

Everything You Need to Know About Terrazzo





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— WHAT IS TERRAZZO?

Terrazzo is a composite material, poured in place or prefabricated in the form of precast, consisting of marble, granite, pebbles, shells or glass combined with a cement or epoxy matrix.

Terrazzo originated from Venice, Italy in the mid-16th century. Terrazzo, which means “terrace”, was once made by pressing marble pieces into a clay surface and sealing it off with goat milk for a mosaic-like finish, creating inexpensive flooring at the time. Today terrazzo is poured-in-place by installers, cured, and ground to create a smooth, polished surface.

— TERRAZZO SYSTEMS

There are two matrices for terrazzo: cement and epoxy

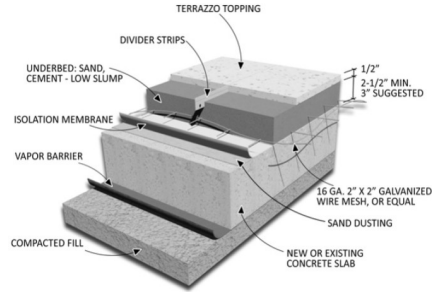
The terrazzo matrix is the binding material that overlays to the underlying structure. Cement terrazzo uses a cement matrix that includes multiple systems - sand cushion, bonded, rustic, monolithic and polyacrylate. Development of epoxy resins led to epoxy terrazzo, made with a two-component resin system. The result is a more durable, versatile, customizable, and cost-effective terrazzo system.

Cement Terrazzo Systems

Sand Cushion Terrazzo

Considered the top cement terrazzo system, Sand Cushion has a cement matrix topping with wire reinforcements, an isolation sheet, and additional layer of sand. It's an interior flooring system. Sand Cushion absorbs minor defects that may occur.

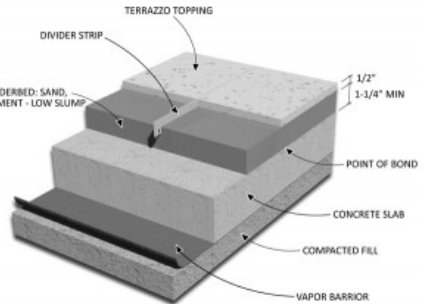
Thickness: 2 ½" to 3" including ½" terrazzo topping
Weight: 25-30 lbs.



Bonded Terrazzo

An interior or exterior application, Bonded Terrazzo bonds with the concrete where conditions must include a 1 ¼" to 1 ¾" of recessed depth to be filled along with a ½" terrazzo topping.

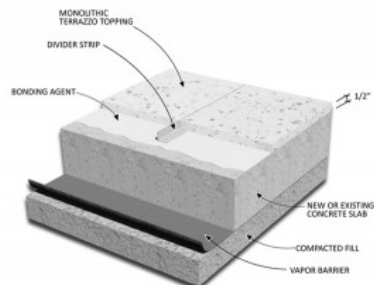
Thickness: 1 ¾" to 2 ¼" including ½" terrazzo topping
Weight: 18-22 lbs.



Monolithic Terrazzo

A cement terrazzo system known for fast installation, it is a nominal ½" thick matrix veneer placed upon a provided concrete slab dependent on the concrete quality for flatness and crack prevention.

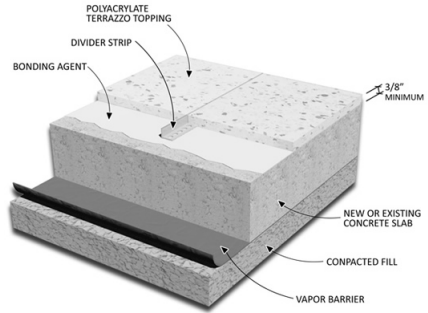
Thickness: ½" terrazzo topping
Weight: 5-7 lbs.



Cement Terrazzo Systems

Polyacrylate Terrazzo

A cement terrazzo system that allows for thinner applications. A $\frac{3}{8}$ " thick polymer modified matrix veneer is placed over a flat concrete slab. A main attribute of Polyacrylate terrazzo is its ability to reduce moisture vapor transmissions. A drawback is that due to a thinner application, aggregates are limited to smaller sizes.

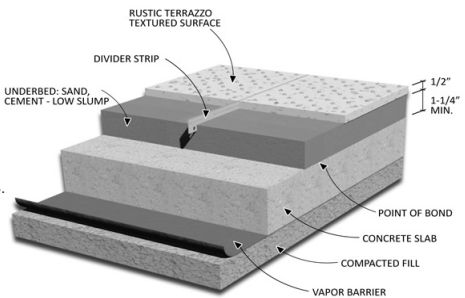


Thickness: $\frac{3}{8}$ " terrazzo topping

Weight: 4 ½ lbs..

Rustic Terrazzo

A cement terrazzo system commonly used for exterior application. Available with sand cushion, bonded and monolithic systems. Rustic terrazzo has a textured slip-resistant surface adaptable to most weather conditions.



Thickness: $\frac{1}{2}$ " to 6" including $\frac{1}{2}$ " terrazzo topping.

Weight: Dependent on system selected

Source: NTMA

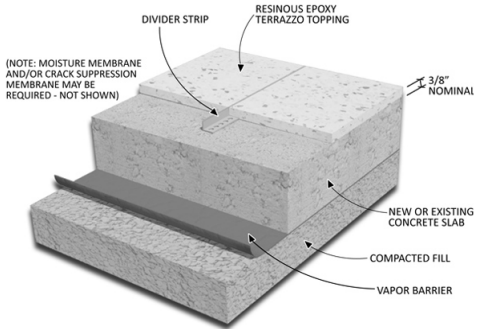


Resinous Terrazzo Systems

Epoxy Terrazzo

Most commonly used terrazzo system installed today, epoxy terrazzo is a 1/4' to 3/8" topping. It is the best-thin set system.

