

Palladiana Terrazzo: Custom Designs for Distinctive Spaces



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INTRODUCTION

A. Brief overview of Palladiana terrazzo

Originating in Italy, Palladiana terrazzo is a custom flooring technique that creates unique designs for distinctive spaces and exemplifies terrazzo's design flexibility. As with standard terrazzo, a Palladiana application embeds marble pieces in a cementitious or resinous binder, which is then polished. The mosaic-style application is visually striking and durable, with enduring appeal in contemporary architectural design.

Palladiana extends the range of aggregate sizes used in standard terrazzo installation. From the sleek, monochromatic appeal of the finest microaggregates, terrazzo ranges through a creative spectrum of textures, up through standard aggregate chip sizes, and on to the larger Venetian. It's at the far end of the range where we find Palladiana terrazzo. Classic Palladiana is distinguished by large, irregularly shaped, paver-like stone slabs, while Scarpa Palladiana is precisely cut and set in geometric patterns.

Compared to the standard terrazzo aggregate chips of sizes 00-3 or the larger chips of sizes 4-7 of Venetian terrazzo, Palladiana terrazzo offers a strikingly different aesthetic range, extending from understated to high contrast and assertive. A popular finish that can take on any number of faces, Palladiana shares the design flexibility and value advantages of all terrazzo systems: longevity, sustainability, and cost-effective maintenance. The finished Palladiana surface is nonporous and seamless, with no grout lines. 2. Rocking Detroit: Design Versatility in Classic Palladiana Terrazzo
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About the NTMA

B. Modern Design Versatility

"Palladiana has a warm, authentic, uniquely crafted appeal," said architect Paul Manno of Gensler in Dallas. Hand-laid and hand-finished, it offers such a radically different aesthetic that it's often not recognized as terrazzo, he added.

Palladiana terrazzo's hand-crafted character showcases the marble's texture and profile. For visual effects that are both timeless and contemporary, Palladiana offers limitless design options with custom variables for stone type, shape, size, arrangement, and formulation of the joint matrix. Hand-broken, irregular marble slabs contribute to the distinct character of the installation, while precision-cut pieces allow for precise inlay patterns.

Mr. Manno recommends classic Palladiana to elevate terrazzo from the more streamlined look generally found in larger installations such as airports, convention centers, or educational projects. He also specifies for a change of scale in reception and lobby spaces or break rooms. He likes that it's neither directional nor patterned.

From organic patterns to geometric formations, whether randomly scattered or meticulously patterned, Palladiana terrazzo makes a sophisticated, one-of-a-kind statement that's fully customizable to the space and conditions.

A significant advantage of the entire range of terrazzo systems for a designer is its unlimited color options and design versatility. Terrazzo is routinely customized to incorporate branding and themes. Mother-of-pearl, glass, and other aggregates raise light reflectance and create visual interest.

I. HISTORY OF PALLADIANA TERRAZZO

A. Palladiana's Italian Origins

Palladiana terrazzo techniques are rooted in the history of traditional Italian craftsmanship and architecture. Today, Palladiana terrazzo continues to be a popular choice for architects and designers seeking a timeless, creative flooring solution.

Palladiana terrazzo traces its origins to Ancient Rome, where it was used to construct luxurious villas and public buildings. The application evolved from the opus incertum construction technique, which set uncut stones in cement. Modern Palladiana terrazzo was revived in the Venetian Renaissance when it emerged as a flooring choice for palaces and public buildings. It was named after the 16thcentury Venetian architect Andrea Palladio, who championed the use of the classic terrazzo style in his architectural designs, showcasing its versatility and beauty.

Today's Palladiana, like all terrazzo systems, continues to leverage recycled materials and largely still follows the original Roman in situ model integrated directly into the floor onsite using raw materials. The hand-crafted technique maintains its historical roots alongside modern design elements and current installation technology.

