Tuscan Cast Stone

Casting Instructions

Product Description

Developed out of our frustration with what was currently available on the market, Tuscan Stoneworx has designed and created our own patented cast stone mix. After going through a strenuous optimization process we can confidently offer you the strongest limestone casting mix on the market. With compressive strengths over 7000psi and flexural strengths over 1600psi Tuscan Cast Stone Mix brings a new level of strength and finish to any cast project.

Because of the incredible strength of Tuscan Cast Stone Mix you can cast it ½" thick with an Expanded-Polystyrene (EPS) foam core as an excellent way to save weight and material. These weight savings allow you to attach standard sized parts with simple masonry adhesive, no need for complicated re-enforcing ties. Tuscan Cast Stone Mix is a great alternative to traditional pre-cast concrete or cut stone, as it provides the natural beauty of cut stone with infinite design capabilities well beyond that of traditional pre-cast concrete products. Tuscan Cast Stone Mix may be manufactured in a virtually limitless number of different profiles & shapes including, but not limited to: fireplace surrounds, mantles & hearths, wall caps, window and door surrounds, sills and headers, crown, base and chair-rail moldings, keystones, corbels, columns and many other architectural profiles or shapes. Depending on the shape and size of the part average length should be 3'-4' long. If a foam core is not being used average thickness should be a minimum of 1".

Tuscan Cast Stone Mix technology is based upon a patent pending process of casting stone with an EPS foam core that contributes to its lightweight properties. Tuscan Cast Stone Mix is derived from an abundant supply of commonly available materials such as Portland white cement, natural aggregates and sands, structural fibers that deliver superior flexural and compressive strengths, and admixtures. Additional resistance to water, oils, paints or other solvents are also possible using Tuscan Sealers.

Manufacturing Process

The basic manufacturing process for Tuscan Cast Stone lightweight architectural cast-stone shapes & profiles can be broken down into four (4) processes. Drafting & Design, Foam Cutting & Mold Assembly, Mixing & Casting, and Stone Finishing & Packaging. Depending on how detailed the profile and shape are, as well as the quantities needed, will dictate which style of mold will be most effective for each individual project. For basic shapes High Density Overlay (HDO) wood molds are the least expensive and provide reasonable durability. Fiberglass is good for standard profiles as well as multiple pours as it is very durable. Rubber is expensive and good for highly detailed parts. Foam is good when producing one time parts, as it allows the detail of fiberglass but is much less expensive. Foam is also good with short lead times, as the less expensive mold cost allows you to create multiple molds of the same part. The drawback to foam is its one time use and inability to produce some finishes and details.

Drafting & Design-Foam Molds

You begin by first designing and drafting a foam mold that meets the design requirements of the customer's desired profile or shape. This is accomplished through the use of an industry standard CAD tool, AutoCAD. Then taking that design and forming a tool-path to insure the foam cutting equipment can cut the components while optimizing the foam yield using a simple CAD-CAM tool, BobWIRE.

Foam Cutting and Mold Assembly

The foam cutting and mold assembly process begins with a review of the shop drawing for the profile or shape to be manufactured to insure all foam mold components are cut to the drawing specification. Foam is then cut utilizing a number of industry standard foam cutters, both CNC and manual cutting processes are employed. Once all of the foam mold components are cut they are ready for assembly. The process of assembly requires a basic knowledge of the overall manufacturing process to visualize how the mold is to be assembled. Molds are assembled with hot glue and the face that is to be the finished stone portion of the product is treated with Tuscan Foam Mold Release agent for easy removal in the finishing process.

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Traditional Molds- Wood, Fiberglass, Rubber

Creating simple traditional molds out of HDO wood is done with basic carpentry tools, a table saw to cut and a finish nailer to attach. HDO is good for molds without detail, like wall caps, pier caps, and banding. Caulk is usually used any where there is a return in order to have a clean edge. HDO molds average 10-30 pulls depending on type of finish before needing to be replaced. Because of the complexity and training required to create fiberglass or rubber molds they are best left to experienced mold shops.

Mixing and Casting

If manufacturing high quantities of cast parts production can be dramatically increased with the use of a large mixer, hopper and delivery pump. A 6 gallon bucket, mixing drill and paddle can be utilized for single bag mixes. Combine 11.5lbs of water for each bag of Tuscan Cast Stone Mix along with desired Tuscan Tint Cast Color and mix gently. After mixing color and water add full bag or bags of Tuscan Cast Stone Mix to water/tint mixture and mix for approximately 3 minutes. It is important to mix for three minutes as this ensures proper dispersion of all mix components. Please contact Tuscan Stoneworx for more information regarding your personal specifications. Depending on heat and humidity the water can be adjusted +/- .4lbs. Keep in mind that changing water amounts, even in this small an increment will change your color. *To keep your color consistent it is critical you use the same amount of water, every single time, from start to finish on a job.*

Mix can be transferred into mold by pumping or pouring. For many parts vibration may be necessary to release any entrapped air. Vibration is introduced to the mold during the initial pour or while installing foam core. Fill mold until it is approximately half full, press pre-cut foam core into back of mold ensuring that there is a ½ " of material between mold face and foam core. Attach cross brace to mold using screws or clamps, this will keep the foam core in the proper place. Fill all remaining voids in back of part with mix and trowel smooth.

