



ARCHITECTURAL MOLDED COMPOSITES



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# GFRC & UHPC

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Guideline for Architects & engineers





# Elevating Architectural Excellence

## ABOUT US

**Petra Design, where innovation meets tradition in crafting timeless spaces.**

Petra Design, where architectural excellence meets a legacy of over 25 years in delivering premium GFRC, FRP and Precast architectural products. We take pride in supplying a diverse range of solutions to both commercial and residential projects across North America.

At Petra Design, our extensive product line includes but is not limited to exterior cladding solutions, columns, cornices, door surrounds, sills, porticos, domes, balustrades, and more. Whether you're an architect, interior designer, contractor, builder, or homeowner, we collaborate with you on new constructions and renovations, ensuring your project receives the highest quality and aesthetic appeal.

### Engineering Excellence

Following an extensive and thorough research effort spanning the past few years, Petra Designs has successfully developed highly refined **Ultra-High-Performance Concrete** (UHPC) and **Glass Fiber Reinforced Concrete** (GFRC) mix designs, each branded differently. These formulations are crafted to be easily customizable, catering to the specific requirements outlined by architects and engineers.

### Quality Assurance

Petra Design engineers benefit from a substantial database of material properties and comprehensive full-scale tests, offering a robust reference point for the creation of new systems. Our Petra team maintains ongoing communication with leading universities and researchers globally, integrating cutting-edge design knowledge into our projects.

Many of our engineers have firsthand experience as shop or site engineers, ensuring that the designs not only showcase innovation but are also practical for efficient manufacturing and installation. This collaborative approach, with knowledge shared across the five main domains in which Petra operates, translates into a significant productivity advantage, enhancing the overall effectiveness of design and implementation processes at Petra Design.

#### Our support system



# GFRC

## Glass Fibre Reinforce Concrete (GFRC)

Glass Fiber Reinforced Concrete (GFRC) is a versatile and innovative building material that combines the strength of traditional concrete with the flexibility and lightweight properties of glass fibers. This composite material is created by incorporating alkali-resistant glass fibers into the concrete matrix, resulting in a high-performance material with enhanced durability and design flexibility.

### Composition



Cement



Sand



Water



Glass Fiber



Additives

### Benefits of GFRC

Glass Fiber Reinforced Concrete or GRC can be tailored to meet a wide variety of aesthetic, structural, requirements Below are some of the benefits that GRC brings to architecture.



Light weight with high strength



High design Flexibility



High Compressive, flexural and tensile strength



Environmentally friendly

# APPLICATION



## Metal Frame

The GRC stud frame panel consists of a single skin of GRC attached to a prefabricated frame, usually galvanized metal with flexible anchors and support anchors.

The flex anchors are for lateral support to the GRC facing whilst allowing some degree of rotation and shrinkage/movement of the GRC

This selection may depend on local building regulations.



## Expanded polystyrene

The expanded polystyrene used in the sandwich panel is depend on project specification.



## Joint Sealant

The purpose of joint sealant is to minimize infiltration of surface water and incompressible material into the joint system.

The materials used on joints can be:

- Silicones.
- Polyurethane.



# COLOURS & FINISHES

## COLOURS

Products are manufactured in a Standard Grey Colour unless one of our Premium colours are specifically requested. we can custom match colours.

These swatches indicates general colour and finishes only. To ensure accuracy please request a sample from our office. A natural variance in colour and finishes is to be expected during the manufacturing process.



## FINISHES

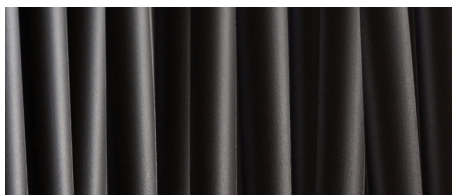
Beyond texture and color, finishes are a way to accentuate the design of a custom facade by highlighting the surface properties of UHPC through clean lines, bright colors, or exposed aggregate.



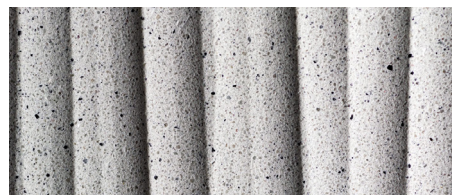
CAST FINISH STANDARD



LIGHT SANDBLAST FINISH STANDARD



POLISHED COLORED PREMIUM



AGGREGATE FINISH PREMIUM

## GFRC PROJECTS





# Ultra-High Performance Concrete (UHPC)

# UHPC

## Ultra-High Performance Concrete (UHPC)

Ultra-High-Performance Concrete (UHPC) redefines construction materials, boasting exceptional strength and durability. With compressive strengths surpassing 110 MPa and low porosity, UHPC ensures unparalleled resistance to corrosion and wear. Its innovative composition allows for slender designs, making it a preferred choice for robust, long-lasting structures.

