

Attention Specifiers

This specification shall be edited by the specifier to conform to project performance and contract requirements. Contact Xypex Technical Services Department for additional information.

Concrete Repairs and Resurfacing using Megamix II with Bio-San for Microbial Enhanced Protection

PART 1 – GENERAL

1.01 SUMMARY

- A. **Section Includes:** Furnishing of all labour, materials, services, and equipment necessary for the supply and installation of a repair mortar to patch or resurface deteriorated concrete substrates, including horizontal, vertical, or overhead surfaces, as indicated on the drawing and as specified herein.
- B. **Related Documents:** Drawings, Conditions of Contract, General Requirements, and Supplementary Conditions that apply to this specification.

1.02 REFERENCES

- A. **Applicable Standards and Guidelines:** The following standards are referenced herein.
 - 1. American Society for Testing and Materials (ASTM)
 - 2. Army Corps of Engineers (CRD)
 - 3. American Concrete Institute (ACI)
 - 4. American National Standards Institute (ANSI)
 - 5. NSF International
 - 6. European Standards (EN)
 - 7. Drinking Water Inspectorate (DWI)
 - 8. International Standards Organization (ISO)
 - 9. Canadian Standards Association (CSA)

1.03 SYSTEM DESCRIPTION

Resurfacing and Repair Mortar: A one-component, cementitious repair mortar with antimicrobial protection specifically formulated to produce superior bond and resist chemical and microbial induced corrosion. Repair mortar may be spray or float/trowel applied at a thickness of 3/8 "(10 mm) to 2" (50 mm) per layer. The product design produces a high-performance repair mortar that is enhanced by specialized antimicrobial and "Crystalline Waterproofing and Protection Technology."

1.04 SYSTEM PERFORMANCE REQUIREMENTS

- A. **Testing Requirements:** Repair mortar shall have been tested in accordance with the following standards and conditions described in Table 1 and Table 2. The testing results shall meet or exceed the performance as specified herein.

Table 1 – Mechanical Performance and Environmental Resistance

1. Compressive Strength* (ASTM C 109)	24 hrs	2200 psi	15 MPa
	3 days	4300 psi	30 MPa
	7 days	5100 psi	35 MPa
	28 days	6500 psi	45 MPa
2. Flexural Strength (ASTM C 78)	28 days	940 psi	6.5 MPa
3. Direct Tensile Bond Strength to Concrete* (ASTM C 1583)	90 days	145 psi	1.0 MPa
4. Elastic Modulus (EN 13412)	28 days	2,730,000 psi	18.8 GPa
5. Scaling Resistance (ASTM 672)	50 cycles	No scaling	
6. Carbonation Depth (EN 13295)	49 days @ 1% CO ₂	No measurable carbonation depth at 56 days	
7. Sulfate Resistance (ASTM C1012)	6 months Expansion	0.027%	
	12 months Expansion	0.029%	
8. Acid Resistance (ASTM C 267)	Mass Loss (84 days)	Negligible. (retained 99.8% mass)	
9. Setting Time (ASTM C 266)	Initial (hrs:min)	3:25	
	Final (hrs:min)	5:00	

* Results may differ based on statistical variability and site conditions. The recommended minimum specified compressive and bond strength in the field are 6,500 psi (45 MPa) and 130 psi (1.0 MPa) respectively (at 28 days).

Table 2 – Anti-Microbial Resistance

1. Measurement of Anti-bacterial Activity (ISO 22196 Modified) – Substrate Conditioned to Stable pH below 7.0	Anti-microbial Efficacy Bacteria Concentration (<i>Thiobacillus Novellus</i> / <i>Starkeya Novella</i>)	≥ 3.8 (99.98% reduction) in 24 hours vs untreated
2. Long term Field-demonstrated Mass loss and Bacteria Count Efficacy at Live Wastewater Structure	Mass Loss at 10 years	≥ 9x less vs untreated
	Anti-microbial Efficacy at 10 years (log 10 Reduction in Bacteria Concentration)	≥ 2.4 (99.58%) vs untreated
3. Short-term Field-demonstrated Bacteria Count Efficacy at Live Wastewater Structure	Anti-microbial Efficacy at 1 year (Reduction in Bacteria Concentration)	≥ 50x sulfur-oxidizing bacteria vs untreated ≥ 100x total bacteria vs untreated

1.05 SUBMITTALS

- A. **General:** Submit listed submittals in accordance with the conditions of the Contract and with Division I Submittal Procedures Sections.
- B. **Product Data:** Submit product data, including the Manufacturer's specifications, installation instructions, and general recommendations for the repair mortar application.
- C. **Test Reports:** Submit, for acceptance, complete test reports from approved independent testing laboratories certifying that materials conform to performance characteristics and testing requirements specified herein.
- D. **Manufacturer's Certification:** Provide documentation signed by the manufacturer or manufacturer's representative certifying that the materials to be installed comply with the requirements of this specification.

