## Hi-Tek Polymers, Inc.

# HI-TEK POLYMERS T-Poxy Terrazzo Arch Data

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Reference

A. ACI Committee No. 403 Bulletin Title No. 59-43

B. ASTM A 185 - Welded Steel Wire Fabric for Concrete Reinforcement.

C. ASTM C 33 - Concrete Aggregates.

D. ASTM C 131-89 - Test Method for Resistance to Degradation of Small- Size Coarse Aggregates by Abrasion and Impact in the Los Angeles Machine

E. ASTM C 150 - Portland Cement.

F. ASTM C 309 - Liquid Membrane-Forming Compounds for Curing Concrete.

G. ASTM D-56 - Test Method for Flash Point by Tag Closed Tester.

H. ASTM D-412 - Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension.

I. ASTM D-635 - Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position.

J. ASTM D-638 - Test Method for Tensile Properties of Plastics.

K. ASTM D1308 - Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.

Terrazzo Specification:

L. ASTM D 2103 - Polyethylene Film and Sheeting.

M. ASTM D 2240 - Test Method for Rubber Property-Durometer Hardness.

N. ASTM D 2103 - Polyethylene Film and Sheeting.

O. ASTM D 2240 - Test Method for Rubber Property-Durometer Hardness.

P. NTMA (National Terrazzo and Mosaic Association, Inc.) - Terrazzo Ideas and Design Guide.

**1.02 SUMMARY**

**A. Section Includes:**

1. Thin-set Epoxy Terrazzo Flooring including preparation of

substrates.

2. Thin-set pre-cast epoxy terrazzo tread or tread & riser units.

3. Thin-set pre-cast epoxy terrazzo wall base units.

4. Related accessories.

**B. Related Sections:**

1. Section 03300, Cast In Place Concrete.

2. Section 04200, Unit Masonry.

3. Section 05510, Metal Stairs.

4. Section 07260, Under-slab Vapor Retarder/Barrier.

5. Section 07900, Joint Sealants.

Terrazzo Specification:

6. Section 09900, Painting.

7. Section [_____] Furnishing and setting floor drains.

8. Section [_____] Setting of Metal Base Beads and Wood Grounds.

9. Section [_____] Temporary heat, water and electricity.

10. Section [_____] Other adjacent floor finish trades (for transition details).

11. Section [_____] For confirmation of LEED Requirements.

1.03 SUBMITTALS

A. Manufacturer's product data for each type of terrazzo and accessory. System will be evaluated on the basis of standards. For tests not listed in published data, manufacturer shall supply missing data according to standard referenced.

1. Physical properties.

2. Performance properties.

3. Specified tests.

4. Material Safety Data Sheet.

5. Manufacturer's standard warranty.

**Terrazzo Specification:**

**System Specifications**

**T-POXY TERRAZZO ® Resin Systems—Thin-set Epoxy Terrazzo**

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**B. LEED Submittals**

1. Product Data for Credit MR 4.1 [and Credit MR 4.1]: For [aggregates,] indicating percentages by weight of postindustrial recycled content.

a. Include statement that indicates cost for each product having recycled content.

2. Product Data for Credit MR 5.1: For products manufactured within a 500-mile radius of the project.

3. Product Data for Credit EQ 4.1: For adhesives, including printed statement of VOC content and chemical components.

**C. Shop Drawings. Include terrazzo installation requirements. Include plans, elevations, sections, component details and attachments to other work. Show layout of the following:**

1. Divider strips.

2. Control- and expansion-joint strips.

3. Base and border strips.

Terrazzo Specification:

4. Abrasive strips.

5. Stair treads, risers and landings.

6. Pre-cast terrazzo jointing and edge configurations including anchorage details.

7. Terrazzo patterns.

8. <Insert requirements>

D. Samples for Initial Selection [NTMA] [Manufacturer's] color plates showing the full range of colors and patterns available for each terrazzo type indicated.

E. Samples for Verification: Match Architect's samples for each type, material, color and pattern of terrazzo and accessory required showing the full range of color, texture and pattern variations expected. Label each terrazzo sample to identify manufacturer's matrix color and aggregate types, sizes and proportions. Prepare samples of same thickness and from same material to be used for the Work in size indicated below:

1. Epoxy Terrazzo: minimum 6" x 6" (152.4 mm x 152.4 mm) sample of each color and type of terrazzo.

2. Precast Epoxy Terrazzo: minimum 6" x 6" (152.4 mm x 152.4 mm) sample of each color and type of terrazzo.

Terrazzo Specification:

3. Accessories: 6” length (152.4 mm) of each kind of divider strip,

stop strip and control joint strip required.