### Composition



Sand



Cement



Water



PVA Fiber



Admixture

### Benefits of UHPC

Ultra-High-Performance Concrete (UHPC) can be tailored to meet a wide variety of aesthetic, structural, requirements Below are some of the possibilities that UHPC bring to the design.



Durability & Low Maintenance



Reproducibility of Shapes



Low Thermal Conductivity



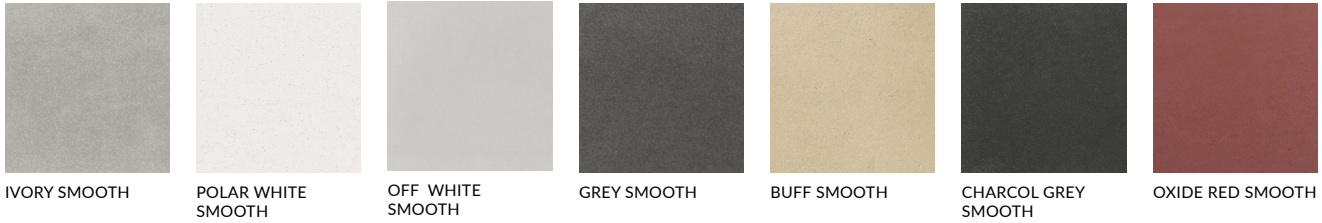
Fire resistance



Environmentally friendly

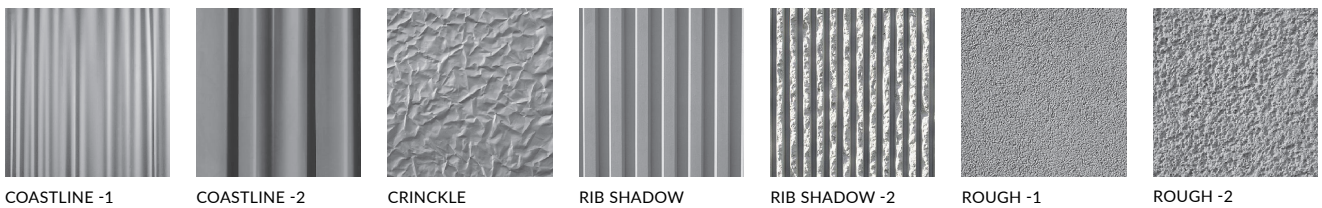
## COLOR & FINISHES

### Shades



One of UHPC’s defining qualities is its ability to enhance wide range of colors. We have developed ten standard shades for the construction industry with the ability to formulate customized colors as per requirements. The Platinum and White colors are formulated without any pigment. All other colors contain pigments that are UV-stable and specifically engineered for use in concrete. These pigments are added during the mixing Process.

### Textures



All standard BFG textures are available in the full range of standard colors, including but not limited to matte, glossy, pebbly, and even artistic textures are available. These are a few samples of our standard textures.

### Hydrophobic and Oleophobic Sealants



To protect the UHPC surface from dirt and stains, a transparent hydrophobic sealant can be applied to the surface. Hydrophobic and Oleophobic sealer are invisible and does not affect the rich, natural appearance of the UHPC surface; It does not form any film or layer on the surface. Furthermore, UHPC itself is highly impermeable.

# PRODUCT GROUPS

## Architecture & Infrastructure

- Building Facades & Cladding
- Rainscreen Cladding
- Decks
- Cornice Profile
- Statues and Monument
- Sculpture
- Shingles



