

K R E Y S L E R &

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A S S O C I A T E S

# Architectural Composites since 1982

Kreysler & Associates is primarily a composites fabrication facility. For more than 30 years, our company has worked with firms large and small producing FRP (fiberglass reinforced polymer) products for a variety of industries including construction, environmental graphics, theater, entertainment, and fine arts.

We have a respected reputation for our broad range of project experience and capabilities, along with our traditionally high standards for quality, innovation, customer service and teamwork. We believe this is why our repeat customer base is so high. Kreysler & Associates does not typically do installation however, we do frequently train and/or supervise contractors in the installation of our products.

In addition to our traditional fabrication techniques Kreysler & Associates has pioneered the art of Digital Fabrication, Engineering and 3-D Digital Scanning. This capability allows our company to offer some of the most complete fabrication services available involving complex shapes defined by scale models or complex 3D-CAD data.

We hope you will consider our company should a project come along that would require our specialized services.

Founded in 1982 after 10 years of building high performance racing sailboats, K&A brought the materials, technology and craftsmanship of boat building to the construction industry.

*"We maintain our commitment to quality by utilizing the latest technology while respecting the important role craftsmanship plays in the digital age."*

-Bill Kreysler



## SF MOMA | 2015

Inspired by the rippling water of the San Francisco waterfront, the undulating exterior wall created for the expansion of the San Francisco Museum of Modern Art represents a quantum leap for architectural composites—demonstrating the extraordinary design potential for custom cladding and bespoke finishes. Kreysler & Associates fabricated approximately 1,400 panels using Fireshield 285, a material and panel system developed by Kreysler & Associates to meet the National Fire Protection Association's 285 standard. Meeting that stringent standard made it possible to use the unconventional cladding panel system on a large scale.

Designed by New York and Oslo-based Snohetta Architecture in collaboration with San Francisco's EHDD, the 235,000 square foot project features a wall of white panels curved to emulate the fluidity of San Francisco Bay. Each panel is unique and measures up to 5.5' wide and 30' high and weighing up to 825 pounds—light enough to fasten to a wall system without an intermediate frame, thereby saving tons of steel. Sand from the Monterey Bay is a key ingredient of the unique composite, lending texture and creating another connection to the surrounding natural landscape.

**Fabricator:**

Kreysler & Associates

**Architect:**

Snohetta

**Associate Architect:**

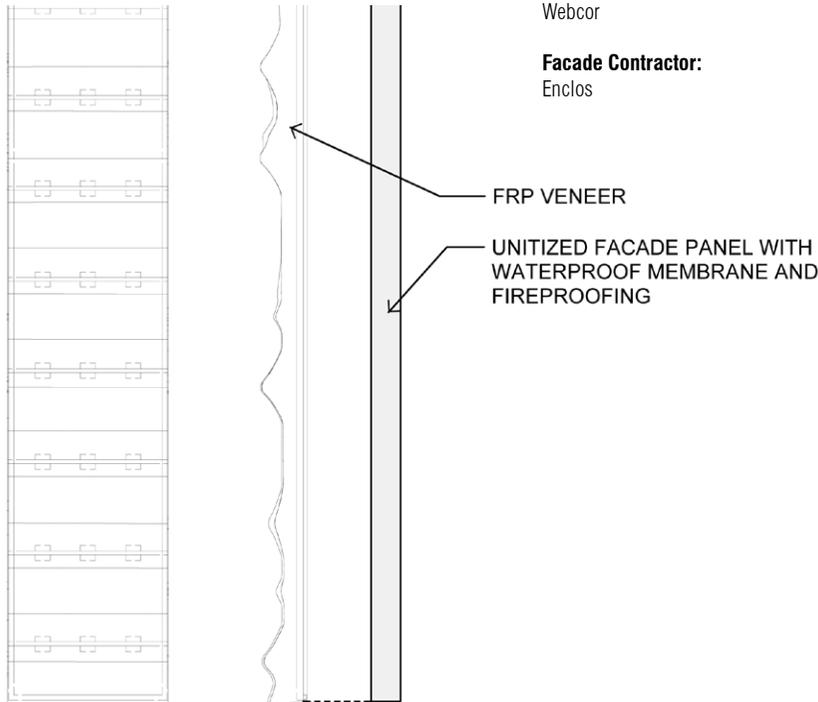
EHDD

**General Contractor:**

Webcor

**Facade Contractor:**

Enclos





SFMOMA



## CALIFORNIA BAY HOUSE | 2007

The California Bay House represents the future in construction where high-strength envelopes support themselves. There are no “bones” in this two story house, just the skin which consists of an FRP composite sandwich shell, anchored to a concrete slab.

Taking less than three days to assemble on site, Bay House’s two story main building arrived in nine custom molded panels with perfectly mating flanges designed to distribute loads throughout the skin. Although unique in construction, monocoque structures like this have proved themselves thousands of times in marine, aerospace and transportation systems.

Recyclable EPS (expanded polystyrene) foam molds and environmentally responsible composite materials made the project not only unique, but efficient. Nine panels comprise the shell, which is a self-supported monocoque structure without internal columns or structural walls.



### Fabricator:

Kreysler & Associates

### Composite Building Engineering:

Juri Komendant PhD S.E.  
Kurt Jordan M.E. P.E.