4. Stair Treads: 12” length (304.8 mm) wide sample combination

tread/riser with cast-in nosing.

**F. Manufacturer Experience:**

Furnish a list of at least five (5) epoxy terrazzo projects using material being submitted fort his project installed during the last five (5) years of the same scope, complexity and at least 50 percent of the square footage.

**G. Qualification Data: For qualified Installer.**

1. Submit proof of Contractor membership in NTMA.

2. Furnish a list of at least five (5) epoxy terrazzo projects using material being submitted for this project installed during the last five (5) years of the same scope, complexity and at least 50 percent of the square footage.

**1.04 QUALITY ASSURANCE**

A. Installer Qualifications: A qualified installer who is acceptable to architect and epoxy terrazzo manufacturer to install manufacturer’s products.

1. Engage a terrazzo contractor with at least five (5) years of satisfactory experience in installation of epoxy terrazzo. Terrazzo contractor shall demonstrate experience during last five (5) years of at least (5) projects of comparable scope and complexity of at least 50 percent of the total square footage of this project

2. Engage an installer who is a contractor member of NTMA.

**Terrazzo Specification:**

**B. Source Limitations:**

1. Obtain primary Epoxy Terrazzo Flooring System materials including membranes, primers, resins and hardening agents from a single manufacturer with proof of NTMA membership.

2. Obtain aggregates, divider strips, sealers, cleaners from source recommended by primary materials manufacturer.

C. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Section 01200 – Project Meetings. Review methods and procedures related to terrazzo including, but not limited to, the following:

1. Inspect and discuss installation procedures, joint details, jobsite conditions, substrate specification, vapor barrier details and coordination with other trades.

2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment and facilities needed to make progress and avoid delays.

3. Review special terrazzo designs and patterns.

4. Review dust control procedures.

5. Review plans for concrete curing and site drying to enable timely achievement of suitable slab moisture conditions.

D. NTMA Standards: Comply with NTMA's "Terrazzo Specifications and Design Guide" and with written recommendations for terrazzo type indicated unless more stringent requirements are specified.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups for terrazzo including accessories.

a. Size: Minimum 100 sq. ft. (9.3 sq. m.) of typical poured-in-place flooring [and base] condition for each color and pattern [in locations directed by Architect] <Insert location requirements>.

Terrazzo Specification:

2. Approved mockups may become part of the completed Work if undistributed at time of Substantial Completion.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to Project site in supplier's original wrappings and containers, labeled with source's or manufacturer's name, material or product brand name and lot number if any.

B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures and humidity.

1. Storage temperatures should be between 600F to 800F.

**1.06 PROJECT CONDITIONS**

**A. Terrazzo contractor shall, prior to surface preparation:**

1. Evaluate slab condition, including slab moisture content and extent of repairs required, if any.

2. Maintain the ambient room and floor temperature at 600F or above for a period extending 72 hours before, during and after floor installation. Concrete to receive epoxy terrazzo shall have cured for at least 28 days and be free of all curing compounds. Test concrete substrate to determine acceptable moisture levels prior to installation. Testing should be conducted according to ASTM F2170.

B. Prior to and during each day of installation, the terrazzo contractor shall verify that the dew point is at least 50F (-150C) less than the slab and air temperature.

**C. Acceptable Substrates:**

1. Level tolerance: Concrete sub-floor shall be level with a maximum variation from level of 1/4" in 10 feet. Any irregularity of the surface requiring patching and/or leveling shall be completed.

2. Concrete floor shall be prepared mechanically by shot blasting or by grinding.

Terrazzo Specification:

3. Concrete floor shall receive a steel trowel finish.

4. Concrete shall be cured a minimum of 28 days. No curing agents are to be used in areas to receive terrazzo.

5. Concrete slab shall have an efficient moisture vapor primer (suggested minimum: 15 mils thickness) directly under the concrete slab. Moisture primer shall NOT be punctured.

6. Saw cutting of control joints must be done between 12 and 24 hours after placement of the structural concrete and at a frequency compatible to ACI recommendations.

D. Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during terrazzo installation.