## Landscaping

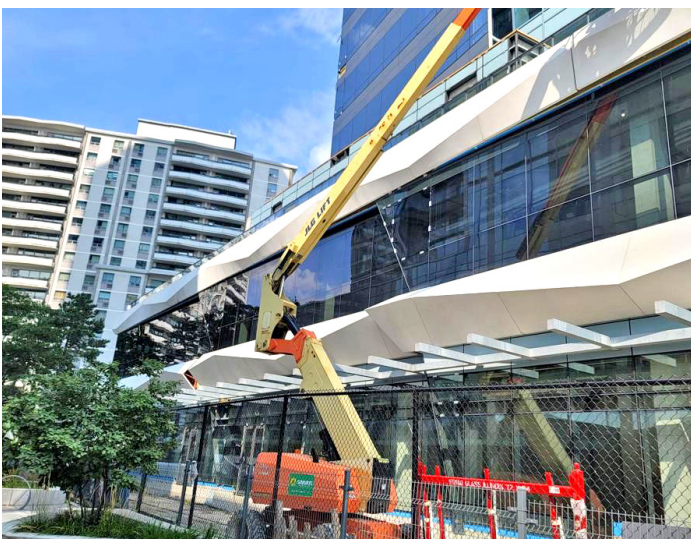
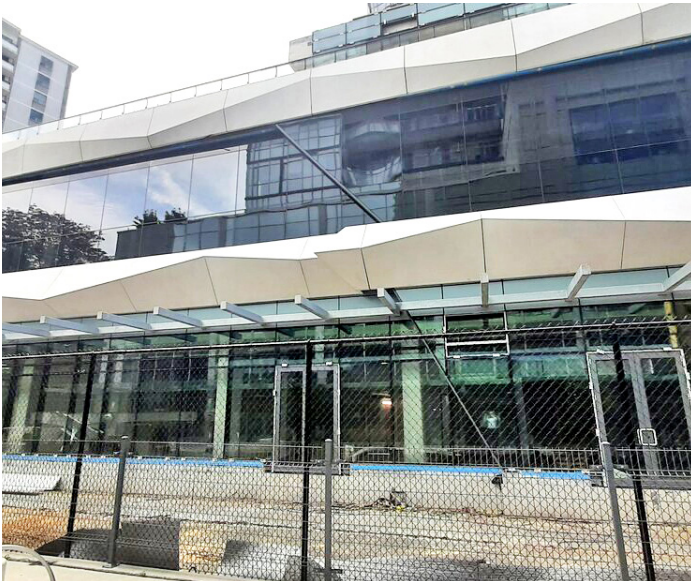
- Paving
- Faux Stones
- Benches
- Tables
- Planters/Pots
- Street Lights
- Fountains
- Custom Designs

## Interior Decoratives

- 3d wall claddings
- Columns
- Decorative Panels
- Countertops/Tabletops
- Fireplaces/Interior
- Decorative



