

SeaShield™ FX-225

Non-Shrink Underwater Grout



CSI Specification: 03.01.00 Maintenance of Concrete

DESCRIPTION

SeaShield FX-225 Non-Shrink Underwater Grout is a flowable, high-strength, non-metallic, non-segregating grout designed with a special anti-washout admixture, corrosion inhibitors, and polymers. SeaShield FX-225 can be pumped or tremied underwater to grout SeaShield FX-70® and fiberglass pile jackets and as a structural repair mortar for formed applications above and below water without dewatering.

ASSESSMENT

WHERE TO USE

- Concrete repairs in marine structures
- Underwater grouting applications
- Pile jacket repairs with the SeaShield Series FX-70 structural repair and protection system
- Seawall repairs without dewatering
- Form and pour repairs above water

FEATURES

- Flowable and pumpable
- No de-watering or cofferdams required
- Shrinkage compensated
- Bonds well to concrete
- May be extended with clean, washed nominal 3/8 in. (9 mm) pea gravel
- Ready to use — simply add potable water
- Suitable for saltwater marine applications

PRODUCT DATA

All testing performed at 73°F (23°C) and 50% R.H.

Generic Description

Cementitious underwater grout

Packaging

55 lb. (24.9 kg) bag
3,000 lb. (1,134 kg) bulk bag

Product Yield ASTM C138

0.47 ft.³ (0.013 m³) per 55 lb. (24.9 kg) bag
0.64 ft.³ (0.018 m³) per 55 lb. (24.9 kg) bag extended with 30 lb. (13.6 kg) of pea gravel

Working Time

30 minutes at 75°F (24°C)

Set Time

ASTM C191

Initial 2.5 hours minimum

Final 3.5 to 7 hours

Storage

Store dry between 40° and 95°F (4°–35°C)

Shelf Life

1 year in unopened packaging

VOC

0 g/L

TECHNICAL INFORMATION

The data herein is based on laboratory testing under controlled conditions. Variations may result from mixing methods and jobsite conditions. All testing performed at 73°F (23°C) and 50% R.H., unless otherwise noted. Results were performed using 134 fl. oz. (4.0 L) water per 55 lb. (25 kg) of SeaShield FX-225.

Splitting Tensile Strength

ASTM C496
28 days 600 psi 4.14 MPa

Density
ASTM C138
134 lb./ft.³ 2,146 kg/m³

Compressive Strength
ASTM C109
24 hours 4,000 psi 27.5 MPa
3 days 5,000 psi 34.5 MPa
7 days 6,000 psi 41.3 MPa
28 days 7,000 psi 48.2 MPa

Height Change
ASTM C1090
Shows positive expansion
28 days
Less than 0.1% expansion

Volume Change
ASTM C827
Less than 0.5% expansion
Flexural Strength, 28 days
ASTM C348
1,200 psi 8.3 MPa

Freeze Thaw Resistance
ASTM C666, 300 cycles
100% durability factor

Bond Strength
ASTM C882M, hardened to plastic grout
28 days 3,000 psi

Modulus of Elasticity
ASTM C469, 29 days
4.9 x 10⁶ psi 33,780 MPa

Resistance to De-icing Salts
ASTM C672, 50 cycles
Excellent resistance – 0 grams loss / 0 visual rating

Bleeding
ASTM C232-C940
No bleeding

Length Change
ASTM C157
Wet Cured 0.03%
Dry Cured -0.18%

Flow Table
ASTM C1437 modified per ASTM C1107
75 – ideal for pump or tremie applications underwater

LIMITATIONS

- Do not apply in water temperatures below 40°F (4°C)
- Do not apply in water temperatures above 90°F (32°C)
- Underwater product placement should only be attempted only by certified and experienced diving contractors
- Underwater placement by pump or tremie only
- Always follow ACI 305 and 306 for hot or cold weather installations for best results beyond published recommendations
- Not designed as a leveling mortar, must be formed
- Do not mix partial bags
- Avoid contact with aluminum surfaces
- Site conditions can greatly affect cure times and product performance