Epoxy terrazzo offers unlimited matrix colors, resiliency, and high compressive, tensile and flexural strength not available with cement terrazzo systems. Glass, shells, plastics and metal chips can be paired with traditional marble chips.



Epoxy terrazzo has the quickest pour to grind time of all terrazzo systems. It can be paired with flexible membrane systems to suppress cracking. This system can provide a seamlessly finished floor installed with minimal divider strips.

Epoxy can also be tinted to any color, allowing for multi-colored patterns and logos.

Epoxy terrazzo is highly recommend for installation in high-traffic areas, providing the strongest surface with lowest maintenance costs. An epoxy terrazzo floor can last the lifespan of any building structure, and remains the most cost-effective flooring system compared to traditional flooring materials.

Thickness: 1/4" or 3/8" epoxy terrazzo topping

Weight: 3-4 lbs.

Source: NTMA





— TERRAZZO SYSTEMS

“Today about 90% of terrazzo being installed is epoxy-based.”

When specifying terrazzo, the first big decision you will need to make is whether you want to select a traditional cement matrix or go with the new standard, epoxy. The design flexibility, speed of install, the introduction of crack suppression membranes and overall weight of epoxy terrazzo make it a popular choice. Epoxy can also be created in any color that the designer desires. Still, cement terrazzo is great for exterior applications and some renovation projects where there is not an active vapor barrier beneath the slab. If you would like to do cement-based terrazzo, make sure you have a skilled contractor, as there are few skilled tradesmen that are doing this type of work.

— EPOXY OR CEMENT?

Physical Properties

Epoxy is stronger and more durable than cement. Epoxy terrazzo's compressive, tensile and flexural strengths exceed cement terrazzo. As a result, it is more versatile, and the least susceptible to cracking and scratching.

Color Options

Epoxy offers a wider color palette than cement terrazzo. Cement is limited to earth-tone and pastel-like colors. On the other hand, epoxy can be tinted to any color and is much easier to match.

Epoxy colors are more consistent and will never fade during the flooring lifecycle. It's more challenging for cement terrazzo systems as factors such as water-cement ratio and temperature can effect its consistency.

Aggregates

Aggregate size and type matter depending on the system you select. Epoxy terrazzo has a greater advantage in the type of aggregates available. In addition to marble and granite chips, glass, mother of pearl, plastic, metal and other decorative stones are acceptable. 3/8" epoxy terrazzo will support standard and finer-size chips.

A cement terrazzo system is thicker than epoxy terrazzo and is more suitable for the Venetian chips sizes #3 through #8. It is also not recommended to use specialty aggregates due to curing shrinking and their dense surfaces. Traditional materials like marble and granite chips are acceptable for use.

— EPOXY OR CEMENT?

Interior or Exterior

Epoxy terrazzo is recommended for interior use only. Outdoor exposure to ultraviolet rays and heat exposure is challenging for epoxy terrazzo. For exterior applications, a rustic (cement) system is recommended.

Installation Timelines

If scheduling is important to your project, then an epoxy terrazzo system is suggested. Epoxy terrazzo has the quickest pour-to-grind installation times, and can be turned over to other trades much quicker than cement terrazzo. Cement terrazzo will take 4 to 5 times longer to cure. Due to its construction flexibility and quick cure times, it is suggested that a poured-in-place terrazzo system be used building projects with large square footage.

Installation Costs

Epoxy terrazzo installations will typically cost equal or less than cement terrazzo systems. Less material is needed to install an epoxy terrazzo floor due to the floor's thickness.

With the advancements in technology and materials, most terrazzo contractors prefer installing epoxy terrazzo over cement terrazzo due to short lead times to acquire materials including precast and reduced labor costs.

Multi-story Use

Buildings with multiple stories will benefit from epoxy terrazzo due to its lightweight and flexibility. Elevator cabs where weight restrictions matter benefit from a lighter product.

Maintenance Costs

A study conducted by the NTMA showed that epoxy terrazzo costs less to maintain than cement terrazzo. No grout lines, no bacteria growth and minimal repairs save building owners costs annually, making epoxy terrazzo the most cost-effective terrazzo system available.

Moisture Vapor Transmissions

Cement terrazzo is a porous flooring system. In contrast, epoxy terrazzo is nonporous. If moisture vapor transmissions is a concern, then cement terrazzo has the advantage.