E. Provide protection from other trades prior to final acceptance by owner.

**PART 2 – PRODUCTS**

**2.01 EPOXY TERRAZZO**

| | | | |
|---|---|---|---|
| **A. Materials:** | Hardness | ATM D-2240 using Shore D Durometer | 60-85 |
| | | ASTM D-638 run at 2" min. Specimen made using "C" die listed in ASTM D-412 | |
| | Tensile Strength | ASTM D-638 run at 2″ min. | |
| | Specimen made using "C" die listed in ASTM D-412 3,000 psi min. | | |
| | Compressive Strength psi min. | ASTM D-695, Specimen B cylinder | 10,000 |
| | Chemical | ASTM D-1308 – 7 days at room temperature immersion method have no deleterious effects. The following contaminants used: | |
| | | Distilled Water | 1% |
| | | Soap Solution | |

Terrazzo Specification:

| | |
|---|---|
| Mineral Water<br>Hydroxide | 10% Sodium |
| Isopropanol<br>Hydrochloric Acid | 10% |
| Ethanol<br>Sulfuric Acid | 30% |
| .025 Detergent Solution<br>Acetic Acid | 5% |

1. Primer: T-POXY PRIMER Moisture Vapor Primer (for slabs on-grade or lightweight and green concrete).

2. Flexible Reinforcing Membrane: T-POXY EPOXY Crack ISOLATION Membrane, for substrate crack preparation and reflective crack reduction.

a. NO-Fiberglass Reinforcement

3. Epoxy Matrix: HI-TEK POLYMERS T-POXY EPOXY Matrix and in color required for mix indicated.

1. Physical properties without aggregates. All specimens cured for 7 days at 750F plus or minus 20F and 50 percent plus or minus 2 percent RH. This product shall meet the following requirements:

4. Aggregates [OPTION: Marble, Glass, Mother of Pearl] Complying with NTMA gradation standards for mix indicated and containing no deleterious or foreign matter.

a. Abrasion and Impact Resistance: Less than 40 percent loss per ASTM C 131.

b. 24-Hour Absorption Rate: Less than 0.74 percent.

c. Dust Content: Less than 1.0 percent by weight.

d. Post-Industrial or Post-Consumer Recycled Content: <Insert Value> percent.

5. Finishing Grout: HI_TEK POLYMER T-POXY MATRIX Clear Resin as recommended by HI-TEK POLYMERS T-POXY RESIN SYSTEM.

**Terrazzo Specification:**

Terrazzo Typical Results

C. Mix: Comply with NTMA's "Terrazzo Specifications and Design Guide" and manufacturer's written instructions for matrix and aggregate proportions and mixing.

1. Color and Pattern Schedule: Where the following designations are indicated, provide specified terrazzo matrices matching architect's samples:

a. HI-TEK TZ1: <Insert Sample Number>

b. HI-TEK TZ___: <Insert Sample Number>

c. HI-TEK TZ___: (Precast Tread/Riser) <Insert Sample Number>

d. HI-TEK TZ___: (Precast Base) <Insert Sample Number>

**2.02 STRIP MATERIALS**

**A. Thin-set Divider Strips: L-type.**

1. Material [White-zinc alloy] [Brass] [Aluminum] [Plastic, in color selected from

manufacturer's full range].

**Requirements**

2. Guide for commonly used L-type divider strips for Thin-set Epoxy Terrazzo Systems:

B. Control-Joint Strips: Separate double L-type angles back to back with minimum 1/8" width between. Fill joint and area between strips with semi-flexible joint filler. Match material, thickness and color of divider strips and depth required for topping thickness indicated.

Terrazzo Specification:

C. Construction-Joint (Cold-Joint) Strips: Separate double L-type angles back-to-back with minimum 1/8” width between. Fill joint and area between strips with semi-flexible joint filler. Match material, thickness and color of divider strips and depth required for topping thickness indicated.

D. Expansion-Joint Strips: Separate double L-type angles, positioned back-to-back with minimum 1/8” width between. Fill area between strips with semi-flexible joint filler. Match material, thickness and color of divider strips and depth required for topping thickness indicated.

E. Accessory Strips: Match divider strip width, material and color unless otherwise indicated. Use the following types of accessory strips as required to provide a complete installation:

1. Base-bead strips for exposed top of terrazzo base.

2. Edge-bead for exposed edges of terrazzo.

3. Nosings for terrazzo stair treads and landings.

4. <Insert requirements>.

2.03 MISCELLANEOUS ACCESSORIES

A. Strip Adhesive: 100% solids epoxy resin adhesive recommended by HI-TEK POLYMERS T-POXY RESIN SYSTEM.

1. Use adhesive that has a VOC content of 50g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

**B. Anchoring Devices:**

1. Strips: Provide mechanical anchoring devises for strip materials as required for secure attachment to substrate.

2. Precast Terrazzo: Provide mechanical anchoring devices as recommended by Terrazzo Contractor for proper anchorage and support of units for conditions of installation and support.