Application Thickness Limits

	Annular Space FX-70 Jacket	Above Water Application	Underwater Application
Minimum Neat	2" (51 mm)	1½" (13 mm)	1" (25 mm)
Maximum Neat	8" (203 mm)	3" (76 mm)	8" (203 mm)
Minimum Extended	3" (76 mm)	2" (51 mm)	2" (51 mm)
Maximum Extended	—	8" (203 mm)	24" (610 mm)

SURFACE PREPARATION

SeaShield FX-70 Jackets

Surface must be at least 35°F (2°C) prior to application. All surfaces must be sound, free of loose rust, marine growth, oil, and other contaminants. Consult a qualified professional engineer in all cases when section loss exceeds 25% only.

Concrete: Prepare surface by high-pressure water-blasting or other mechanical means to meet ICRI Guideline 310.2R CSP 6-9. Repair or replace any reinforcing steel as determined by a qualified professional engineer.

Steel: Prepare surface by high-pressure water-jetting or other mechanical means necessary to meet SSPC-SP12/ NACE 5 WJ-4. Repair or replace any structural steel elements with excessive section loss as determined by a qualified professional engineer.

Wood: Prepare surface by high-pressure water-blasting or other mechanical means necessary to achieve a sound surface, free of all contaminants.

All submerged forms should be installed by certified professional divers. All forms must be sealed appropriately to prevent grout leakage during installation.

Formed applications: Concrete and reinforcing steel to receive repair mortar must be sound, clean, and free of all contaminants that could impair product adhesion, bond, or performance. Concrete should be a minimum of 28 days old or substantially cured to the equivalent design strength prior to SeaShield FX-225 installation. Prepare concrete and reinforcing steel in accordance with ICRI Guideline 310.1R. Saw-cut the perimeter of the repair area, taking care to avoid cutting any reinforcing steel. Remove all loose or deteriorated concrete by chipping hammer, water jetting, or other mechanical means to reach sound concrete and achieve an open pore structure and surface profile per ICRI Guideline 310.2R CSP 5-9, taking care to avoid micro-cracking. Remove all corrosion, rust, and surface contaminants from reinforcing steel by sandblasting or other mechanical means. Remove all cleaning media and debris by water jetting, vacuum or blowing with high-pressure, oil-free air.

Forming: Forms must be liquid tight to prevent leakage during installation. Use appropriate sealants or putties to seal all surfaces to prevent leaks. Use an appropriate release agent prior to erecting forms to improve release. Do not allow release agent to be applied to any non-formed surfaces as it can inhibit the bond of SeaShield FX-225.

MIXING

For optimal product performance, condition to 70°F (21°C). Do not prepare more material than can be used in the working time of the product. Mix with a mortar mixer or a low-speed (300–600 rpm) drill and mixing paddle. For best results, start with 90% of total mixing water and slowly add entire contents of SeaShield FX-225 while mixing to avoid clumping. Adjust using remaining 10% of total mixing water until desired consistency is achieved scraping unmixed material from the sides and bottom of mixing container as needed to ensure all material is mixed. **Consult the printed instructions on the product package for the maximum recommended amount of mixing water.** Mix for approximately 3 minutes. Do not re-temper. Continue to slowly agitate to prevent product from setting in the mixer up to the maximum working time of 30 minutes at 75°F (24°C). SeaShield FX-225 can be extended with ¾ in. (9 mm) pea gravel up to 30 lb. (13.6 kg) per bag, and requires the use of a mortar or grout mixer with stationary barrel and moving mixing blades. Aggregate used must be nonreactive, clean, well graded, and saturated surface dry (SSD), have low absorption and high density in compliance with ASTM C1260, C227 and C289. Do not use limestone aggregate.