B. Palladiana's Evolution in Modern Architecture

Classic Palladiana terrazzo created the striking look that made design headlines in 2014 with New York's Fifth Avenue Valentino flagship store, designed by David Chipperfield. Other contemporary restatements of Palladiana terrazzo owe much to Italian architect Carlo Scarpa (1906-1978).

II. TECHNICAL DETAILS

A. Components of Palladiana terrazzo

In a Palladiana installation, as with standard terrazzo, the stone pieces are embedded in an epoxy or cement substrate and infilled with terrazzo poured in place onsite. Precast elements are also an option, generally applied on stairs or vertical surfaces.

B. Installation process and techniques

1. Epoxy or Sand-Cushion Cement Terrazzo Systems

While traditional sand-cushion cement-based terrazzo remains a viable option for Palladiana installation, it is a thicker system (2.5-3 inches) than epoxy terrazzo. Most terrazzo installations today are epoxy, which can capture the traditional look of cement terrazzo while offering broader options for color and design, higher tensile strength, and resistance to cracking and staining. As a thinner application, epoxy installation is a less time- and labor-intensive process, with shorter drying times. While sand-cushion terrazzo isn't appropriate for renovation projects, it is less limited by the conditions of the job than epoxy. It might be a better option for specific situations, such as below-grade applications or installations during freezing weather and outdoor applications.

Epoxy terrazzo is a nominal 1/4- or 3/8-inch-thick resin matrix veneer placed upon a level, properly prepared concrete substrate. Sand-cushion terrazzo layers a cement matrix topping on an underbed with wire reinforcing, isolation sheet, and sand layer system for interior floor use.

2. Substrate Preparation

The use of crack-isolation and moisturebarrier membranes is standard on epoxy terrazzo installation. A crack-suppression membrane over the slab inhibits any cracking in the substrate from telegraphing into the terrazzo. The membrane is designed to aid in the suppression of reflective cracking caused by substrate movement.

To avoid cracking, correctly treat the substrate for joints and cracks and use control joints and divider strips as recommended. In an epoxy terrazzo installation, divider strips are more a matter of aesthetics than crack prevention. Cement-based terrazzo, however, must be poured in 4.4 or 5.5panels to allow for shrinkage.

3. Cutting and Application of Stones

Stones for a Palladiana installation can be precision waterjet machine- or hand-cut or handfractured for irregular shapes. The stone can then be machine-adhered to a mesh to facilitate the installation or laid by hand. They can be placed in a precise geometric Scarpa formation or a random classic pattern. In the 20th century, Scarpa played a significant role in redefining the use of terrazzo in modern architecture. Renowned for his innovative approach to materials and meticulous attention to detail, Scarpa's structured reinterpretations of Palladiana took this ancient technique in a new direction. His distinctive, boldly geometric projects brought a new refinement to terrazzo and highlighted its potential for creating seamless, elegant surfaces. His designs in the Mid-Century Modern Olivetti showroom in Venice, now a museum, and the Brion Cemetery, demonstrate the timeless appeal and modern versatility of Palladiana.

Case Studies



Palladiana Terrazzo Distinguishes New York Office Lobby Hand-fractured, hand-set stones, poured-in-place with precast stairs.

This spectacular terrazzo installation is found on Manhattan's west side in an office building renovated by Meringoff Properties at 533 W. 57th Street. NTMA annual Honor Awards 2021 for its creative artisanship. With irregularly shaped paver-like marble slabs, this installation typifies the classic Palladiana technique with poured-in-place epoxy terrazzo.

Dan Shannon, partner at Mdeas in New York City, designed this stunning lobby. In the textured, monochromatic Palladiana terrazzo installation, the marble slabs were hand-set in a dense, rhythmic composition with half-inch spacing of remarkable uniformity. Each hand-fractured 2-inch marble slab was hand-placed, the broadest side set at the surface. This painstaking task had to be carried out by a single installer to ensure consistency in the pattern, reported John Magnan of D. Magnan of Mt. Vernon, NY, an NTMA member contractor company since 1948.