### General Contractor:

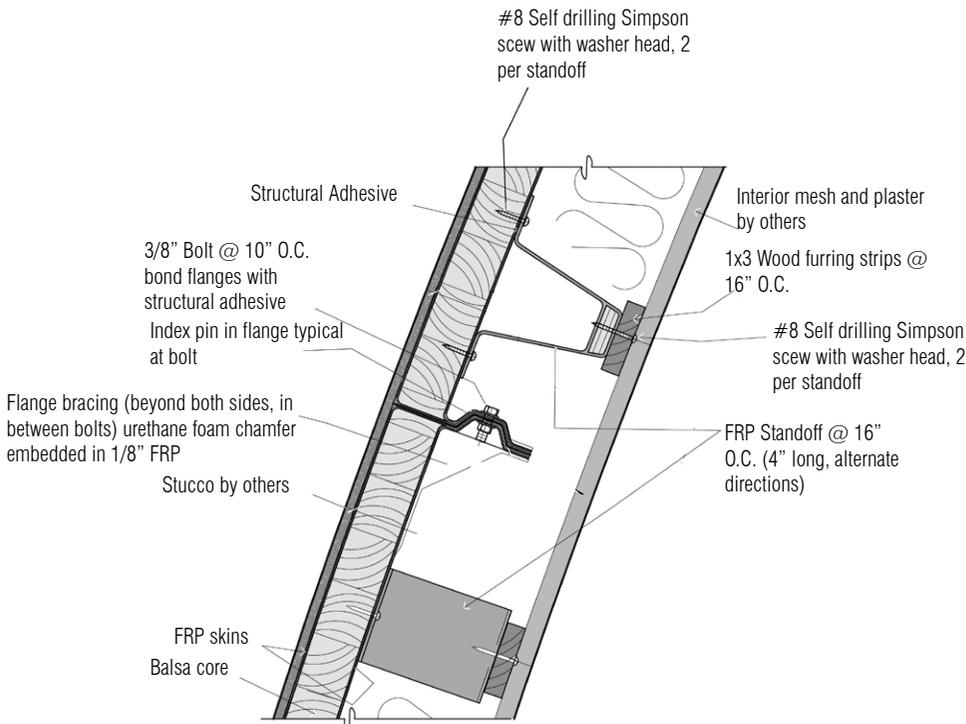
Thompson Brooks

### Designer & Client:

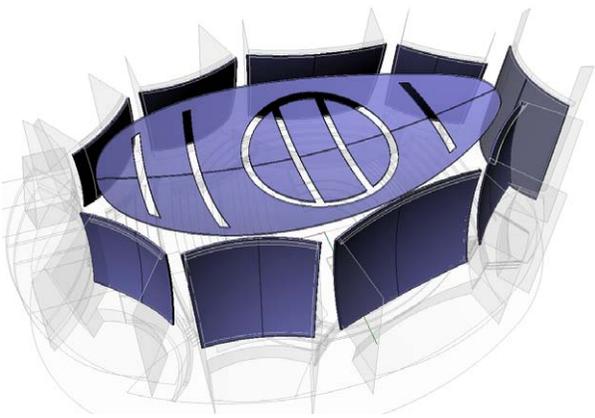
Miranda Leonard

### Architect:

Walker & Moody Architects







## BING CONCERT HALL | 2012

This new concert hall is located at Stanford University. K&A fabricated the primary interior acoustic surfaces. The nine wall panels (aka "Sails") range in size from approximately 26' x 26' to 35' x 50'. The Ceiling (aka "Cloud") is roughly elliptical with a maximum length of 130'. All of the surfaces are compound curving shapes, and the cloud has a complex sinusoidal surface articulation.

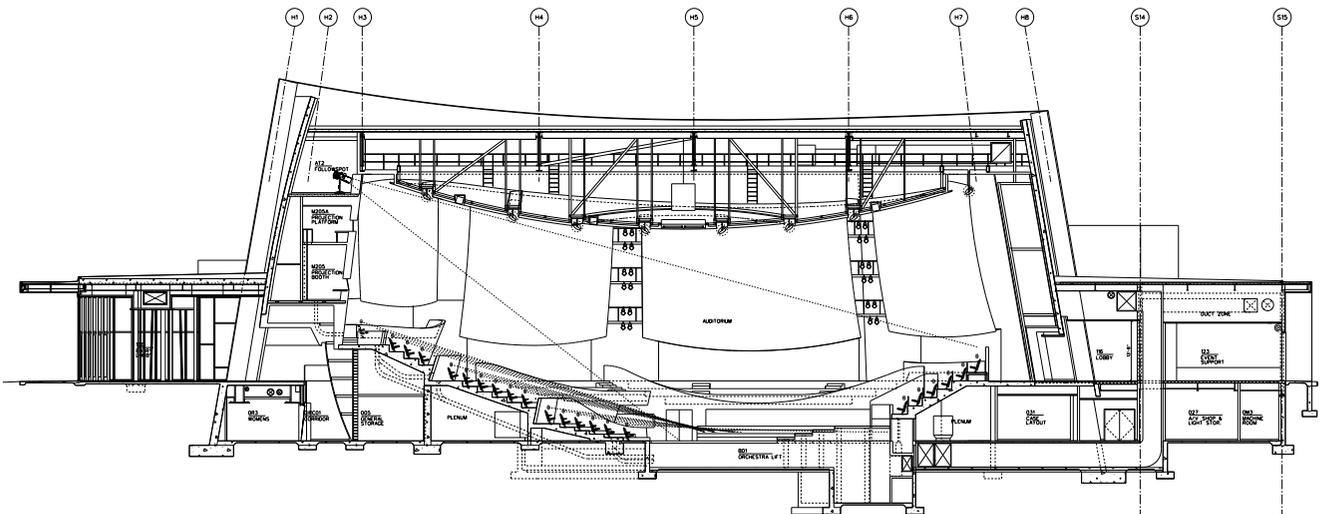
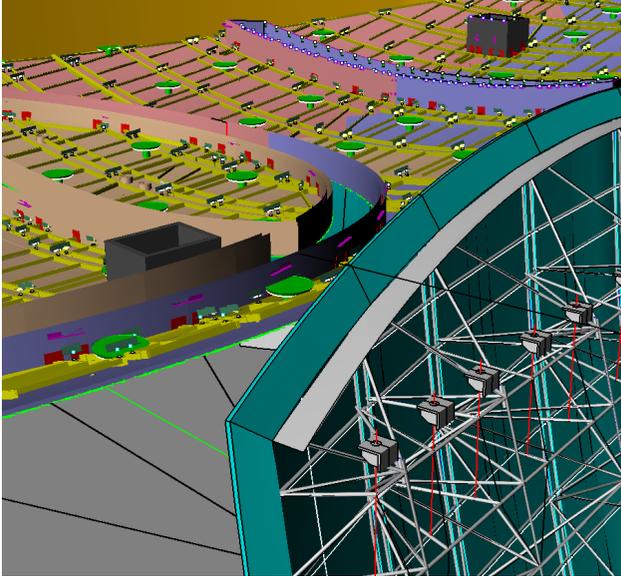
**Fabricator:**  
Kreysler & Associates

**Architect:**  
Ennead Architects LLP

**General Contractor:**  
Turner Construction

**Acoustician:**  
Nagata Acoustic, Inc.

**Structural Engineer:**  
Degenkolb Engineers







## SAN FRANCISCO FERRY BUILDING | 2011

The San Francisco Ferry Building needed restoration. Kreysler & Associates was asked to fabricate fiberglass arches to replace the crumbling brick ones on the main floor as well as the clerestory. Weight was a main concern, making the lightweight fiberglass an ideal alternative to brick.

All historic replica elements were fabricated from molds made off of full scale patterns using wood, foam and plaster. Parts are all FRP with fire retardant unsaturated polyester resin and E-Glass reinforcement. Panels have imbedded steel anchors and connections. A finish was designed to match existing brick.