APPLICATION

SeaShield FX-70 Jackets

For pumping applications, pump properly mixed SeaShield FX-225 as follows: Install pumping ports at 90 degrees from tongue-and-groove joint, alternating sides. Place the first port approximately 1 ft. (30 cm) from the bottom of the jacket. Place subsequent ports at a maximum 5 ft. (1.5 m) vertical spacing, alternating sides. Begin pumping from the lowest port and move up from port to port. Do not exceed 10 ft. (3 m) pumping distance from any individual port.

For tremie applications, make sure the hose extends all the way to the bottom of the form. Fill the form to the desired level, allowing water to displace from the top of the form. Depending on the head pressure, depth of pour, and size of the vessel, the tremie hose may need to be retracted as the form fills to maintain flow.

All submerged jackets should be inspected by a certified professional diver during the filling process to check for leaks and proper placement.

Formed applications, below water

For pumping applications, pump properly mixed SeaShield FX-225 as follows: Install pumping ports as required for the repair. Begin pumping from the lowest port and move up from port to port making sure the form is completely filled and the water is displaced. Do not exceed form design pressure rating.

For tremie applications, make sure the hose extends all the way to the bottom of the form. Fill the form to the desired level, allowing water to displace from the top of the form. Depending on the head pressure, depth of pour, and size of the vessel, the tremie hose may need to be retracted as the form fills to maintain flow. Do not exceed form design pressure rating.

CAUTION

May cause serious eye and skin irritation or damage. When combined with water, may cause moderate to severe alkali burns. Contains silica; do not breathe dust.

Protective Measures: The use of safety glasses and chemical-resistant gloves is recommended. Use appropriate clothing to minimize skin contact. The use of a NIOSH-approved respirator is required to protect respiratory tract when ventilation is not adequate to limit exposure below the permissible exposure limit (PEL). Refer to Safety Data Sheet, please contact Denso North America for an SDS.

FIRST AID

Eye Contact: Immediately flush eyes with plenty of cool water for at least 15 minutes while holding the eyes open. If redness, burning, blurred vision, or swelling persists, seek medical advice.

Skin Contact: Remove product and wash affected area with soap and water. Do not apply greases or ointments. Remove contaminated clothing. Wash clothing with soap and water before reuse. If redness, burning, or swelling persists, seek medical advice.

Ingestion: DO NOT INDUCE VOMITING. Seek medical advice. Never administer anything by mouth to an unconscious person. Rinse mouth out with water. Never leave affected person unattended. If vomiting occurs spontaneously, lay affected person on their side, keeping head below hips to prevent aspiration of material into lungs.

Inhalation: Remove affected person to fresh air. If affected person continues to experience difficulty breathing, seek medical advice.

CLEAN-UP

Spills: Sweep or vacuum material and place in a suitable container. Keep out of sewers, storm drains, surface waters, and soils.

Surface Clean: Remove any residue with hot soapy water. Cured material can be removed only by mechanical means.

Tools and Equipment: Clean with soap and water immediately after use.

Skin: Use a non-toxic, pumice-based soap, citrus-based hand cleaner, or waterless hand-cleaner towel. Never use solvents to remove product from skin.

Disposal: Dispose of container and unused contents in accordance with federal, state, and local requirements. Containers may be recycled; consult local regulations for exceptions.

IMPORTANT INFORMATION

It is the responsibility of each purchaser and user of each product to determine the suitability of the product for its intended use. Prior to using any product, consult a qualified design professional for advice regarding the suitability and use of the product, including whether the capacity of any structural building element may be impacted by a repair. As jobsite conditions vary greatly, a small-scale test patch is required to verify product suitability prior to full-scale application. The installer must read, understand, and follow all written instructions and warnings contained on the Limited Warranty, product label(s), Technical Data Sheet(s), Safety Data Sheet(s), and the www.densona.com website prior to use. For industrial use only by qualified applicators. The information given on this sheet is intended as a general guide only and should not be used for specification purposes. We believe the information to be accurate and reliable but do not guarantee it. We assume no responsibility for the use of this information. Users must, by their own tests, determine the suitability of the products and information supplied by us for their own particular purposes. No patent liability can be assumed. KEEP OUT OF REACH OF CHILDREN!