The lobby and elevator cab Palladiana design was produced with marble shards sourced from the same French Blue de Savoie panels as clad the walls. The existing staircase—treads, nosing, and a recessed riser was overlayed in precast segments of the same Palladiana terrazzo as the floor, produced in the contractor's workshop. The surfaces of the marble shards are revealed taking the turn of the nosing on the perfectly detailed steps, which is particularly striking. Once adhered to the substrate and polished, the precast sections' joints were undetectable; the whole appears to be of a single element. The steps are finished with 1/8-inch brass strips for slip resistance.

Urban Renewal in Manhattan with Palladiana Paving

Water-jet cut stones installed with meshed.

This LEED-certified urban redevelopment project at 601 Lexington Market Place in Manhattan transformed an interior-focused public square. Adjacent to a six-story, 1970s-era office building, the light-filled atrium with its European sidewalk cafe-inspired design enlivens and updates the staid business environment. Multicolor marble pieces were waterjet cut and mounted onto a mesh backing to create the patterned Palladiana terrazzo paving. The striking cobblestone-style installation was completed with epoxy as mortar, zinc divider strips, and a muted 200-grit polish.



Good planning and inspired design are evident in the charming neighborhood ambiance of the distinctive plaza, which enhances the entire neighborhood's value while expanding dining and retail options. The project contractor, Wilkstone of Paterson, New Jersey, won a 2021 Honor Award from the NTMA.



Hudson Square: Lobby Transformed into Productive Space Hand-fractured, precast



Once a manufacturing district, New York City's Hudson Square has evolved into a hub for technology and media companies. "A+I designed productive spaces that act as social activators, lending value to the buildings in which they are placed," said Jennifer Wichtowski, Associate at A+I of New York City.

The design of the new lobby at 225 Varick Street pays homage to the building's industrial heritage, dating back to 1926. It's also the perfect backdrop for the 12 floors of loft-like office spaces with expansive city views.

Palladiana terrazzo is the focus of the space. T was accomplished using large-aggregate Palladiana and Venetian terrazzo with inlaid brass accents. Crafted from hand-fractured marble pavers, the installation elevates the aesthetic while complementing exposed columns and concrete. Benches, planters, and steps in striking Palladiana terrazzo demarcate lobby circulation and social space. The textured curves of the space-defining raised platform demonstrate remarkable artisanal craftsmanship, which was recognized with an NTMA Honor Award in 2020. "Terrazzo is at once incredibly durable and incredibly varied and beautiful," said Ms. Wichtowski. "It has a timeless character but can be given a modern edge, making it extremely versatile and flexible."

The precast terrazzo steps are all handmade, with book-matched marble treads and nosings. Designed to render the tread to appear to be a two-inch thick slab, the innovative design is produced with a 3/8inch epoxy terrazzo system. Richly textured Venetian aggregate in sizes one to three is troweled between the pieces of marble.

The marble pavers were fractured and mounted offsite at the terrazzo contractor's precast facility to expedite the installation process, then set on numbered sheets. On the job site, the interlocking sheets were reassembled like puzzle pieces and adhered to the substrate. The vertical Venetian terrazzo panels with 2-inch brass inlays and radius corners around planters and benches are also precast.

Efficient Elegance

Scarpa Palladiana Techniques at The Artisan at Essex Crossing Machine-cut. mesh

The Artisan at Essex Crossing, a 1.65-millionsquare-foot mixed-use redevelopment project on Manhattan's Lower East Side, is a diverse mix of retail spaces undergirding a 19-story affordable housing tower. In an elegant commercial lobby, a subtle precision-cut stone Palladiana terrazzo pattern lends texture to the minimalist space. Waterjet-cut Suzuko white marble in alternating rectangles and squares was machine-attached to a mesh for layout. Microaggregate epoxy fills the one-inch spacing.