Terrazzo Specification:

C. Patching and Fill Material: Fill and selected aggregates as recommended by HI-TEK POLYMERS T-POXY RESIN SYSTEM.

D. Joint Compound: color to be selected by architect to match/compliment terrazzo.

E. Cleaner: A neutral cleaner with pH factor between 7 and 10 specifically designed for terrazzo.

F. Surface Finish System: Level of polish to be specified by architect in accordance with desired appearance and level of reflectivity.

G. Sealer: Slip- and stain-resistant sealer that is chemically neutral with a pH factor between 7 and 10, a standard coefficient of friction of 0.6 or higher, does not affect physical properties of terrazzo and complies with NTMA's "Terrazzo Specifications and Design Guide."

**2.04 PRECAST TERRAZZO**

A. Precast Terrazzo Units: Precast epoxy terrazzo [base] [stair tread] [threshold] [bench] [and]

[planter] <Insert requirements> units.

1. Manufacturers: Subject to compliance with requirements, provided products acceptable to architect.

a. <Insert manufacturer's name>.

B. Precast Terrazzo Base Units: 1/4" (6.4 mm) thick, cast in maximum lengths possible, but not less than 36" (900 mm).

1. Type: [As indicated].

2. Height: [As indicated].

3. Outside Corner Units: With finished returned edges at outside corner.

4. Color and Pattern: [Match Architect's sample] [Match adjacent poured-in-place terrazzo flooring].

**Terrazzo Specification:**

**C. Terrazzo Cove Base:**

1. [Option : Epoxy Matrix poured-in-place cover base with 3/4" (19

mm) radius, [____]" high. (4" (10.12 cm), 6" (15.24 cm) or 8" (20.32cm))]

2. [Option 2: Precast Epoxy Terrazzo Cove Base: Type _____, _____" high.]

D. Precast Terrazzo Stair Treads: Thickness indicated, with cast-in nosing.

1. Tread/Riser: 1/2" (12.7 mm) thick epoxy, Type _____ with abrasive pattern _____.

2. Color and Pattern: [Match Architect's sample]

**PART 3 – EXECUTION**

3.01 EXAMINATION

A. Examine substrates and areas, with Terrazzo Contractor present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions, including level tolerances, have been corrected.

3.02 PREPARATION

A. Clean substrates of substances, including oil, grease and curing compounds, that might impair terrazzo bond. Provide clean, dry and neutral substrate for terrazzo application.

**B. Concrete Slabs:**

1. Provide sound concrete surface free of laitance, glaze, efflorescence, curing compounds, form release agents, dust, dirt, grease, oil and other contaminants incompatible with terrazzo.

Terrazzo Specification:

a. Prepare concrete mechanically by shot blasting or by grinding with WolverineScarifying Diamonds. Surface preparation results should achieve a CSP3-CSP5 profile according to International Concrete Repair Institute Guideline No. 03732.

b. Repair or level damaged and deteriorated concrete according to HI-TEK POLYMERS T-POXY TERRAZZO ® Resin Systems Substrate Leveling Requirements.

c. Repair cracks and non-expansion joints greater than 1/16” (1.6 mm) wide according to HI-TEK POLYMERS T-POXY TERRAZZO ® Resin Systems Crack Detailing and Joint Treatments.

2. Verify that concrete substrates are visibly dry and free of moisture.

3. Moisture Testing:

d. Test for moisture according to ASTM F2170.

e. Proceed with installation only after substrates have a maximum relative humidity measurement reading less than 80% If relative humidity measurement reading is greater than or equal to 80%, Moisture Vapor Primer is recommended.

C. Protect other work from dust generated by grinding operations. Control dust to prevent air pollution and comply with environmental protection regulations.

1. Erect and maintain temporary enclosures and other suitable methods to limit dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.

**3.03 EPOXY TERRAZZO INSTALLATION**

**A. General:**

1. Comply with NTMA’s written recommendations for terrazzo and accessory installation.

2. Place, rough grind, grout, cure grout, fine grind and finish terrazzo according to T-POXY Epoxy Matrix Product Data Sheet and NTMA’s “Terrazzo Specifications and Design Guide.”

Terrazzo Specification:

3. Ensure that matrix components and fluids from grinding operations do not stain terrazzo by reacting with divider and control-joint strips.

4. Delay fine grinding until heavy trade work is complete and construction traffic through area is restricted.

B. Thickness: [1/4" (6.4 mm)] [3/8" (9.5 mm)] [As indicated]

**C. Flexible Reinforcing Membrane**

1. [Option 1: Membrane application for isolated cracking. Route out all cracks and fill with appropriate filler per HI_TEK POLYMERS INC, Joint Filler. Apply HI-TEK POLYMERS T-POXY CRACK ISOLATION MEMBRANE (spread at 40 mils thickness) across the crack allowing 12 inches on either side. NO-FIBERGLASS REQUIRED.