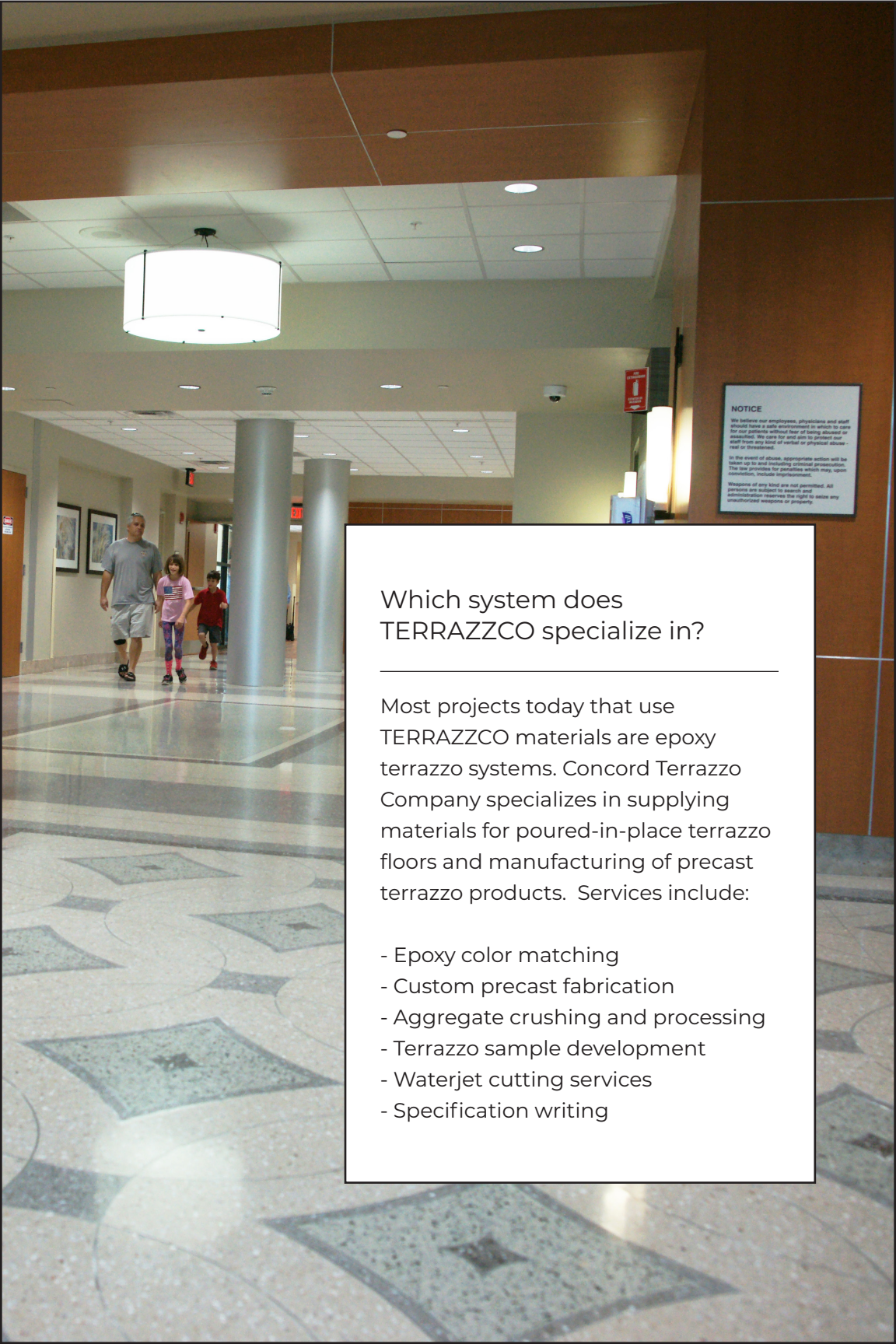
A concrete sub floor with a high relative humidity will cause an epoxy terrazzo floor to blister or bubble. However, most epoxy terrazzo systems can be paired with a moisture mitigation system which prevents vapor transmissions from transferring from the concrete slab to the surface.

Gloss Finish

Glossiness can make a difference in the overall aesthetics of a terrazzo floor. An epoxy terrazzo floor can yield a mirror-like finish, and is recommended to use when high gloss levels is desired. With cement terrazzo, a low gloss finish is achievable.

Strip Geometry

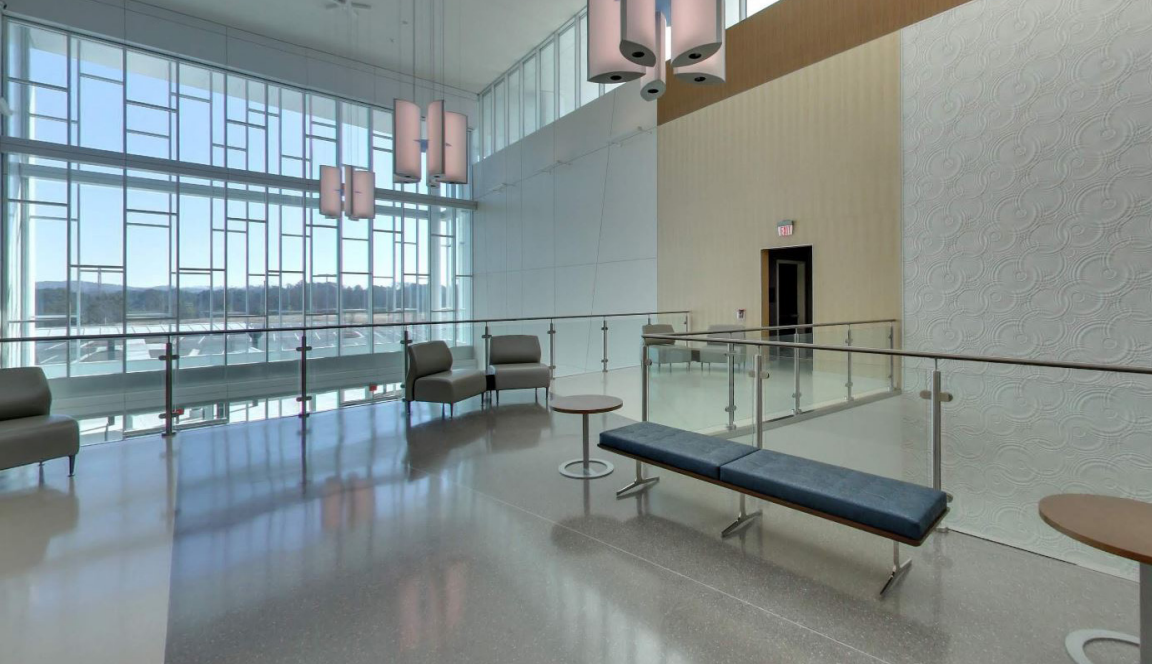
Divider strips are utilized to form the design of a terrazzo floor. A cement terrazzo floor is limited to rectangular shapes and patterns whereas an epoxy terrazzo floor is unlimited in its design with wider use of colors.