Evan Tarabocchia of Imperial Flooring Systems of Freehold, New Jersey, the contractor on the project, said that using a machine-fabricated mesh backing to install the attached marble pieces saved labor costs. The mesh installation with the marble pieces took two to three days; he estimated it would have taken at least twice that long to lay them out by hand.



Mr. Tarabocchia, a third-generation terrazzo tradesman, reports that the mesh also made it easier to control the spacing of the marble pieces. He noted that the epoxy has to be poured higher than the pre-polished marble inserts to ensure an even finish after grinding. Imperial Flooring Systems netted a 2022 NTMA Honor Award for the project.



Hand-crafted Scarpa Palladiana Elegance Shines at Fulton Market Hand-cut, hand-laid

Each element contributes to a cohesive interior design in this LEED-certified, mixed-use lobby space at 800 W. Fulton in Chicago's Fulton Market neighborhood. The distinctive matte-finish Palladiana terrazzo installation complements the glass storefronts and brick walls.

Creatively elevating the space are 12,889 marble inserts placed in an 800-square-foot grid, soldier style, and mounted in a monochromatic charcoalpigmented terrazzo frame. The sophisticated pattern evokes the space-framing effect of a series of wellplaced area rugs, which present considerably lower maintenance demands than carpets. with a jig. The designer then hand-selected each three-by-five-inch insert, which the terrazzo crew set by hand in an 800-square-foot grid, maintaining precise spacing.

Steve Menconi, president of Menconi Terrazzo in Bensenville, Illinois. since 1974, said he would use a mesh if working with smaller pieces in varying sizes, but he believed they could save time and control the result of this installation with this system. Not only was a firm date lacking for the marble tiles to be machine-produced, mounted on mesh, and delivered, but mesh also proved too flimsy to control the positioning of such large tiles. The inserts are framed by charcoal epoxy terrazzo poured on-site around the tiles.

Terrazzo artisans cut marble tiles to size by hand

III. BENEFITS OF PALLADIANA TERRAZZO

A. Durability and longevity

Terrazzo can last the life of any building structure without replacement and with considerable capacity for repair, restoration, and refinishing.

B. Sustainability and environmental impact

All terrazzo systems, including Palladiana terrazzo, provide a resilient and sustainable flooring option that can contribute to green building certifications. Its use of local materials and recycled aggregates reduces its environmental impact, and its longevity and low-maintenance demands conserve resources long-term, making it a particularly cost-effective choice in high-traffic environments.

C. Ease of Maintenance

Floor Trends and Installation magazine states, "Over 90 percent of a floor's lifecycle cost is spent on long-term cleaning and maintenance." Terrazzo's nonporous, seamless finish is exceptionally impervious to water and impact damage, with high tensile and compressive strength. It is also one of the simplest and most economical floors to maintain.

Maintenance savings on terrazzo bring its lifecycle costs in line with less durable floorings such as VCT, which will require replacement, while terrazzo is a permanent floor. Like all terrazzo systems, the finished Palladiana surface is solid, with no grout lines. Properly sealed and maintained floors rarely need stripping. Essential maintenance of a terrazzo floor:

Daily dust-mop the floor to remove loose dust.
Using plain water or a neutral cleaner, wet mop the floor

Use of a floor scrubber at least once a week.
Spray buffing to restore gloss. After the floor is

dry, machine buffing will restore shine.

A complete maintenance guide is available at www.NTMA.com.

D. Lifecycle Analysis

Given its low maintenance requirements, terrazzo's lifecycle costs for a permanent, seamless, custom-designed, low-maintenance terrazzo floor are competitive with carpet and VCT. A permanent terrazzo floor, which will not need to be replaced for the life of the building, avoids the immense costs and downtime associated with floor replacement, even in the highest traffic areas, for the life of the facility.

