place, increasing vertical print rate while reducing risk of setting in equipment
- Highly adaptable to jobsite conditions with on-site chemical dosing system
- Strong interlayer bond
- Excellent strength and low shrinkage
- Meets and exceeds ASTM C387

## Accessory Products

- **Dosing System.** Titan offers a simple yet robust dosing system to adjust the set accelerator and superplasticizer in response to jobsite conditions, primarily temperature and printing rate.
- **Axion™ NCA/3D Set Accelerator.** Higher dosages are suitable for faster vertical print rates or cooler temperatures.
- **Axion™ HR/3D Superplasticizer.** Increase dosage for faster mixing and extrusion, or for higher temperatures.
- **Water.** Meeting ASTM C1602/ C1602M. Potable water preferred.
- **Curing Compound.** Apply curing compound within 1-hour of printing.

## Product Data

Property	Standard	Typical Result
Compressive Strength <sup>1</sup> , psi	ASTM C39	
1-Day		2,000 - 3,000
7-Day		5,000 - 6,000
28-Day		7,000 - 8,000
Surface Resistivity, KOhm.cm	ASTM C1876	
28-Day		< 20
Air Content, %	ASTM C138	3 to 6
Slump, in.	ASTM C143	4 to 7
Stabilization:	N/A	
Open/Working Time <sup>2,3</sup> , min		10 - 30
Solidification:	ASTM C403	
Green Strength, min		5 - 20
Setting Time (Initial) <sup>2,3</sup> , min		90 to 180
Vertical Print Rate <sup>2</sup> , ft/hr	N/A	1.0 - 2.0
Maximum Particle Size, in	ASTM C136	0.2

<sup>1</sup>Strength at water/solids of 0.17 <sup>2</sup>Typical values, adjustable based on field conditions and set accelerator dosing

<sup>3</sup>Open/working time is the amount of time to use concrete without remixing; however, the concrete will not set or gain strength in this time period. Initial setting time is the time for the concrete to solidify to a predefined strength as defined in ASTM C403.

## Instructions

1. Load xForm3D™ Marine cement into mixer hopper.
2. Connect dosing system to water line of mixer. Set dosage rate for set accelerator and superplasticizer.
3. Mix to proper consistency. Ensure material is fully mixed. Sample to verify. Adjust water and superplasticizer as necessary.
4. Extrude into place. Adjust set accelerator as necessary if setting is too fast or slow.
5. Apply curing compound within 1 hour.

## Temperature Range

Maintain freshly mixed concrete between 50 and 90°F.

## Delivery and Storage

xForm3D™ Marine cement is a dry, free-flowing powder and granular blend, available for delivery in double-sealed supersacks or by bulk delivery. Keep supersacks sealed until ready for use. Each sack can make 1 cubic yard of printed material.

## Compatibility

xForm3D Marine cement is compatible with most 3D printers and mixers. Consult your Titan America representative for the latest information.

## Safety

Refer to the Safety Data Sheet (SDS) for additional handling instructions. Keep out of reach of children.