Which system does TERRAZZCO specialize in?

Most projects today that use TERRAZZCO materials are epoxy terrazzo systems. Concord Terrazzo Company specializes in supplying materials for poured-in-place terrazzo floors and manufacturing of precast terrazzo products. Services include:

- Epoxy color matching
- Custom precast fabrication
- Aggregate crushing and processing
- Terrazzo sample development
- Waterjet cutting services
- Specification writing



— MAIN CHARACTERISTICS

Thin-set epoxy terrazzo is a product that optimizes building performance, reduces operation costs, and enhances aesthetics.

Terrazzo is best known for its durability, ease of maintenance, design flexibility and environmental impact. Other attributes of epoxy terrazzo include:

- Stain and chemical resistance
- Bacteria and fungi resistance
- Slip resistance
- Thermal-shock resistance
- High impact resistance
- Abrasion resistance
- Excellent fire endurance
- Water resistance
- Zero VOCs

A Floor to Last a Lifetime

A terrazzo floor stands the test of time, providing a high-performance surface for areas with heavy foot traffic. With proper care, it can last 100 years, with buildings owners seeing a return on investment early on in the flooring lifecycle.

Durability

Once set, epoxy terrazzo never needs replacing. Epoxy resins support high compressive, flexural and tensile strengths, making epoxy terrazzo a common surface in high traffic locations such as airports, schools, and hospitals. Where some flooring materials wear down and require replacements, epoxy terrazzo never needs to be replaced. Recent times have shown older buildings uncovering carpet to reveal a terrazzo floor underneath, which can be refinished at a fraction of the cost of the initial installation.

Low Maintenance

Seamless terrazzo flooring allows for easy cleaning and sanitizing. Regular routine cleaning will keep the terrazzo well-maintained and only requires a mop and bucket of warm water. Epoxy terrazzo is nonporous and does not allow for the growth of bacteria and mildew either. This prevents dirt and grime from building up as there is no seams in an epoxy terrazzo floor. An epoxy terrazzo floor requires few repairs during its lifecycle; therefore, can save building owners on overall costs to care for a flooring system.



Visual & Responsible Design

Materials matter. From classic styles to eye-catching public art, epoxy terrazzo creates a visually stunning flooring surface, while using environmentally-friendly materials that better the planet and people.

Design Flexibility

A terrazzo floor is left to the imagination of a designer. Designers have endless options to select among a wide color palette and aggregates. From elegant floors to artistic designs featuring logos and graphics, terrazzo enhances the aesthetics of any indoor space. Designers can even find unique ways to utilize terrazzo that includes branding and wayfinding opportunities. Terrazzo can also be integrated into architectural features like countertops and stair treads that complement the floor design.

Sustainability

Terrazzo is a sustainable flooring system, that can consist of post industrial and post consumer marble and glass aggregates combined with low VOC epoxy resins. These attributes contribute to U.S. Green Building Council's (USGBC) credits under the LEED rating system. Speaking longterm, terrazzo benefits the overall health of building occupants with no harmful gases, and its durability offers long lasting floors able to be recycled and reused again, which ultimately helps to reduce landfill waste.





— APPLICATIONS

Advancements in technology bring new real world applications of terrazzo. The versatility of terrazzo extends beyond flooring to bring architectural structures to building spaces in precast form.

Now designers can find new ways to add terrazzo to complement an epoxy terrazzo floor including:

- Stair Treads
- Countertops
- Tabletops
- Benches
- Wall Panels
- Backsplashes
- Wall Base
- Showers

Precast Terrazzo

Precast terrazzo shares the same properties as traditional terrazzo, but is made off-site. Under controlled environments, it offers excellent quality and appearance. Custom fabrications are made possible with different dimensions, curved shapes, and larger thicknesses.



Stairs

Precast terrazzo stairs are common applications for commercial projects, particularly for multi-story buildings. Stairs are built to fit many designs with different styles including self-supporting, tread only, and tread and riser combination sets.

Abrasive channels are inserted into each stair tread to add support against slips and falls. Landings can be poured in place or manufactured as precast panels or tile in various size.



Wall Base

Projects with epoxy terrazzo specified typically pair the flooring surface with precast floor base. Cove base and straight base are available, that can be matched to the main color of the terrazzo floor, or in a contrasting color.

Terrazzo wall base is often selected its durability and low maintenance, protecting the wall from high impacts and abrasion. The ability to match wall base to the floor color creates a seamless appearance.