**Fabricator:**

Kreysler & Associates

**Client:**

Port of San Francisco

**Contractor:**

Plant Construction Company

**Architect:**

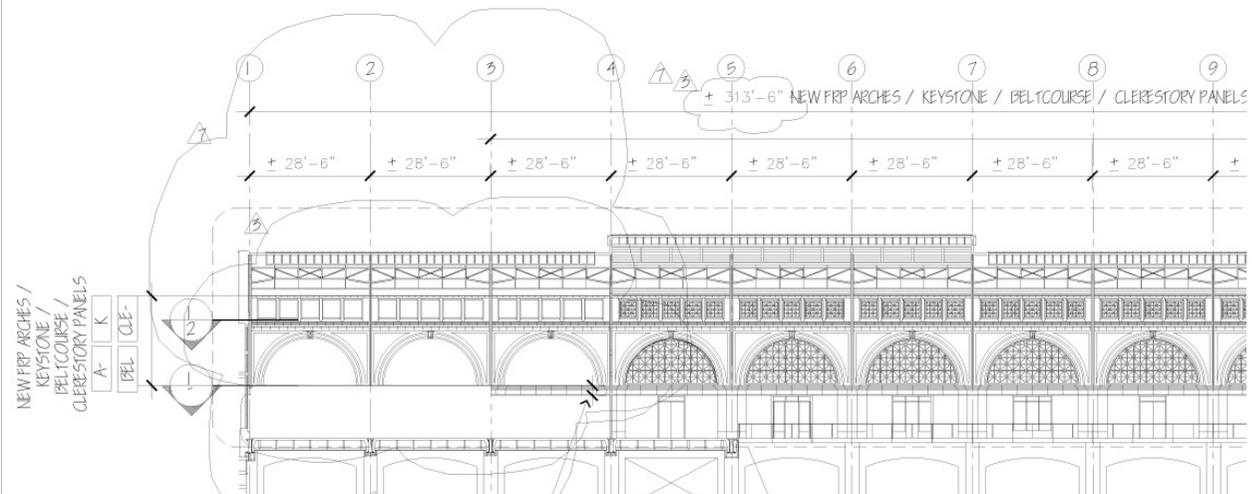
SMWM

**Historic Architect:**

Page and Turnbull

**Finish:**

Jacque Giuffre







## BLOOM LANTERN | 2008

The digitally fabricated shape of this translucent FRP lantern started as a MAYA file from the design office of Greg Lynn Form.

3D data was imported into Rhino software, where the design was refined for fabrication. G-Code was generated with Delcam's PowerMill CAM program, and male EPS foam molds were milled on our large CNC gantry mill.

The translucency of this FRP product was complicated by the need to meet Class 1 fire resistance. K&A developed a unique and proprietary formulation to attain this goal.

### Fabricator:

Kreysler & Associates

### Designer Consultants:

Greg Lynn Form

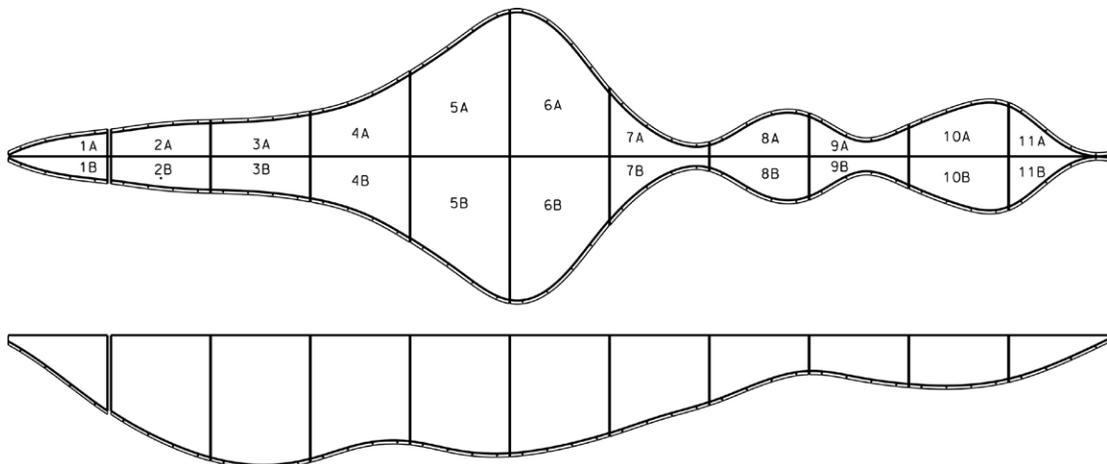
### Clients:

Jason and Jackilin Bloom



Greg Lynn , Principal, Greg Lynn FORM:

*"Kreysler & Associates was able to deliver a very complex composite solution to a task that had never been attempted: Build a translucent, illuminated ceiling that passed L.A. County smoke and fire requirements. Through prototypes, material testing, their position at the center of the composites industry and Bill's personal expertise, K&A was able to make the first glowing composite surface that passed our stringent flame spread and smoke emissions requirements. In addition, K&A is always meeting both time and budget commitments. They combine precision and the ability to match a designer's artistic expression with affordability and an understanding of building construction practices."*







## ILLUMINATION 1 | 2006

This sculpture was created by the blending of photos into a 3-D form by photographer/sculptor Michael Somoroff.

The sculpture needed to be disassembled, shipped and re-assembled multiple times, the first destination being a special exhibition at the Rothko Chapel in Houston Texas.

An innovative system of post tensioning cables, sophisticated digital fabrication and composite craftsmanship, combined with the renaissance finish of *marmalino* created this unique and complex form.

The inherent strength and lightweight nature of fiberglass was the key to successful travel and installations.



### Fabricator:

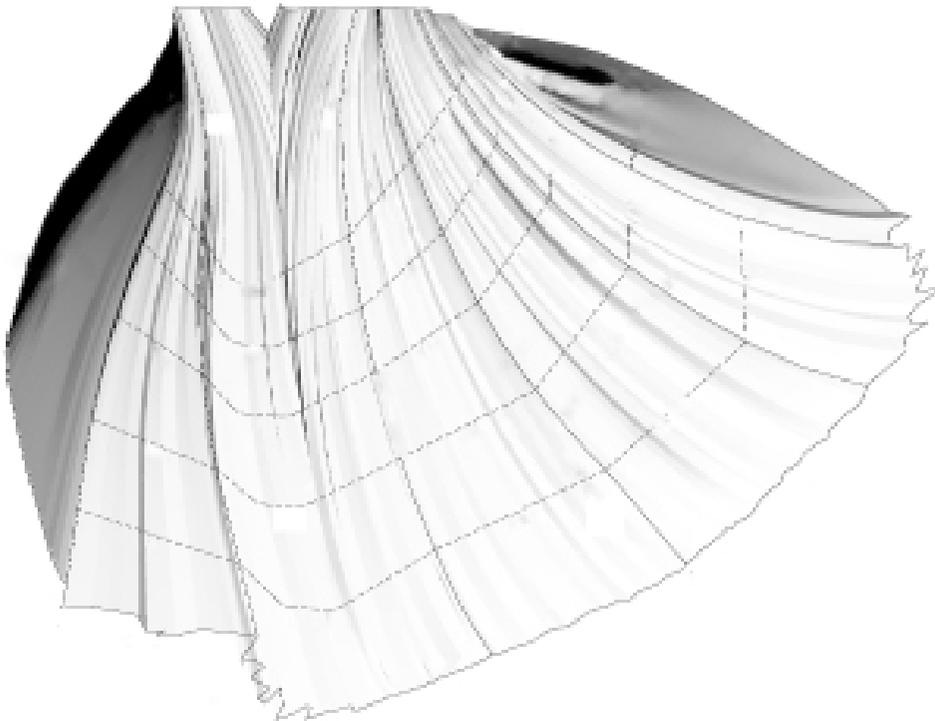
Kreysler & Associates

### Artist:

Michael Somoroff

### Marmalino Finish:

Stephen Torton







## LOUISE M. DAVIES SYMPHONY HALL | 1992

The Louise M. Davies Symphony Hall in San Francisco required 40 lb/ft<sup>2</sup> wall panels which were the key elements in a major acoustic renovation. Designed by Skidmore, Owings & Merrill, the panels were mounted onto massive steel trusses, to “close in” the space around the orchestra and direct the sound to the audience and musicians.