Ellie Tower





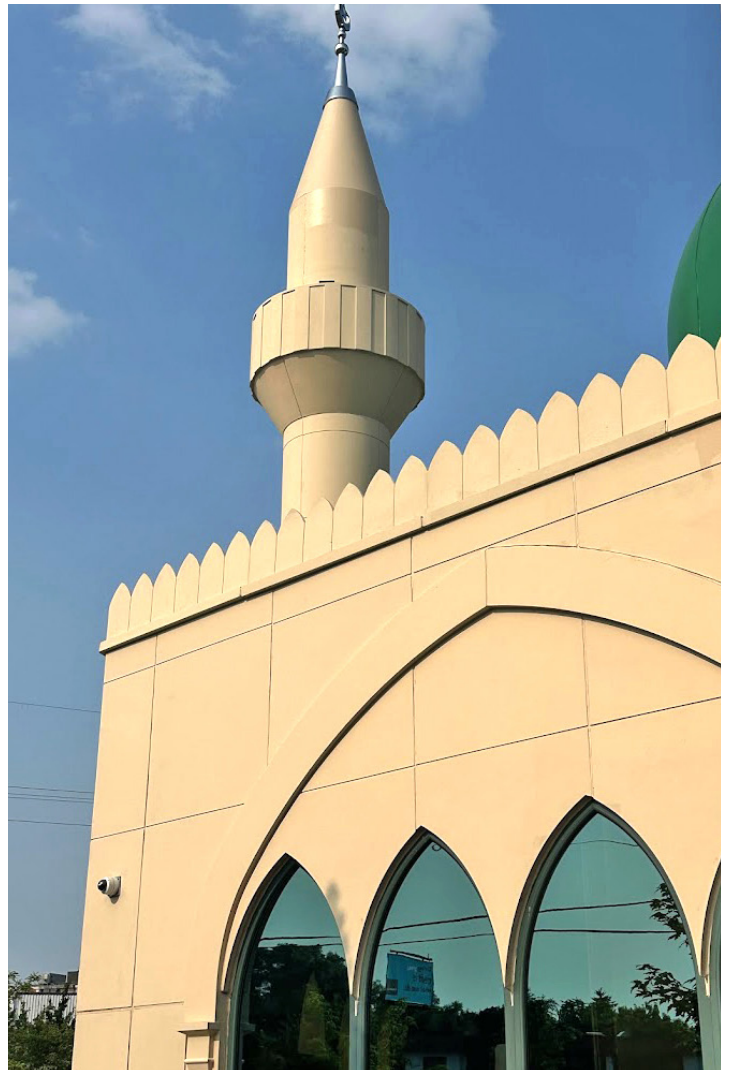
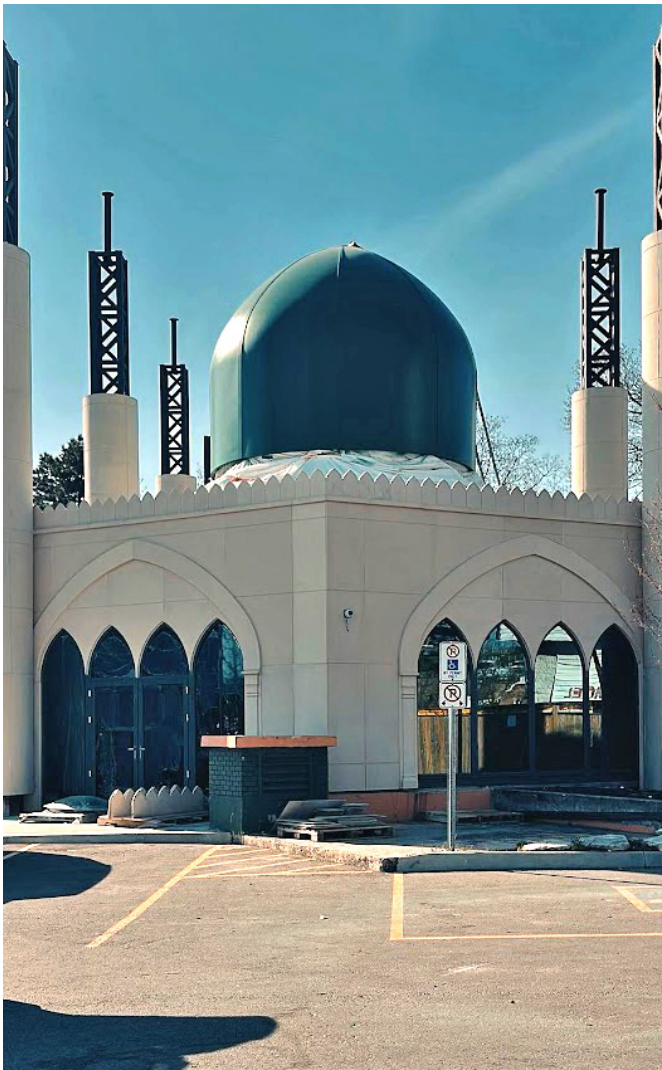
**Browns Bay Canteen**