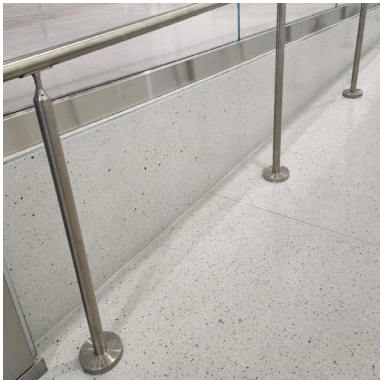
Countertops

Terrazzo is a durable alternative to natural stone countertops, often used as reception desks, commercial kitchen and bathrooms surfaces.



Tabletops

Terrazzo tabletops is an attractive feature for hospitality designs, and can be crafted in round, rectangular or other custom shapes and sizes.



Walls

Terrazzo can be applied vertically for walls, columns, backsplashes and plinths. It can even be used as a ceiling application due to its light weight.



Benches

Precast terrazzo can even form seating areas inside commercial buildings, that can take on any shape and size.



— INSTALLATION

For best results, it is recommended to hire a professional terrazzo contractor to perform the installation.

Terrazzo can be installed as a poured in place system or with precast. The installation itself is a highly skilled trade that requires extensive knowledge and good craftsmanship to deliver the best quality of terrazzo. The National Terrazzo and Mosaic Association (NTMA) offers memberships to contractors who meet rigid proficiency standards and participate in continuing education seminars annually.

— INSTALLATION

Moisture Testing

For epoxy terrazzo installations, moisture vapor transmission tests should be performed on all slabs. The threshold is 75% to 80% relative humidity. Once moisture levels are acceptable, installers can begin floor prep.

Concrete Preparation

During this stage, installers will begin by shot blasting the floor, removing the top layer of concrete to reinforce a strong bond between the concrete and terrazzo.

Next, the installers will vacuum clean the floor, and then inspect the floor for any issues. Common issues might include uneven surfaces or areas where cracks are present. These issues are then addressed in a timely manner.

Moisture Mitigation System

If relative humidity levels are high, contractors have option to allow the slab to dry or to apply a moisture mitigation system. A moisture mitigation system will keep the project on schedule, and create a barrier against vapor transmission reaching the terrazzo topping.

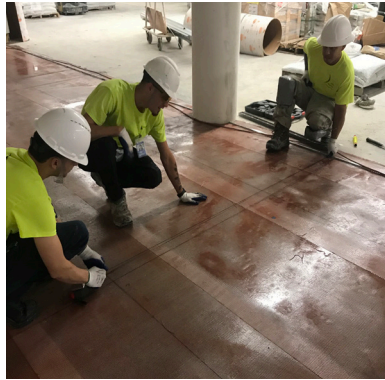
Leveling Fill

In circumstances where the surface level is out of tolerance, installers can apply a leveling fill resin to create a uniform and even surface prior to pouring terrazzo.

— INSTALLATION

Flexible Membranes

If the installer identifies cracks present in the concrete slab, they will apply a flexible membrane to fill in cracks before progressing forward. This application assists in the prevention of substrate cracks transferring to the terrazzo surface during the flooring lifecycle.



Floor Layout

After the floor is prepared for terrazzo, installers will establish the design of the terrazzo floor. The floor layout involves cutting divider strips and placing them according to drawings. This will include any saw cuts and expansion areas. Even logo templates are set in place at this time.



Divider Strips in Terrazzo

A divider strip serves two needs: function and form. Divider strips are available in different options. Aluminum divider strips are the most economical dividers, but zinc, brass and even plastic divider strips are considered for epoxy terrazzo.

Form

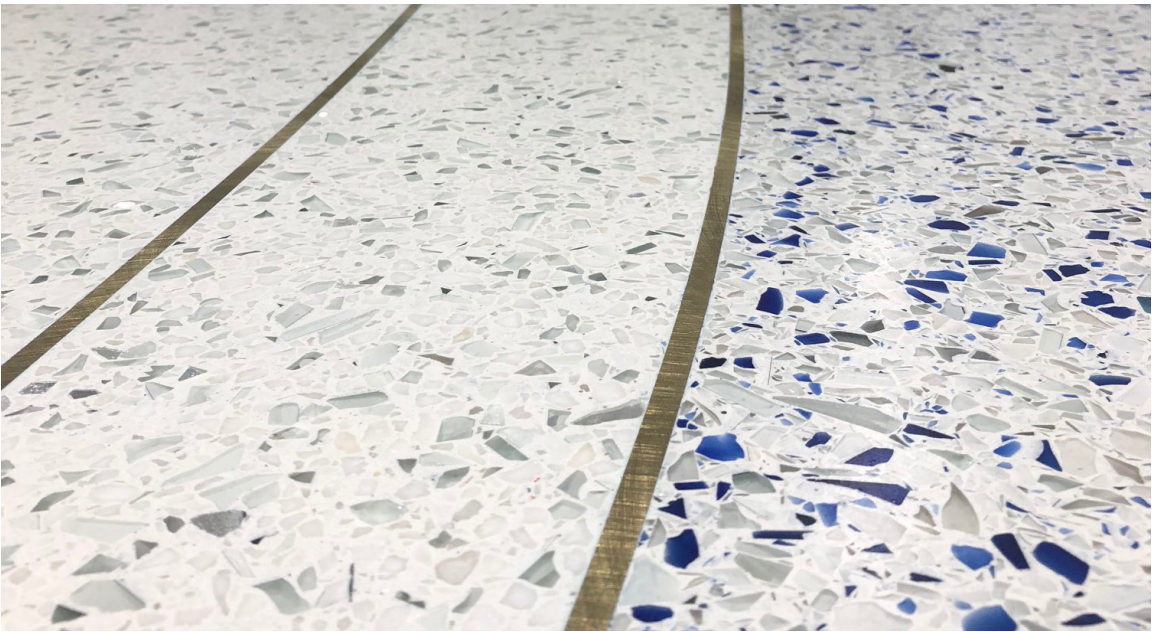
Divider strips form the layout of the terrazzo floor design. They help to indicate any color transitions in the floor design.