No two of the 88 panels are the same shape, and some weigh as much as 8,500 lbs. K&A solved a significant installation problem by making the panels hollow and light enough to lift inside the building, then filling them with sand after installation.

**Fabricator:**

Kreysler & Associates

**Engineer:**

Juri Komendant

**Architects:**

SOM

**General Contractor:**

Dinwiddie Construction

**Acoustician:**

Lawrence Kierkegaard

**Project Management:**

Steuart Donnell Assoc.



David Larson, Skidmore, Owings & Merrill:

*“Their contribution during the design and construction of the new Davies Hall was invaluable and a major factor in its success.”*

John D Kieser, Director of Operations, Davies Symphony Hall San Francisco:

*“Mr. Kreysler and his company far surpassed our expectations in terms of the quality of the craftsmanship and effectiveness of the product ... accuracy was of pivotal importance.”*





## MINORITY REPORT | 2001

Set Design for 20th Century Fox's 2002 science fiction movie *Minority Report* included these textured CNC milled wall panels which made up the "Precog Chamber".

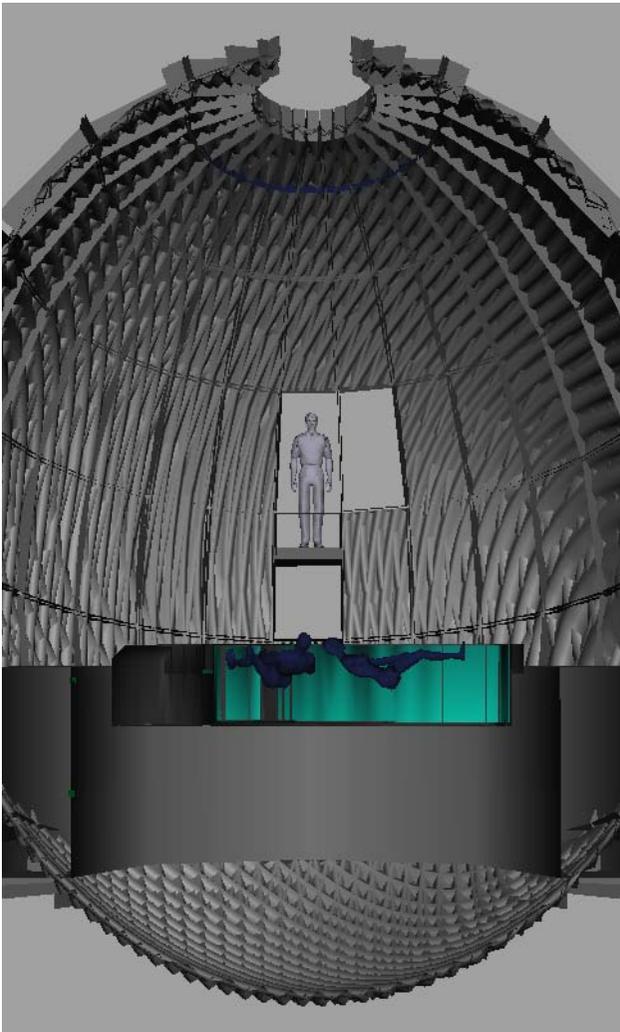
The MAYA-generated pattern of interplaying ripples on the surface of this elliptically shaped space was designed by production designer Alex McDowell.

The 3-D data was then emailed to K&A where the shape was segmented, the support structure designed, and the panels and support frame fabricated on a multi axis CNC router. This was K&A's first all electronic project done entirely without paper except for the purchase order from the client.

**Fabricator:**  
Kreysler & Associates

**Designer:**  
Alex McDowell

**Client:**  
20th Century Fox



Alex McDowell, Production Designer, *Minority Report*:  
*"For Minority Report we attempted for the first time in film to create a complex set directly from a computer-based design. Kreysler was our first choice to translate the computer design data into CNC cut full-scale panels that made up the full surface of our set. Not only did they help us through each step of this complex process, they delivered a package of beautifully manufactured and detailed parts, organized for easy assembly, on time and at a better price than any alternative. I would not hesitate to work with them again."*





Photo: Jessica Stockholder

## UCSF MEDICAL CENTER AT MISSION BAY | 2015

Jessica Stockholder's art installation at the UCSF Benioff Children's Hospital in San Francisco is called "Like Water if Pond as Lily", and is comprised of six pieces. These sculptures can be found in the hospital's lobby, entrance and plaza. K&A fabricated two exterior composite sculptures, one large interior composite sculpture, and one composite frieze.

**Fabricator:**

Kreysler & Associates

**Client:**

UCSF Medical Center at Mission Bay

**Artist:**

Jessica Stockholder

**General Contractor:**

DPR Construction

**Construction Manager:**

Cambridge CM/UCSF Medical Center at Mission Bay

**Art Advisor:**

Lynne Baer + Art Projects

**Installation:**

Four Star Erectors



Photo: Jessica Stockholder



Photo: Jessica Stockholder



## JAMES T. FLOOD BUILDING | 1994

The James T. Flood Building restoration in San Francisco required replicas be made of arches, balustrades, and balconies since replacement using the original sandstone, demolished in the 1950's, would be too heavy to meet current code.

The award winning project allowed the existing structural steel to remain unaltered due to the light weight composite additions which perfectly matched the original stone shapes and texture.

**Fabricator:**  
Kreysler & Associates

**Client:**  
James Flood Partners

**Contractor:**  
Plant Construction Company

**Architect:**  
HOK Architects

**Engineer:**  
Weiss Janny Elsner



James C. Flood, Owner:

*"Your entire company went all out and the renovation of the Flood building exceeds my wildest imagination. I think the single-most important contribution was your personal dedication to excellence. I hope you are as proud of the job as we are."*

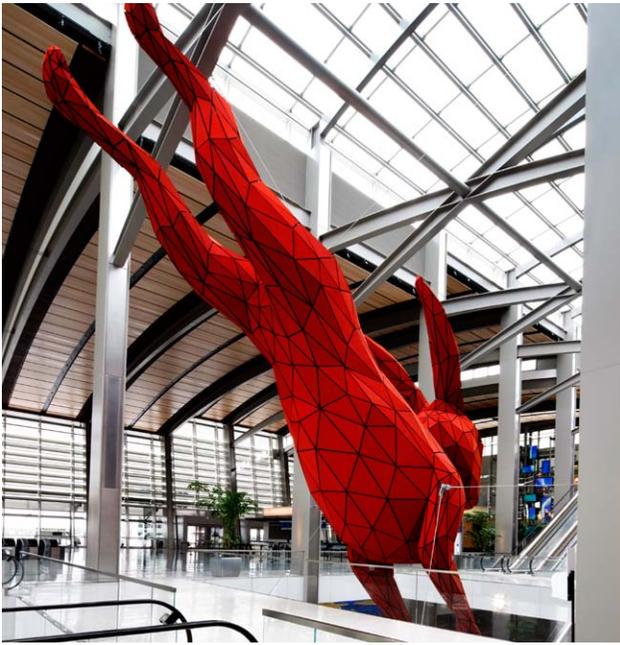


WOOLWORTH  
WOOLWORTH

URBAN  
OUTFITTERS

Urban  
Outfitters

DO NOT  
ENTER



## “LEAP” RED RABBIT | 2011

Sculptor Lawrence Argent designed “Leap”, an all aluminum 56’ red rabbit for the Sacramento International Airport. Installed in the baggage claim area of a new terminal, it is the centerpiece of several new art exhibits in the airport.