1.06 QUALITY ASSURANCE

- A. **Manufacturer Qualifications:** The manufacturer shall be ISO 9001 registered and shall have no less than 10 years of experience in manufacturing cementitious crystalline waterproofing materials and repair mortars for the required work. Manufacturers must be capable of providing field service representation during the construction phase. Manufacturers who cannot provide ongoing field support or the performance test data specified herein will not be considered for the project.
- B. **Applicator's Qualifications:** Applicator shall be experienced in work of the type specified in this section and shall be approved in writing by the manufacturer.
- C. **Pre-Installation Meeting:** If dictated by project complexity and magnitude, conduct a meeting with the applicator, engineer/architect, product manufacturer's representative, and owner's representative to verify and review the following prior to the application of repair mortar:
 - 1. Project requirements for repair procedures as set out in the Contract Documents.
 - 2. Manufacturer's product data, including application instructions, and appropriate scope of work based on proximity to untreated surfaces and low pH runoff.
 - 3. Contractor's experience and qualifications.
 - 4. Substrate conditions and procedures for substrate preparation and repair mortar application.
 - 5. Moist curing methods and protection.
- D. **Technical Consultation:** The manufacturer's representative shall provide technical consultation on the repair mortar application as needed.

1.07 DELIVERY, STORAGE AND HANDLING

- A. **Ordering:** Comply with the manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- B. **Delivery:** Deliver packaged waterproofing materials to the project site in original undamaged containers, with manufacturer's labels and seals intact.
- C. **Storage:** Store waterproofing materials in a dry, enclosed location at a minimum temperature of 45°F (7°C).

1.08 PROJECT CONDITIONS

- A. **Compliance:** Comply with manufacturer's product data regarding the condition of the substrate to receive repair mortar, weather conditions before and during installation, and protection of the applied repair mortar.

1.09 WARRANTY

- A. **Manufacturer's Material Warranty:** The manufacturer shall provide a standard material product warranty executed by an authorized company official.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. **Acceptable Manufacturer:**

Xypex Chemical Corporation
Website: www.xypex.com E-mail: info@xypex.com

- B. **Products:**

1. Repair and Reprofiling Mortar - Xypex Megamix II with Bio-San

- C. **Substitutions:** Prepackaged, anti-microbial cementitious repair mortars that are enhanced with "Crystalline Waterproofing and Protection Technology," meet or exceed the above-specified performance requirements, and are approved by the engineer of record.
- D. **Source Quality:** Obtain all crystalline anti-microbial repair mortar from a single manufacturer.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. **Verification of Substrates:** Verify that receiving concrete substrate is sound, all loose and delaminated substrate is removed and free of all debris, laitance, and other potential contaminants that may inhibit the bond.
- B. **Examination of Defects:** Examine surfaces to which the repair mortar is to be applied for any structural defects such as spalls, leaks, delaminations, honeycombing, rock pockets, faulty construction joints and cracks. Such defects are to be repaired prior to the application of the repair mortar in accordance with the project engineer's recommendations and the manufacturer's published product data.
- C. **Waterproofing Repairs:** See Xypex technical literature, including method statements, product data, and specifications for waterproofing repair of cracks, joints, and other details, prior to proceeding with

the application of the repair mortar.

Note: Prior to the installation, it is recommended to hold a preconstruction meeting and an in-situ mock-up. The mock application should be completed under anticipated ambient and project conditions to demonstrate acceptable bond and applicator competency.

- D. **Hot or Cold Weather Application:** Contact the engineer of record and manufacturer's representative for guidance on hot or cold weather applications.

3.02 INTERFACE WITH OTHER MATERIALS

- A. **Secondary Coatings are not Permitted:** It is **imperative** that Megamix II with Bio-San is completely exposed and uncoated otherwise its anti-microbial benefit may be adversely affected. Construction repairs or additional resurfacing must be completed with Megamix II BS.

3.03 FIELD QUALITY CONTROL

- A. **Observation:** Do not apply repair mortar before it has been observed by the Architect, /Engineer or other designated entities.
- B. **Independent Testing:** Retain an independent test agency at the discretion of the engineer of record to follow the QC/QA plan of the project. Report quality control and quality assurance test results as per the contract requirements. All testing shall be completed by an accredited third-party consultant with appropriate level of experience for the complexity of the project. The testing company of record shall employ a facility and technicians with certifications that are conducive to the data required of the project.

End of Specification