NA-100

High Flow, Zero Bleed, Non-Aggregate, Non-Shrink Grout

DESCRIPTION
NA-100 is a blend of specialty cements and proprietary admixtures. This material is designed to provide maximum flow, shrinkage compensation and extended working times in an aggregate free formulation where clearances are minimal, such as the grouting of tendon cables. **NA-100** is non-metallic and non-corrosive.

USES
NA-100 is ideal for a wide variety of applications that include:
- Vertical and horizontal post-tension grouting of stressed steel to provide complete encapsulation and protection from corrosion.
- Grouting of tight clearances between precast segments, beams and columns in contact with stressed steel tendons or cables
- Anchor bolts, dowels and rods where sanded grouts restrict complete encapsulation

BENEFITS
- Extreme fluidity: Can be pumped into areas that are virtually inaccessible with standard C-1107 non-shrink grouts
- Working time: Extended for maximum pumping range
- Strength: Attains high compressive strengths at specified water ratios
- Thixotropic: High flow restored by agitation
- Corrosion Protection: Encapsulates tendons, bolts or bars to protect from corrosion
- Zero Bleed: When tested to 100 psi per ASTM C1741 via PTI M55.1-12, Section 4.4.6.2
- Consistent: Strict Quality Control testing and standards

STANDARDS
NA-100 has been specifically formulated to meet and exceed the testing requirements of PTI M55.1-12. When tested to 100 psi per ASTM C1741 in accordance with PTI M55, Section 4.4.6.2 and Table 4.1(b), **NA-100** complies with PTI M55.1-12 as a Class C Grout using no fillers or aggregates.

SURFACE PREPARATION
Post-Tensioning Applications: Refer to PTI M55.1-12 or other governing specification.

Non-Post Tensioning Applications: All surfaces in contact with **NA-100** shall be free of dirt, oil, grease, laitance and other contaminants that may act as bondbreakers. All unsound concrete should be removed to ensure a good bond. Smooth, dense surfaces need to be mechanically abraded to provide necessary bonding requirements. Mechanically prepare the substrate to a minimum CSP 5 following ICRI Guideline 310.2R to allow proper bonding. ACI recommends that the area to be grouted should be saturated for 24 hours before placement. Remove any standing water. Surfaces should be saturated, surface dry (SSD). Maintain contact areas between 40°F (4°C) and 90°F (32°C) prior to grouting and during initial curing period.

FORMING
Method of forming must provide for rapid, continuous grout placement. For pourable grout, construct forms to retain grout without leakage. Forms should be coated with **US SPEC Slickote** for easy removal. Post-tension ducts should be leak free.

MIXING
Post-Tensioning Applications: Use a high-shear colloidal mixer capable of achieving a homogeneous mixture. Pre-wet mixer and empty excess water. Mix at a water ratio of 7.0 quarts of cool, clean, potable water per 50 lb bag of **NA-100**. Mix at approximately 1,500 RPM for 3 to 5 minutes or until desired flow has been

MIXING (continued)
achieved and determined using the Modified Flow Cone Method. Mix only enough grout that can be pumped continuously within the working time for mixed grout. Do not blend excess water as this will cause bleeding leading to segregation and sedimentation. Do not use any other admixtures or additives.

Non Post-Tensioning Applications: For larger batches, use a mortar mixer with rotating blades. For smaller batches, use a heavy duty ½"(15mm) (or larger) low-speed, corded drill and mixing paddle #6 per ICRI Technical Guideline 320.5. Pre-wet mixer (or container) and empty excess water. Place ¾ of the required 7.0 quarts of cool, clean potable water in mixer, then add dry material. Mix on low RPM for a total of 3 to 5 minutes, adding the remaining water, until a homogeneous mixture is achieved. When using a mortar mixer higher RPMs may be necessary to achieve a homogeneous mixture. Mix only enough grout that can be placed within working time. For placements greater than 3" depth, **NA-100** must be extended by up to 30%, by weight, with clean, washed and dried 3/8" (1 cm) pea gravel. Do not blend excess water as this will cause bleeding leading to segregation and sedimentation. Do not use any other admixtures or additives.

PLACING
Post-Tensioning Applications: Post-Tensioning grouting applications should commence following grout approval in accordance with governing specifications such as Post-Tensioning Institute Guide Specification, AASHTO LRFD Bridge Construction Specifications Section 10.11, USDOT FHWA Post-Tensioning Tendon Installation and Grouting Manual or other applicable governing specifications.

Non Post-Tensioning Applications: Grout should be placed using established procedures according to American Concrete Institute recommendations. Mechanical vibration may cause segregation. Place grout on one side of area. Let grout flow to opposite and adjacent sides to avoid entrapment of air and uneven bearing of the grouted surface. When necessary, provide vent holes. **NA-100** must be 100% encapsulated to prevent cracking.