Another expense and environmental impact to consider is the removal and disposal of replaced flooring. High-traffic environments may have to replace carpet or vinyl as often as every five years, triggering costly planning, disruption, and waste. Terrazzo is a material that lasts and conserves resources long-term.

Terrazzo can be spot-repaired or replaced in sections between divider strips. Because terrazzo has standard specifications for mixes, repairs can be perfectly matched to existing materials. Getting a good match for replacements can be a challenge with many softer synthetic materials or natural stones.

Countless examples exist of terrazzo floors still in use after 75 years and more, and renovations of 50to 75-year-old terrazzo that needed only refinishing. The primary impediment to refinishing old terrazzo issue is lack of structural soundness.

Case Studies

A Heritage Reclaimed In-Situ Recycling for Palladiana Combines History and Sustainability



In this striking example of Palladiana terrazzo, accomplished through in-situ recycling, heritage marble was repurposed in a new design to complement the aesthetic of the 1912 Ottawa Union Station. Public Works Canada, with Diamond Schmitt Architects and KWC Architects, designed the floor of the former railway station to serve as an interim home for the Senate of Canada.

Following a heritage preservation plan for the landmark structure to conserve materials and divert construction waste from landfills, terrazzo artisans salvaged Missisquoi Grey Marble, a compact local stone, from existing floors, baseboards, wainscoting, and stairs. This marble was repurposed to create the new floor, seamlessly integrating with the historic structure's Beaux-Arts design.

The marble slabs were cut with a mosaic chopper into 2-by-1.5-inch pieces with irregular edges in random lengths from 10 to 30 inches, maintaining their irregular edges for a hand-crafted charm. The marble slabs were embedded in an epoxy mastic in 4-by-9-foot panels. Installers then filled the joints in the stone pattern with an epoxy terrazzo mixture, and the floor was ground smooth and sealed. The entire project covered 8,000 square feet. All adjacent materials were deemed heritage and required protection during the installation. To compensate for the irregular, sloped floor, the contractor applied a conventional underbed of sand and bonded Portland cement. A moisture vapor treatment was applied, followed by epoxy prime and two coats of full-coverage fiber-reinforced crack isolation membrane. Zinc divider strips were laid along with expansion joints.

The project received an NTMA 2023 Honor Award and numerous other accolades, including top honors in the 2021 International Architecture Award. Rocking Detroit: Design Versatility in Classic Palladiana Terrazzo.

Rocking Detroit: Design Versatility in Classic Palladiana Terrazzo



The visionary behind Detroit's revitalization, billionaire businessman and philanthropist Dan Gilbert, again spearheaded a renewal of the city with the unveiling of his Rock Ventures Family of Companies headquarters in 2022. In 2024, an award for the terrazzo masterpieces showcased at the central hub at One Campus Martius joined the list of recognitions for the renovated office space.

The design team crafted striking compositions in epoxy terrazzo that provided an engaging context. In two sections at the main entry, a spectacular Palladiana design incorporates 12-by-12-inch irregular slabs in three types of marble embedded in epoxy terrazzo.

Artisan Tile of Brighton, Michigan, won a 2024 NTMA Honor Award for the terrazzo installation.

Pophouse, an interior design studio founded by Gilbert's wife, Jennifer Gilbert, designed the project and is one of the companies now occupying space in the 50,000-squarefoot headquarters. The architect was Ghafari of Dearborn, Michigan.

"Artisan Tile's expertise in terrazzo installation was crucial in bringing the project to life," a Pophouse representative said. "The use of terrazzo to create this design allowed for a complex pattern that was durable for high-traffic areas but at the same time provided one of the unique qualities of the entry experience."