Suspended by 7 cables, it appears to be leaping through the atrium space into a vortical suitcase on the ground below.

K&A designed the fabrication method, engineered the structure, and fabricated, assembled and installed the aluminum panels of the rabbit according to a 3D model provided by the artist.

### **Fabricator:**

Kreysler & Associates

### **Artist & Client:**

Lawrence Argent

### **General Contractor:**

Austin-Walsh Construction Joint Venture

### **Art Administrator:**

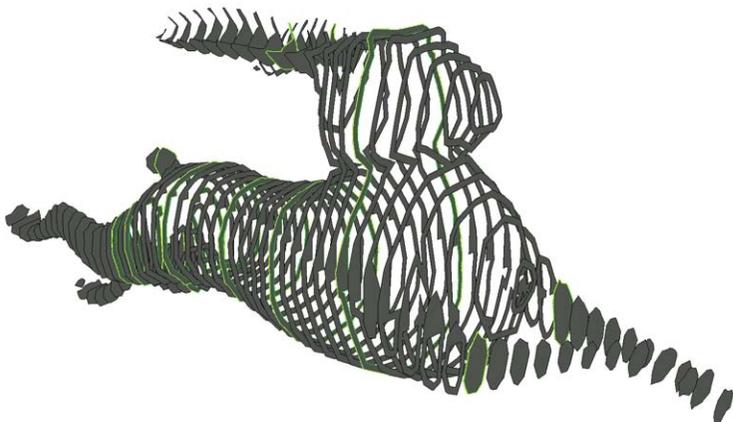
Sacramento Metropolitan Arts Commission

### **Rigging:**

Four Star Erectors, Inc.

### **Airport Engineer:**

LA Fuess Partners, Inc. Structural Engineers





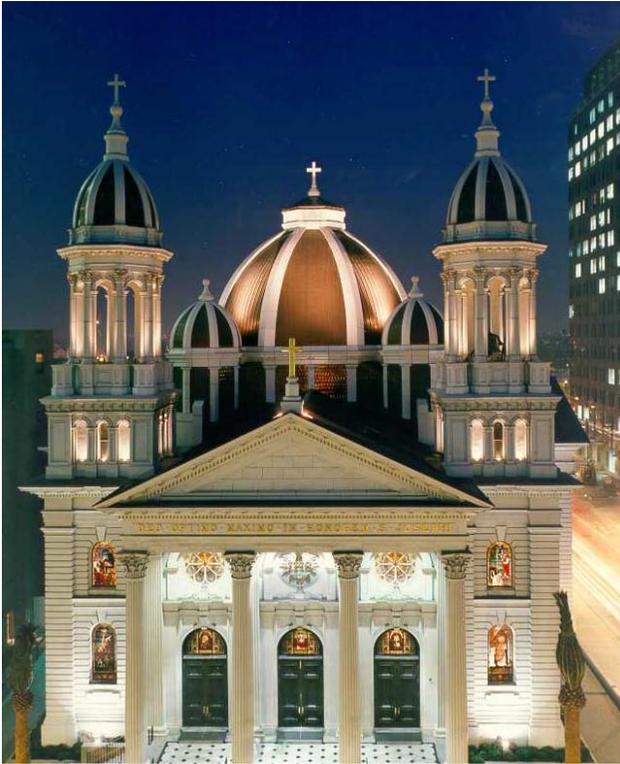


## ST. JOSEPH'S CATHEDRAL | 1983

San Jose California's St. Joseph's Cathedral is number one on the list of historic buildings in California. Built in the 1860's this wood structure badly needed structural repair and restoration. The dome had to be light to avoid overloading the wood trusses.

K&A utilized high-performance boat-building techniques to fabricate all the ornamental ribs, cornices, and cupola structure out of FRP. Although the restoration is 25 years old now, the FRP remains beautiful and clean.

St. Joseph's is one of the hundreds of examples of the long term durability of architectural FRP throughout the world.



**Fabricator:**

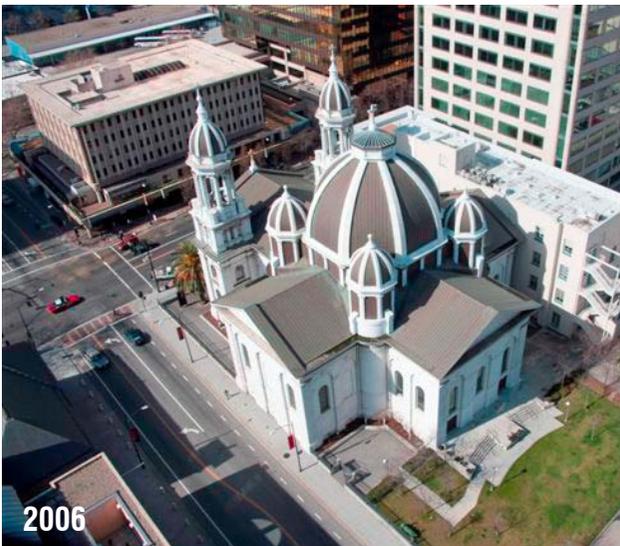
Kreysler & Associates

**General Contractor:**

TBI Dinwiddie Joint Venture

**Engineering:**

Juri Komendant



Tony Mirenda, CEO of TBI Construction

*"The durability and beauty of your product over 20 years is remarkable. Every time it rains, it cleans the product to where it looks as if it is brand new. I was equally impressed by the ease of handling and installing the product given the warped 100 year old shape of the structure. And the strength of the product was superior to any precast options we explored."*





## CLAES OLDENBURG AND COOSJE VAN BRUGGEN WORKS

Right:

### **INVERTED COLLAR & NECKTIE** | 1994

Steel, polymer concrete, FRP; painted with polyester gelcoat.  
39' x 27' 9" x 12' 8"

**Fabricator:**

Kreysler & Associates

**Location:**

Deutsche Zentral-Genossenschaftsbank, Platz der Republik,  
Frankfurt-am-Main, Germany

**Commissioned By:**

The Deutsche Genossenschafts Bank



Left; Top:

### **CUPID'S SPAN** | 2002

**Fabricator:**

Kreysler & Associates

**Location:**

Rincon Park, San Francisco, CA

Left; Middle:

### **HOUSE BALL** | 1996

Stainless steel, FRP, jute netting, polyurethane and polyvinyl chloride.  
foams; painted with polyester gelcoat  
27' 6" high x 24' x 4" diameter



**Fabricator:**

Kreysler & Associates

**Location:**

Bethlehemkirch-Platz, Mauerstrasse, Berlin

**Commissioned By:**

Ronald S. Lauder

Left; Bottom:

### **SAW, SAWING** | 1996

**Fabricator:**

Kreysler & Associates

**Location:**

Tokyo, Japan





## FLYING PINS | 2000

Flying Pins is one of 15 large scale projects fabricated by Kreysler & Associates for the artists Claes Oldenburg and Coosje van Bruggen.