Dividers strips serve to create intricate designs and patterns, which can either be done by bending strips on the job site or by using a waterjet to cut logos and graphics for public art.

Function

Divider strips are also used to control cracking in the terrazzo floor. Installers will secure divider strips in areas where cracking is likely to form, including all saw cuts and expansion areas.

They are also useful to transition between other floor finishes such as wood, vinyl and carpet.



— INSTALLATION

Mixing Components

Installers will mix a two-component epoxy resin with decorative aggregates thoroughly. Once completed, the material will be poured onto the slab. On the job site, one installer will continuously mix terrazzo while another trowels.

Troweling

Installers will trowel the epoxy terrazzo batch to the top of the divider strips at either 1/4" or 3/8" per specifications. Typically one color of epoxy terrazzo is installed per day. However, an installer can install a large area of space in a short duration of time. Once poured in place, it only takes approximately one day for the material to cure before installers can begin the grinding stage.



Grinding of Terrazzo

The grinding stage transitions the terrazzo floor into a smooth hard surface. This involves the installers taking an electric grinder and slowly moving the machine back and forth several times. Afterward the floor is checked to view the exposed divider strips and aggregates.

— INSTALLATION

Grouting

Grouting is a stage right after the installer has finished grinding the terrazzo floor, where the floor is inspected for pinholes. Using a small mix of epoxy, installers will fill all pinholes and voids found in the floor.

Polishing

It is during this stage that a terrazzo floor receives its shine. Grit level indicates the amount of polish that the floor will receive, and can achieve a matte-like or mirror-like finish.



Sealing

Following the polishing stage, a terrazzo floor is sealed. The terrazzo floor is cleaned and allowed to dry. Afterward, multiple coats of sealer is applied to the surface. Sealers are used as added protection to the flooring surface, working against immediate stains and bacteria and mildew. After sealing is completed, the terrazzo installation is finished, and people can begin walking across the floor.

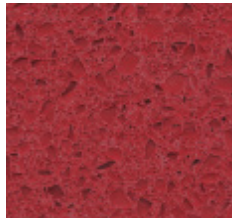
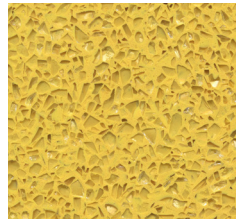
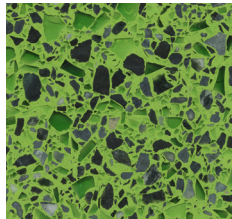
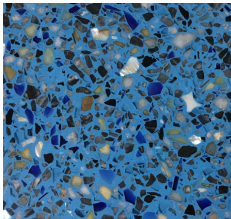
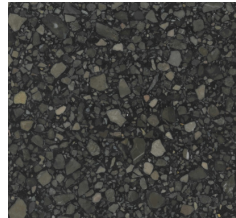
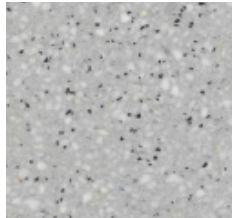
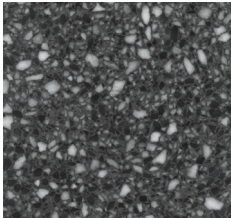
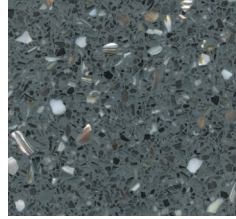
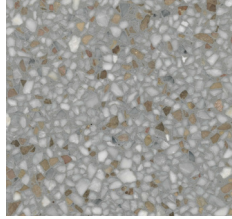
— DESIGN IDEAS

Endless Possibilities

The design flexibility of terrazzo gives way to numerous styles and limitless material combinations. Epoxy terrazzo meets the needs of modern buildings, but offers exceptional beauty and intricate patterns as well. Whether you are looking to design a small or large-scale project, epoxy terrazzo is suitable for any indoor space.

Endless Colors

Epoxy terrazzo is a one-of-a-kind flooring system that blends aggregates into virtually any matrix color. From neutral to vibrant colors, designers have a full palette to work with.



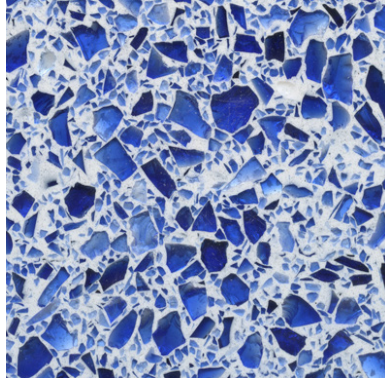
Aggregate Color

Designers have options to include traditional aggregates such as marble and granite chips, or modern choices such as glass, Mother of Pearl, metal, and other decorative aggregates, all which can create either a classic or more artistic look.



Marble Chips

Quarries offer a wide range of hues from shades of white to colorful tones.



Glass Chips

Glass chips offer vibrant colors not found among marble chips. Often recycled for reuse.



Mother of Pearl Chips

Mother of Pearl is the most used shell chip in terrazzo, known for its iridescent effect.