Thousand Islands Parkway, Ontario





**Kingston road Mosque**  
4 Old Kingston Rd, Ontario





## The Kings way

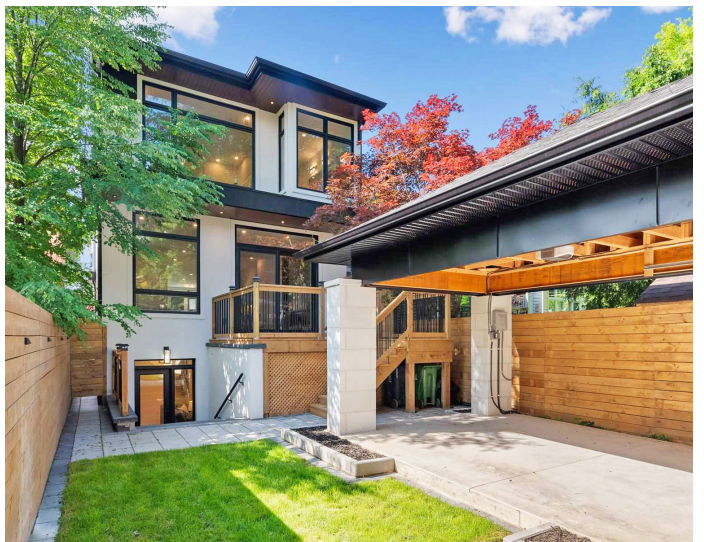
Thousand Islands Parkway, Ontario







**30 Tilson Road**  
Mount Pleasant East, Toronto



### Benches Downtown



# EXECUTION OF UHPC



COASTLINE -1



# EXECUTION OF UHPC

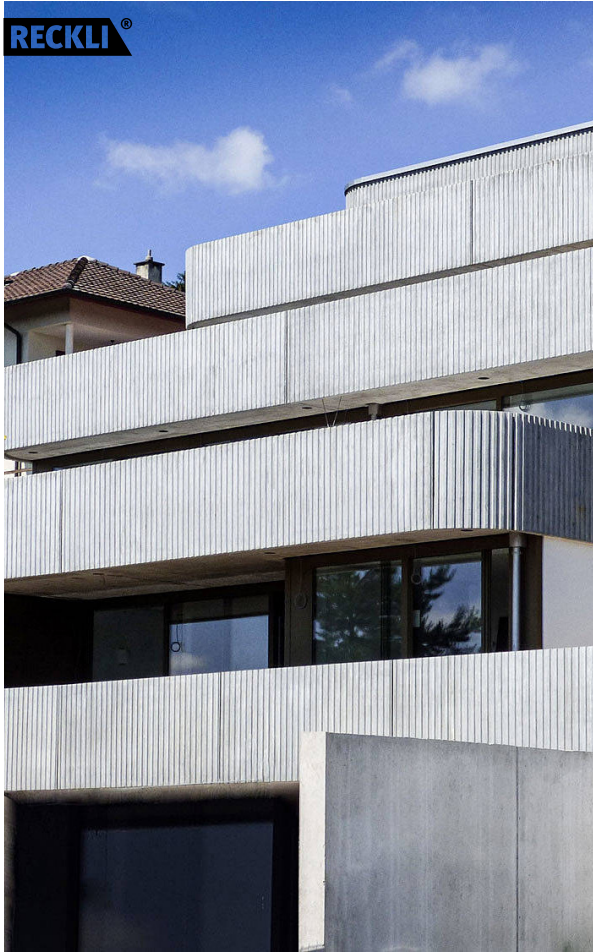
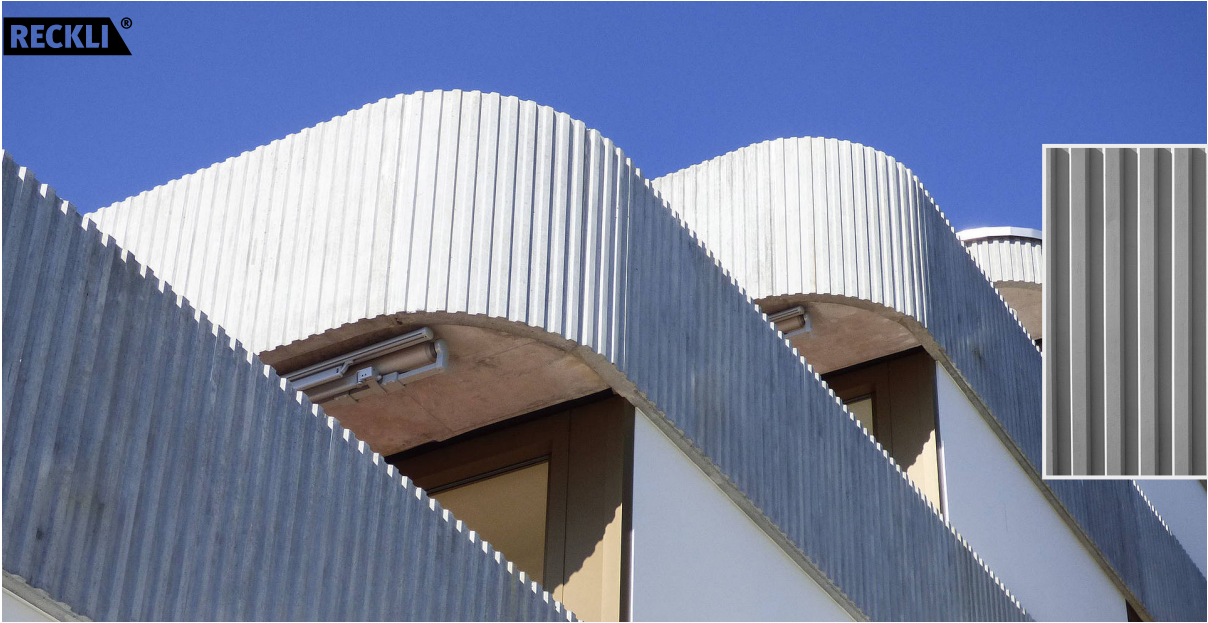


CRINCKLE



RIB SHADOW -2

# EXECUTION OF UHPC



# EXECUTION OF UHPC