Located in the city of Eindhoven in the Netherlands, "Flying Pins" is an example of K&A's innovative use of composite materials and the creative engineering solutions of Serge Labesque, K&A's fabrication director. The pins seem to fly through the air but actually employ an innovative steel structure with slip-together invisible connections.

**Fabricator:**

Kreysler & Associates

**Artist:**

Claes Oldenburg  
Coosje van Bruggen

**Location:**

Eindhoven, Netherlands







## DROPPED CONE | 2001

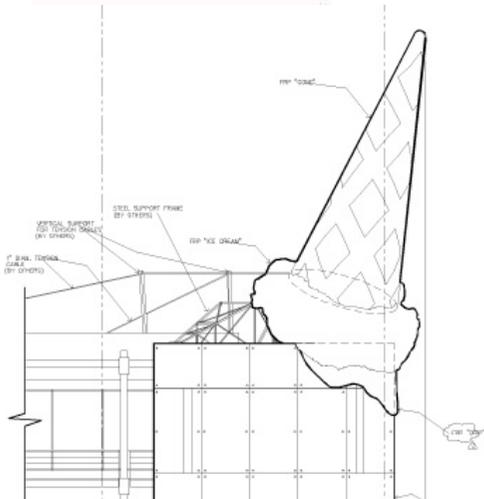
Stainless and galvanized steel, FRP, balsa wood, polyester gelcoat.  
 39' 10" high x 19' diameter  
 height above building: 32' 10"

**Fabricator:**  
 Kreysler & Associates

**Artist:**  
 Claes Oldenburg  
 Coosje van Bruggen

**Location:**  
 Cologne, Germany

**Commissioned By:**  
 Neumarkt Galerie







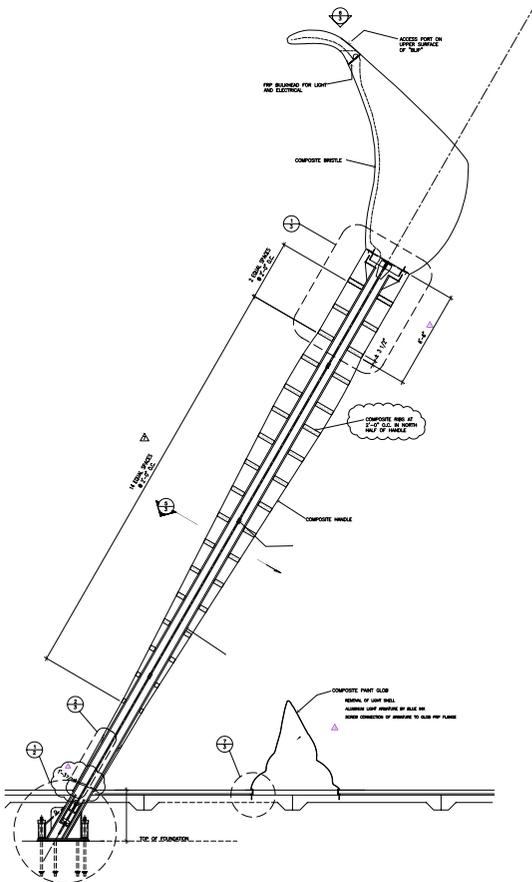
## PAINT TORCH | 2011

Steel, FRP, gelcoat, polyurethane, and LED lighting.  
51' tall slants toward Broad Street at a 60 degree angle.

**Fabricator:**  
Kreysler & Associates

**Artist:**  
Claes Oldenburg

**Location:**  
Lenfest Plaza,  
Pennsylvania Academy of Fine Arts  
Philladelphia, PA





PNF

NO STOPPING ANY TIME

NO STOPPING 1AM-12AM

LOADING ONLY

Photo (c) 2011 Attilio Maranzano



## HELIOSCOPE | 2007

Helioscope, designed by architect & professor Evan Douglass, began as a 3-D CAD model. This was used to CNC machine a pattern to create an FRP mold. This reusable mold then formed the final sculpture. Douglass finished the surface and showed it in multiple locations before it came to rest at the FRAC Center in Orleans, France.

### Description:

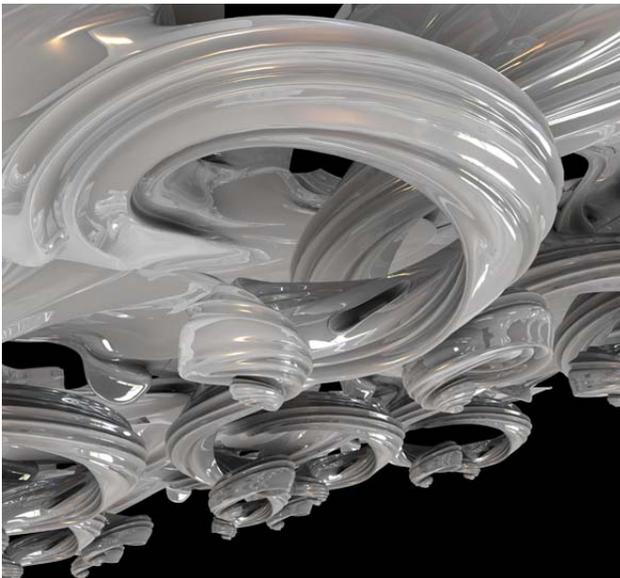
Unsaturated polyester resin and E-Glass fiber reinforcement. The sculpture is monocoque with no internal secondary structure and is engineered to fasten to a plywood template secured to the ceiling through minimally visible connections.

### Fabricator:

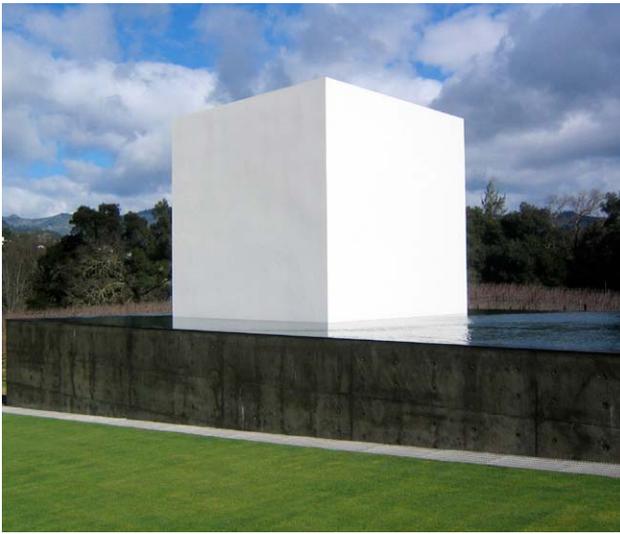
Kreysler & Associates

### Artist:

Evan Douglass







## SKYSPACE | 2013

K&A designed a fabrication method and manufactured an all composite cube with artist specified optical opening in ceiling. The cube also accommodates entry through an opening in the bottom which is submerged in a pool.