Rooted in Legacy: Terrazzo Oak in College Commons



A spreading oak tree in terrazzo is the centerpiece of the urban lodge-style commons area in Roberson Hall at Emmanuel College, Franklin Springs, Georgia. The tree's trunk shows a cross-section of growth rings in terrazzo, alternating with water-jet cut Kempas marble, a rich golden-red stone with a striated, wood-grain pattern. Over 800 hand-set pieces of Emperador Dark marble, a natural stone from Spain, are set in gray epoxy terrazzo to represent the bark of the tree branches, with diminishing scales of bark moving to the ends of the branches. The emblematic fish from early Christian art and other images in water-jet cut aluminum or stone, with aggregates of mother-of-pearl and metal shavings, are expertly incorporated in a symmetrical rug pattern in the corridor to reflect the heart and legacy of the college. The David Allen Company of Raleigh won a 2012 NTMA honor award for the 5,300-squarefoot terrazzo project in 12 colors.

IV. FUTURE TRENDS AND INNOVATIONS

In recent years, larger aggregates have been a growing trend in terrazzo design, from Venetian terrazzo, with larger-than-standard size aggregates, to Palladiana, both classic and Scarpa styles. The possibilities for creativity in terrazzo are limitless, with its many variables for expression.

An example of a creative extension of the Scarpa style is the new Hotel Ibis City Center in the heart of Bucharest, Romania. Instead of larger stones, this innovative use of terrazzo began with a 500-squarefoot grid, which the artisans drew by hand, for the precise hand placement of 8,000 brass rings on the lobby floor. The architect decided upon the spacing for the brass ring pattern in the lobby the day before the work began, so the contractor had no option but to produce the design by hand, recounted Dan Popovici, owner since 1999 of Aragon in Bucharest, the terrazzo contractor and an NTMA international member company. He said he would have used a mesh if he'd had the time. He reported that the most painstaking part of the job was drawing the grid to place the rings perfectly.

Each 2-inch-diameter ring was cut from a tube and then set in the floor. While the epoxy was poured around the rings, each ring was filled with a hard sponge. The sponges were removed, and the darker epoxy mix was hand-troweled into each circle. The reverse pattern in the elevator cabs was achieved with precast terrazzo. Mr. Popovici calls this design "Yayoi terrazzo" in honor of Japanese artist Yayoi Kusama, known for her dotted installations. He intends to produce a series of Yayoi samples for architects showing design options with brass elements of various sizes and shapes.

V. CONCLUSION

Palladiana terrazzo's design versatility, sustainability, and timeless appeal make it a compelling option for architects and designers to create a statement piece in a luxury residence, contemporary office lobby, or elegant retail setting. Adding refinement to any space, it blends classical elegance with modern sophistication.

ABOUT THE NTMA

The NTMA is a full-service nonprofit trade association headquartered in Fredericksburg, Texas. Founded in 1923, the NTMA establishes national standards for terrazzo systems for floor and vertical applications. Its mission is to promote quality craftsmanship and creativity in terrazzo while supporting its 148 members in their trade and service to the construction industry. NTMA member contractors undergo rigorous membership requirements and are the sole qualified resource for terrazzo installations that meet industry standards.

The NTMA provides complimentary services to architects, interior designers, artists, general contractors, maintenance professionals, and property owners. From helping the design community write specifications to providing technical assistance, the NTMA's goal is to help ensure quality terrazzo installations. Terrazzo originated in 15th-century Italy, descending from the mosaic artistry of Ancient Rome. It evolved as a sustainable building system as resourceful Venetian marble workers discovered a creative way to reuse discarded stone chips. Terrazzo artisans still pour terrazzo by hand on the construction site, with options for precast and waterjet-cut elements. Stone, recycled glass, or other aggregates, often sourced locally, are embedded in a cement or epoxy base and polished to reveal the chips. Terrazzo combines design flexibility with ease of maintenance and durability to last the life of the building.

Based on the aesthetics, scope, and quality of the installation, NTMA's annual Honor Awards recognize its member contractors' outstanding terrazzo projects. NTMA member contractors are trained and qualified to meet the industry's top installation standards.