Pebble Chips

Pebbles are an abundant source of aggregates, that offer a rounder terrazzo appearance.



— DESIGN IDEAS

The size of the aggregates will dictate the style of the terrazzo floor, ranging from micro terrazzo to palladiana terrazzo floors.

Terrazzo aggregate is graded according to its size. Aggregates range from size 00 to size 8. When designing an epoxy terrazzo floor, standard aggregates (sizes 0-2) are specified the most. However, micro terrazzo (size #00 and #0), Venetian (size #3-8), and Palladiana styles are sought after for their unique appearances. While rare, they provide designers with greater flexibility to meet their desired aesthetic.



Micro Terrazzo

Micro terrazzo uses aggregates ranging from size #00, 0 and fines. These aggregate are crushed to the smallest size possible, and will offer an appearance similar to polished concrete.



Standard Terrazzo

For a 3/8" or 1/4" epoxy terrazzo floor, standard aggregates work best. Standard aggregates range from size #0-2; however, for 1/4" epoxy terrazzo floor, size #1 or smaller is recommended.

It is important to consider the aggregate size when selecting a terrazzo system. Chips larger than size #2 require more thickness, thus require a greater pour for thinset epoxy terrazzo.



Venetian Terrazzo

Larger aggregates size #3 and above are referred as Venetian. Can reach 1/2" thick, but not suitable for 3/8" epoxy terrazzo systems. Expect cost increases.



Palladiana Terrazzo

Palladiana refers to marble slabs set in place and filled in with terrazzo. Its a specialty floor finish that requires more attention and money to install.



— DESIGN IDEAS

Where is terrazzo installed today? Epoxy terrazzo is often found in high traffic areas of institutional and commercial buildings where a durable and low maintenance flooring system is needed.

Can be applied in the following settings:

- Airports
- Banks
- Churches
- Convenience Stores
- Convention Centers
- Fire Stations
- Hospitals
- Hotels
- Libraries
- Malls
- Movie Theaters
- Municipal Buildings
- Office Buildings
- Police Departments
- Prisons
- Recreation Centers
- Restaurants
- Retail Shops
- Schools
- Stadiums
- Transportation Centers
- Universities

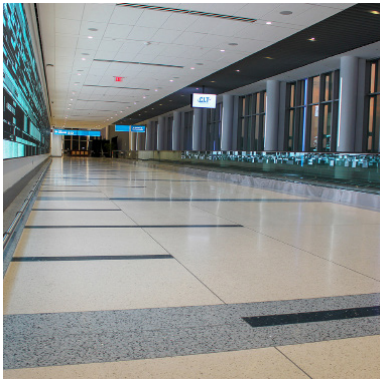
Epoxy terrazzo can be installed in multiple areas within a building including lobbies, corridors, elevators, restrooms, cafeterias, offices, laboratories, auditoriums, and stairwells.



Schools and Universities



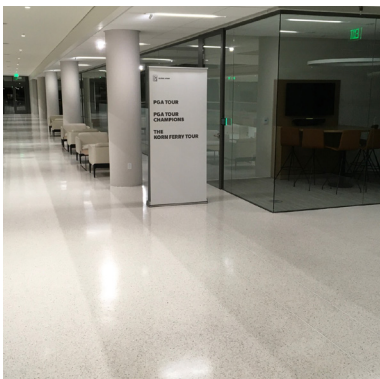
Healthcare Facilities



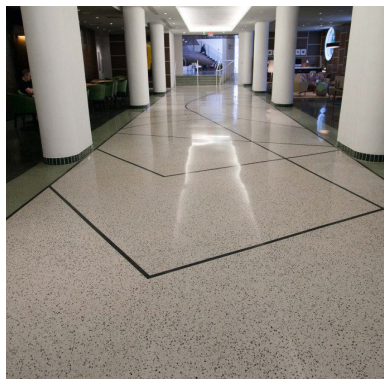
Airport and Transportation



Municipal and Public Works



Office Headquarters



Hotels & Hospitality



— PRICING & COST FACTORS

Epoxy terrazzo's lifetime value and costs are unmatched.

While initial costs are high, epoxy terrazzo has one of the lowest lifecycle costs among commercial floors. The NTMA conducted a cost analysis of terrazzo versus traditional materials, revealing that traditional materials can cost 35 times more than terrazzo during its lifecycle due to repairs and replacement costs.

Each epoxy terrazzo floor is different from one project to the next, requiring thoughtful planning among architects and designers. But when done right, an epoxy terrazzo floor will last the lifetime of the building structure.

— PRICING AND COST FACTORS

Because poured-in-place is installed and finished by specialty contractors, price estimates often include the cost of materials and installation. Stone or ceramic tile is generally priced at material cost so it can appear significantly cheaper.

Depending on cost factors, estimates can range from as low as \$14 per square ft to as high as \$90 per square ft for more complex designs. On average, most institutions today are priced approximately within a range of \$20-40 per square ft. Cost variations include:

Size of Project

Larger projects will cost more to install terrazzo than smaller-size project. However, as the size of the project increases, generally the price per sq ft of epoxy terrazzo will decrease.

Materials

Aggregates vary in cost as well depending on the type of sizes. The larger the aggregate, the higher the costs. Premium aggregates such as Mother of Pearl will effect pricing compared to materials like clear glass and white marble chips.

Geographic Location

The installation area can effect the overall pricing as well. Check with a local installer in your area for price estimates.

Design Complexity

More colors and intricate logos and designs can increase the pricing of a terrazzo installation.