The Skyspace is made with unsaturated polyester resin and E-glass fiber reinforced FRP flat panels fabricated using vacuum infusion and double thickness of 3/4" thick plywood core to create walls and roof, including tapered square oculus opening. The finish is post applied polymer concrete, sandblasted after cure. The shell acts as a monocoque and the structure is integral to the FRP walls. Interior space accommodates seating and mechanical equipment (by others). The piece is engineered to fasten to a plywood template secured to the ceiling through minimally visible connections.

### **Fabricator:**

Kreysler & Associates

### **Architect:**

Jim Jennings Architects

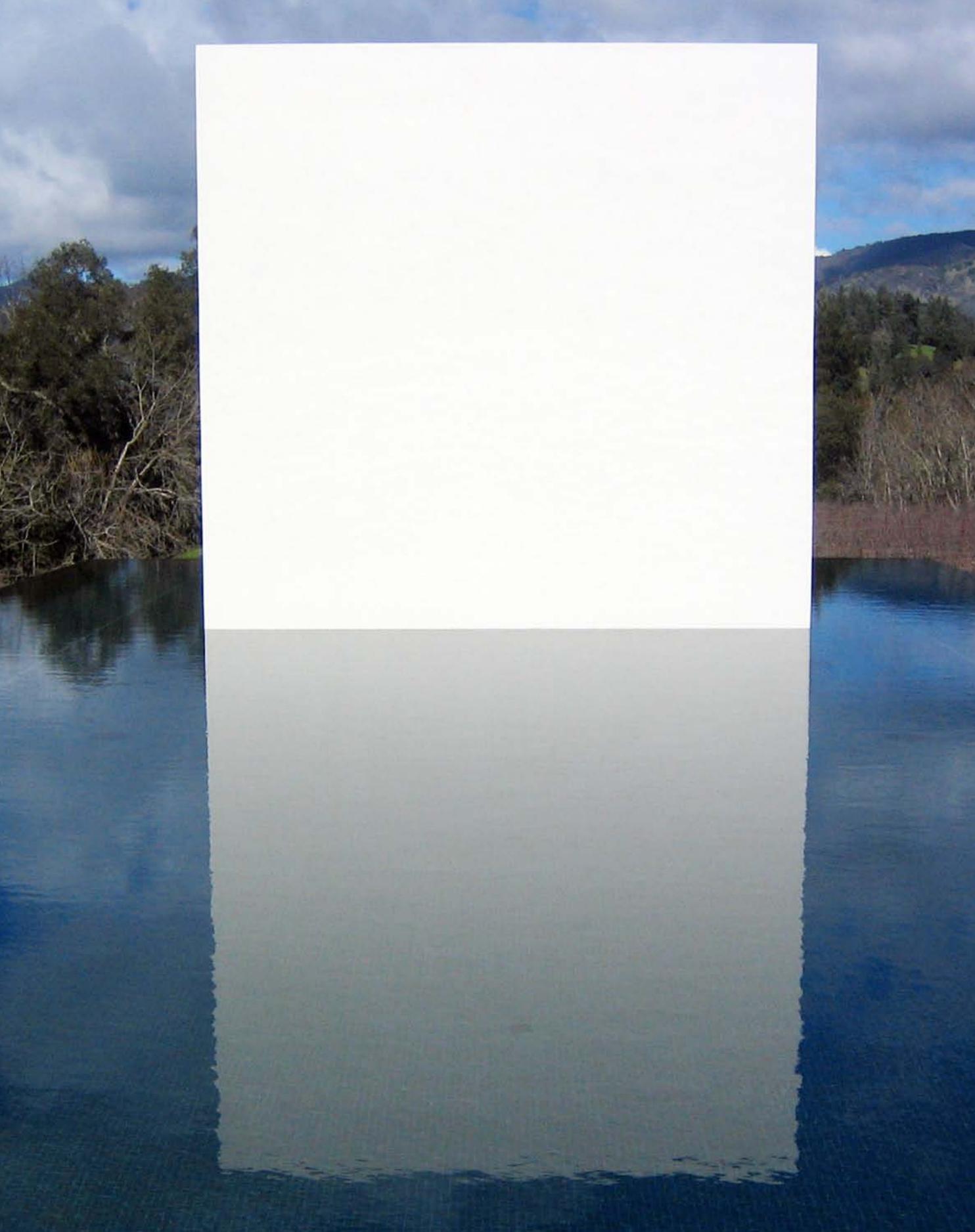
### **Artist:**

James Turrell

### **Client:**

Private Residence







## **RODEO DRIVE DOME**

K&A designed a fabrication method, engineered and manufactured a prefabricated FRP dome with exterior Venetian glass tile bonded to its surface. The final piece was transported to the client site with minimal on-site time and labor.

The FRP dome was fabricated by pendulum carving a foam segment mold, fabricating multiple FRP segments and assembling into two, quarter spheres with internal facing assembly flanges to allow for transportation and simple on-site assembly. Segments were transported to the artist's studio for application of Venetian glass tile and then to the jobsite.

**Fabricator:**

Kreysler & Associates

**Contractor:**

Jones Brothers Construction

**Artist:**

Peter Veres

**Engineer:**

Juri Komendant

**Client:**

Doug Stitzel and Partners



BVLGARI



## SANTANA ROW

Kreysler & Associates was selected to fabricate elements designed by French artists for Santana Row's 40 acre multi-use development. Artist elements included 12 mosaic tiled FRP pylons, 6 mirrored tiled FRP columns, 2 mosaic tiled shell fountains, and several polymer concrete basins.

**Fabricator:**

Kreysler & Associates

**Contractor:**

Bovis Lend Lease

**Architect:**

William Zemsky

**Artist/Designer:**

Andre' Dumonnet/Christine Foulche'

**Client:**

Federal Realty Investment Trust







# ABOUT KREYSLER & ASSOCIATES

## COMPANY STRUCTURE

Kreysler & Associates, founded in 1981, is a privately held company specializing in the design and fabrication of custom architectural products made of Fiber-Reinforced Polymer (FRP) components.

As a leader in the field of custom and digital fabrication, we specialize in using FRP materials to fabricate complex contemporary architectural shapes, realize large-scale sculptural forms, and restore, replicate, or reinforce existing historic buildings. We have worked with leading architects, designers, contractors, and developers on numerous projects. We are equipped and staffed to meet the rigorous challenge of satisfying many different buyers with varying technical, logistical and administrative requirements.