FINISHING & CURING
Follow standard ACI curing practices. Do not disturb formwork or grout for 24 hours.

STORAGE
Normal cement storage and handling practices should be observed. Store material in an interior, cool, dry place. Shelf life is 9 months in original, unopened container.

LIMITATIONS
In addition to limitations already mentioned, please note the following. Do not apply when the surface or ambient temperature is below 40°F (4°C) or when the temperature is expected to fall below 40°F within 48 hours. When grouting at minimum temperatures, ensure surfaces in contact with grout do not fall below 40°F until final set has been achieved and grout has reached 800 psi. Eight hundred psi compressive strength is typically achieved within 24 hours at a 40°F constant although this should be verified onsite per PTI M55.1-12, Section 4.4.2 as needed. Do not apply over surfaces that are frozen or contain frost. Do not apply over any active faults or cracks in the substrate without addressing any movement that may occur. Do not use as a patching or overlay mortar or in unconfined areas. Setting time will speed up in hot weather and slow in cold weather. For hot and cold weather applications, contact your US SPEC manufacturer's representative.

Packaging: 50 lb (22.7 kg) bag, 45 bags per pallet

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PHYSICAL PROPERTIES*

All Physical Property testing performed in laboratory conditions of 73°F (22.8°C) ± 3°F (-16°C) and a relative humidity no less than 50% unless otherwise determined by the test method or specification. All results represent **NA-100** with 7.0 qts water unless listed otherwise. Tests are conducted under standardized conditions for comparative purposes, and results may not be representative of performance under field conditions.

Property and Test Method	Results		
Compressive Strength ASTM C942 per 4.4.2	**1 Day** 5,000 psi (34.47 MPa)	**7 Days** 11,000 psi (75.84 MPa)	**28 Days** 16,000 psi (110.32 MPa)
Rate of Set @ 73°F ASTM C953 per 4.4.1	**Working Time** 4:00		**Set** 8:30
Initial Fluidity	**Test** Flow Cone (ASTM C939) Mod. Flow Cone (4.4.5)		**Efflux Time** 15-30 seconds 6-20 seconds
30 Minutes Fluidity	**Test** Flow Cone (ASTM C939) Mod. Flow Cone (4.4.5)		**Efflux Time** 15-30 seconds 6-20 seconds
Wick Induced Bleed ASTM C940 modified per 4.4.6.1	**Age** 3 Hours		**Percent Bleed** 0%
Volume Change ASTM C1090 per 4.4.4	**1 Day** .07%		**28 Days** .14%
Chloride Ion Test ASTM C1152	**% CI by Weight of Cementitious Content** .011%		
Permeability Test ASTM C1202 modified per 4.4.3	**Age** 28 Days	**Applied Voltage** 30 V	**Charge Passed** <2,500 coulombs
Wet Density ASTM C185 or per PTI M55 Sect. 4.4.8	**Wet Density, lb/ft³ (g/cm³)** 122-128 (1.95 - 2.05)		
Accelerated Corrosion Test Section 4.4.7, Appendix B	**NA Grout** 1,000 hours		**Control** No corrosion
Schupack Pressure Bleed 4.4.6.2, Table 4.1(b)	**Gelman Pressure** 100 psi		**Percent Bleed** 0%
Inclined Tube Test EN 445 per 4.4.9	**Age** Immediately after Mixing 30 min. after mixing with 30 sec remix		**Percent Bleeding** 0.0% 0.0%

***Note:** PTI M55.1-12 **W/(C+P) ratio: .30**

REGULATORY

Read and follow application information, precautions and Material Safety Data Information.
Right-to-know
This product contains Portland Cement (CAS#65997-15-1) and Crystalline Silica (CAS# 14808-60-7)
HMIS
Health 1, Fire 0, Reactivity 0
Prop 65
Warning! This product contains Crystalline Silica, a chemical known to the State of California to cause cancer or reproductive toxicity.
VOC Content
0 g/L

CAUTION

EYE AND SKIN IRRITANT
Contains Portland Cement (CAS# 65997-15-1) and Crystalline Silica (CAS# 14808-60-7). Do not allow contact with eyes or skin. Avoid breathing dust - silica may cause serious lung problems. There is limited evidence silica is a carcinogen. The use of gloves, goggles, dust masks and other protective clothing is recommended. If cement or sand particles get into eyes, rinse immediately with clean water and seek prompt medical attention.

TECHNICAL SERVICE

Contact your US SPEC manufacturer's representative for the most current product information.

US MIX Co.
112 South Santa Fe Drive
Denver, CO 80223
Tel: 303.778.7227 Fax: 303.722.8426
Web Site: www.usspec.com

Yield: 50 lbs (22.7 kg) will fill approximately 0.53 ft³ (0.015 m³) when 7.0 qts mixing water is used.