— PRICING AND COST FACTORS

Selecting flooring is critical for the long-term success of a building. Epoxy terrazzo adds value through performance, aesthetics, ease of maintenance and use of healthy materials, with owners seeing return on investment soon after installation.

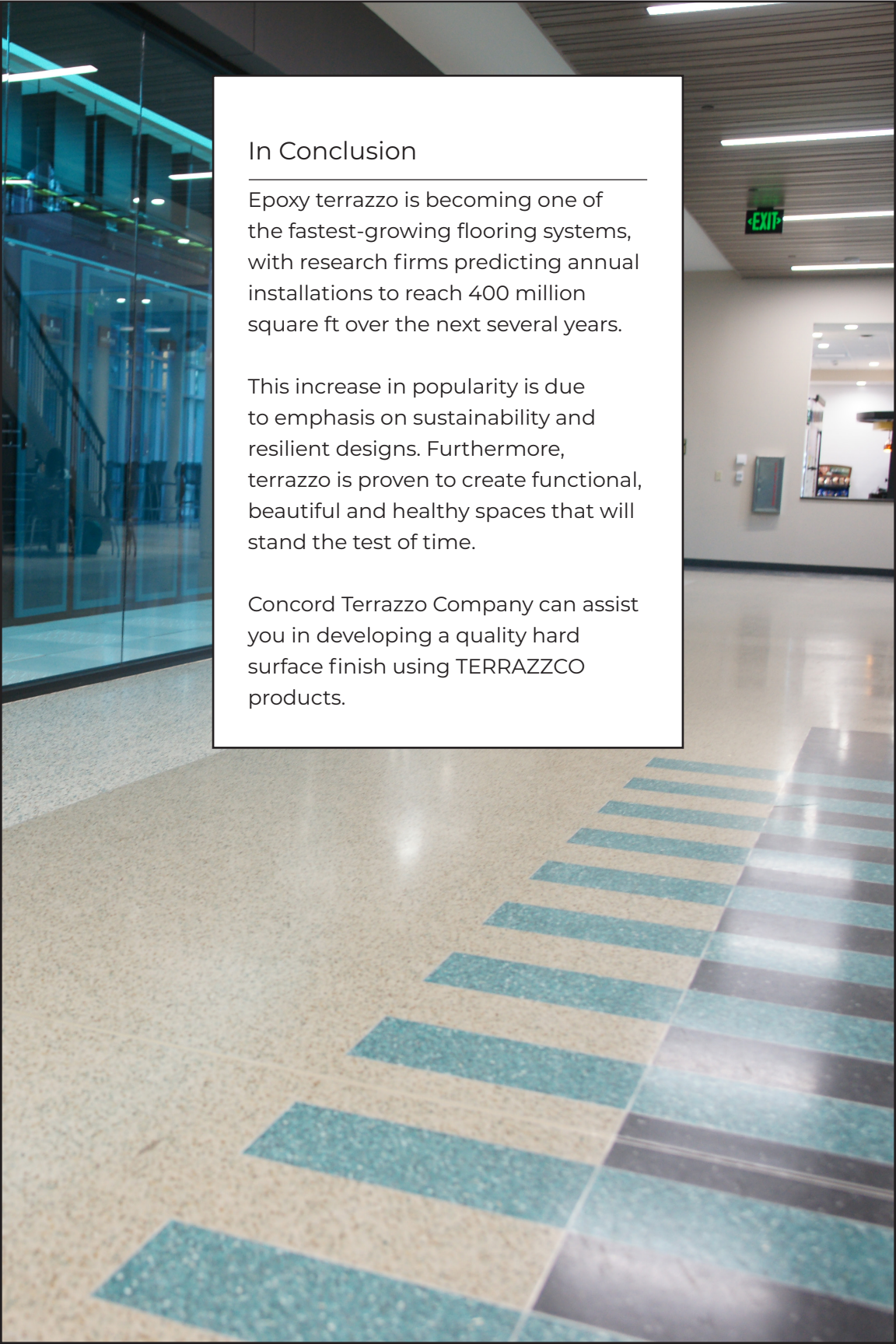
LIFECYCLE COSTS	vinyl sheet	carpet	vinyl tile	porcelain tile	quarry tile	EPOXY TERRAZZO
cost per sq. ft.	\$3.58	\$3.34	\$1.21	\$8.06	\$7.25	\$14.50
annual cost of maintenance per sq. ft.	\$1.12	\$1.23	\$1.18	\$0.10	\$0.98	\$0.43
initial cost + 10 years maintenance	\$14.78	\$15.67	\$13.05	\$17.88	\$17.08	\$18.82
replacement cost per sq. ft.	\$3.58	\$3.34	\$1.12	\$0.00	\$0.00	\$0.00
frequency of replacement	10 years	10 years	10 years	40 years	40 years	40 years
40 year cost	\$32.71	\$66.02	\$53.41	\$47.37	\$46.56	\$31.90
annual cost per sq. ft.	\$1.57	\$1.65	\$1.34	\$1.18	\$1.16	\$0.80

In Conclusion

Epoxy terrazzo is becoming one of the fastest-growing flooring systems, with research firms predicting annual installations to reach 400 million square ft over the next several years.

This increase in popularity is due to emphasis on sustainability and resilient designs. Furthermore, terrazzo is proven to create functional, beautiful and healthy spaces that will stand the test of time.

Concord Terrazzo Company can assist you in developing a quality hard surface finish using TERRAZZCO products.





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