Nearly all of our products become parts on a construction project. They must be on time, they must fit and they must meet stringent quality and building code standards. In doing business for over 30 years, K&A has never had a lost time or warranty claim. With the exception where building designs have been changed, every K&A product that has been built and installed is still in service.

## GUIDING PRINCIPLES

K&A's workforce consists of 30-35 full time employees, most of whom are certified composite technicians (CCT) by the ACMA (American Composites Manufacturers Association). Our turnover is extremely low- evidence of our commitment to a positive and supportive working environment.

K&A's customers will speak to our high standards of quality and excellence. Our letters of recommendation will illustrate the satisfaction our customers experience when dealing with us.

We are committed to being leaders in our industry with respect to using efficient, environmentally sensitive manufacturing means and methods. FRP Composite products, because of their high performance to material volume ratio frequently out perform conventional materials in comparative life cycle assessments.



## RESOURCES

K&A maintains a 5-acre manufacturing facility in American Canyon (Napa County), CA. Our facility meets all state, local and federal requirements for the manufacture of FRP products, including the requirements of the Bay Area Air Quality Management District and EPA clean air regulations permits.

## QUALITY

K&A products meet rigorous in-house standards as well as industry standard architectural and engineering specifications. We have a proven track record of meeting historic building standards and carefully coordinate our work with surrounding work.

## SUSTAINABILITY

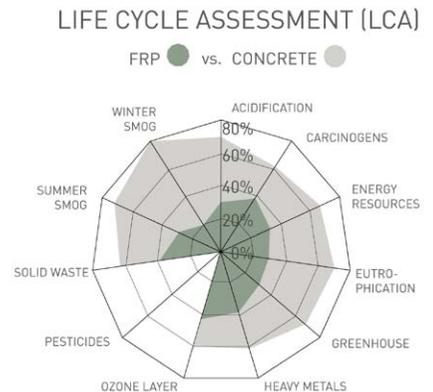
K&A is committed to pursuing opportunities to do business in ways that balance desirable economic outcomes with neutral or positive environmental and social consequences. We are engaged in research to develop advanced manufacturing processes that utilize recycled and renewable materials. We have developed and are utilizing a manufacturing process that nearly eliminates emissions of volatile organic compounds (greenhouse gases). This method is not only good for the environment but also relieves us of meeting emission limits set by the EPA, which govern most other composite manufacturing facilities.

## PRICING

Our customers come to us because of the value we provide. Our unique products are purchased because they represent cost-effective, beautiful and superior value alternatives to other solutions. We are aggressive in keeping our pricing as low as possible and pass savings in material and manufacturing processes along to our customers.

## CNC CAPABILITIES

Our staff is adept in all aspects of CNC milling, from fixing problematic geometry to choosing the best tooling for the client's desired results. Our CNC machines (two 5-axis and one 7-axis robot) are in constant use, at times all on the same project. The largest of our 3 machines is also the largest on the West Coast that is devoted to architecture projects, which enables us to mill very large parts in one pass.



Concrete vs. FRP aquarium tank. K&A client: Monterey Bay Aquarium Marine Institute.  
Data: Stanford University Department of Environmental Engineering.



## DESCRIPTION OF FACILITY

- 3,250 m<sup>2</sup> (35,000 ft<sup>2</sup>) covered fabrication area
- 20,200 m<sup>2</sup> (217,400 ft<sup>2</sup>) total property area
- 3 CNC milling machines
  - 10' x 10' x 4' five-axis
  - 65' x 29' x 9.5' five-axis
  - 10' x 19' diameter seven-axis robot
- CNC Hotwire
- Dual overhead cranes
- Available utilities 3 times current usage
- Metal fabrication shop
- Redundant mission critical machinery, tools and supplies
- 6,000 ft.<sup>2</sup> fabric-covered special projects area
- 5-acre fenced property with easy access to I-80 interstate and Bay Area
- Railroad siding
- 1/2-acre concrete slab outdoor assembly/lay down area
- Easy in and out: Double trailer semi access
- Fully permitted FRP fabrication facility compliant with all Federal, State and local regulations. EPA #CAL000224163 BAAQMD #02004
- OSHA-compliant engineered HVAC system for FRP facilities

## **ABOUT FRP AND THE FABRICATION PROCESSES**

FRP (Fiber Reinforced Polymer) includes hundreds of combinations of fiber, polymer and processes. This versatility is what makes composites unique. On the other hand, it's often difficult to decide what fiber, resin and process is best for a given application. Because FRP is strong, durable, and light-weight it often has advantages over stone, bronze, steel, and other conventional materials. Its ability to be economically molded into complex shapes offers other unique advantages. FRP is the contemporary alternative providing designers with new and unprecedented freedom from material constraints.

### **OPEN MOLDING (MANUAL/HAND LAY-UP):**

FRP laminate is laid up and rolled out on a mold surface manually by fabrication technicians. Additionally, FRP is manually laid on FRP surfaces to join two adjacent pieces of FRP equipment such as pipe ends.

### **OPEN MOLDING (SPRAY/CHOPPER):**

FRP spray gun laminate laid up is similar to manual lay-up but it's done with a glass chopper/resin spraying gun. Glass and resin are sprayed on a large surface area where glass and resin will not be wasted in "over spray" due to smallish molds.

### **VACUUM INFUSION MOLDING:**

Vacuum infusion is a process in which glass is arranged on a mold and then sealed in an air-tight plastic container. The container then has a vacuum introduced to the cavity containing a glass matrix on a mold. This is done using a vacuum pump. The pump is connected to the part with various hoses located at strategic points to induce smooth resin flow throughout the part. When a full vacuum is present, the vacuum pump hose valves are closed and the resin reservoir valves are open. This induces resin flow throughout the glass matrix creating a piece of FRP equipment.



Bing Concert Hall FRP ceiling and wall panels- Stanford University - 2011

## Designing For Composites

Composites are an ideal material for many types of architectural forms. When designed and engineered properly they can offer excellent strength and durability while offering an extremely broad potential design space. As a facade material, they are most advantageous in applications that:

- feature complex geometry, especially compound curvature.
- benefit from being light weight, and
- require a high degree of durability, and repairability.

Fiberglass-reinforced polymers (FRP) perform well on complex architectural facades. They can be formed into virtually any shape with no size limitations. The fiber type and orientation, matrix chemistry, panel thickness, and laminate composition are all routinely engineered to best suit a particular project. With this degree of material customization, FRP can be employed very efficiently and often more cost effectively than alternative facade materials.

Nearly any finish is possible ranging from stone-like, to high gloss, to translucent. Like the other aspects of FRP, the finish is application-specific.

Engineering FRP is best performed using Finite Element Analysis (FEA). This can often show that the geometry of an FRP panel can contribute to its strength and stiffness rather than relying on frequent connection to a substructure or a heavy backup frame to resist loads.

When properly engineered, FRP panels can be extremely light which reduces the demand on a building's primary structure, often reducing its cost. Furthermore, because FRP can be made so strong with so little material, the weight and comparatively small amount of embodied energy makes its environmental impact competitive with - usually better than - other more common materials.

K R E Y S L E R   &  
A S S O C I A T E S

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