2. [Option 2: Membrane application for extensive cracking or crack prevention. Route out all cracks and fill with semi-flexible HI-TEK POLYMERS T-POXY CRACK ISOLATION MEMBRANE (spread at 40 mils thickness) over prepared substrate to produce full substrate coverage in areas to receive terrazzo.]

D. Primer: Apply to terrazzo substrates according to T-POXY Primer Product

**E. Strip Materials:**

1. Divider and Accessory Strips:

a. Install strips in adhesive setting bed without voids below strips or mechanically anchor strips as required to attach strips to substrate.

b. Control-Joint Strips: Separate double L-type angles, positioned back-to-back with minimum 1/8" width between. Fill joint and area between strips with semi-flexible T-POXY CRACK FILLER. Match material, thickness and color of divider strips and depth required for topping thickness indicated.

c. Construction-Joint (Cold-Joint) Strips: Separate double L-type angles, positioned back to back with minimum 1/8" width between. Fill joint and area between strips with semi-flexible T-POXY CRACK FILLER. Match material, thickness and color of divider strips and depth required for topping thickness indicated.

Terrazzo Specification:

d. Expansion-Joint Strips: Separate double L-type angles, positioned back-to-back with minimum 1/8” width between. Fill area between strips with semi-flexible T-POXY CRACK JOINT FILLER. Match material, thickness and color of divider strips and depth required for topping thickness indicated.

**F. Placing Terrazzo:**

1. Mix epoxy matrix with chips and fillers in ratios directed by T-POXY EPOXY ® Resin Systems.

2. Trowel apply terrazzo mixture over epoxy primer to provide a dense flat surface to top of divider strips. Allow to cure per T-POXY EPOXY ® Resin Systems recommendations before rough grinding.

G. Rough Grinding: Grind with 24 grit silicon carbide or D-36 Diamond matrix stones until all Terrazzo strips and marble chips are uniformly exposed.

**H. Grouting:**

1. Cleanse floor with clean water and rinse.

2. Remove excess rinse water by wet vacuum, dry and fill voids with T-POXY EPOXY ® Resin Systems T-POXY Epoxy Matrix or Clear Resin.

3. Allow grout to cure. Grout may be left on terrazzo until other trades work is completed.

I. Polishing: Grind with 120 grit or finer stones until all grout is removed from surface. Repeat rough grinding, grout coat and polishing if large terrazzo chip voids exist after initial polishing. Produce surface with a minimum of 70 percent aggregate exposure.

J. Surface Finishing (Alternate care and maintenance system. If including addendum, remove item

B Sealing from subpart 3.05 CLEANING AND PROTECTION.):

1. Flood mop and wet vac all slurry from surface.

Terrazzo Specification:

2. Continue grinding process with Genesis diamond grits 220, 400 and 600. Repeating Step #1between steps insuring all previous grit latency and particulate matter is removed.

3. Inspect entire surface for consistent appearance, manifesting no abrasion scratches from previous grits. Readdress any area manifesting previous grit scratch pattern not matching 600 grit finish before continuing.

4. Mechanically polish surface using 1,000 grit. Surface shall have uniform reflective appearance showing no high or low sheen variances.

5. Flood mop and wet vac as described in Step #1 insuring no presence of any particulate matter or other trades' dirt or oils.

6. Final polish surface using 3M or equal white polishing pad.

7. Thoroughly scrub and agitate entire surface, wet vac scrub from surface insuring all final chemistry is removed.

8. Once surface is entirely dry, allowing four hours minimum, then seal surface with An acrylic sealer. Following directions, remove any excess.

9. Allow 24 hours before use or open traffic.

B. Seal joints between units with joint sealants.

3.05 CLEANING AND PROTECTION

A. Cleaning: Remove grinding dust from installation and wash all surfaces.

B. Sealing: Apply Slip- and stain-resistant sealer that is chemically neutral with a pH factor between 7 and 10; does not affect physical properties of terrazzo and complies with NTMA's "Terrazzo Specifications and Design Guide.

C. Protection: Upon completion, the Work shall be ready for final inspection and acceptance by the owner or his agent. Provide final protection and maintain conditions, in a manner acceptable to Terrazzo Contractor, that ensure terrazzo is without damage or deterioration.

**END OF SECTION 096623**

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