Creating the two-tone Travertine look requires a different casting process. Instead of pouring a slurry into the mold, Travertine requires a hand-packing process. Using two mixing buckets mix a different color in each bucket with 10.8 pounds of water, for more texture use less water, for less texture use more water. After a play dough consistency is reached combine both colors into 1 bucket, 1 handful at a time, and mix slightly with drill and mixing paddle. The more you blend the two colors together the less variation you will have between colors. Hand press mix into mold, the harder you press the less texture you will have. After packing face of mold wait 20-30 minutes for it to harden. Add water to left over mix to make it a pourable consistency. Fill mold until it is approximately half full, press pre-cut foam core into back of mold ensuring that there is a ½ " of material between mold face and foam core. Attach cross brace to mold using screws or clamps. Fill all remaining voids in back of part with mix and trowel smooth. Do not vibrate mold. Wait 24 hours before pulling from mold.

If space is a problem you can use vertical foam molds, vertical molds allow you to cast more parts in less space. The problem with vertical foam molds is they have more bug holes than traditional face down molds due to the air bubbles having to travel further. To cast vertically secure molds in a casting box to evenly distribute the hydraulic load across the entire mold body. The casting boxes are filled with molds and then placed on a large vibrating table. The primary purpose of vibration is to allow excess air bubbles to escape up and out of the top of the mold as it is being vibrated. This vibration step results in dramatically reduced air voids and far fewer bug holes or trapped air pockets.

Once cast, the mold sits for a pre-described amount of time to allow for an optimal cure in preparation for the finishing process. Optimal cure timing is based upon two primary environmental factors. The first is temperature. Higher temperatures call for shorter cure times. Lower temperatures call for longer cure times. The second primary factor is humidity. As with temperature, lower humidity calls for shorter cure times, while higher humidity calls for longer cure times. Cure timing is basically a component of these two primary environmental factors. After casting, parts must be covered with plastic to assist in the curing process and minimize shrinkage.

Finishing-Foam Molds

Once the molds have been cast and cured for a pre-determined cure time (typically 6-24 hours), and with the assistance of maturity metering, the molds are ready for finishing. The finishing process is timing sensitive and requires the molds to be at a proper stage of cure prior to beginning the crafting of the finish. Each standard finish has distinctly

different finish timing requirements. Heat and humidity as well as the size of the mold will affect the finishing window, please contact Tuscan Stoneworx for more information regarding your personal specifications in finishing foam molds.

Foam Molds: Sanded Finish

Once a part has been determined to be within the finish timing window it is prepared by removing only the EPS foam covering the face, top and bottom of the shape or profile. The standard Sanded Finish is first begun by using 36-grit automotive sandpaper to hand sand the entire area and remove all foam beads. For a rougher sanded finish the part can be sanded by hand or with a sanding block with 36 grit sandpaper. For a finer more polished finish use a hand sanding block or 6" orbital sander with 80-220 grit sandpaper to sand down and expose the limestone aggregate.

Foam Molds: Acid Wash Finish

The Acid Wash finish is created once the part has reached the finishing window outlined in the section above. After removing the part from the foam mold use 36-grit automotive sandpaper to lightly hand sand the entire area and remove all foam beads. Depending on desired finish your Muriatic Acid can be used straight or diluted up to 10:1. The part can be dunked in an acid bath, sprayed by power-washer, or scrubbed with a long handle scrub brush. Take special care not to get the acid on you are anything that could be damaged by it. When washing the part you're looking to work off the top layer and expose the aggregate, similar to sandblasting. After washing rinse part off with clean water. The Acid Wash Finish will leave smoother pits than sandblasting.

Finishing- Traditional Molds

An advantage of traditional molds is the open cure window. The parts can be de-molded and finished any time from 12-48 hours. The different finishes that can come from a traditional mold are; Acid-Wash, Sand-Blast, Polished, and Travertine. To achieve these finishes, some or all of the following tools can be used; variable speed grinder, a dual action sander, a trowel and a hand sander, sand blaster, or muriatic acid wash. Heat and humidity as well as the size of the mold will affect the finishing window, please contact Tuscan Stoneworx for more information regarding your personal specifications.

Traditional Molds: Sandblast Finish

Sandblasting removes the face of the part and exposes the aggregate, leaving a rougher finish. The Sandblast Finish can be created after the part has cured for at least 48 hours. After removing the part from the mold it is brought over to the sandblast station where it is set on the floor or table. Using traditional sandblast equipment sandblast part till desired finish or texture is achieved.

Traditional Molds: Acid Wash Finish

The Acid Wash finish is created once the part has cured for 24 hours. After removing the part from the mold place it in your predetermined washing area. Depending on desired finish your Muriatic Acid can be used straight or diluted up to 10:1. The part can be dunked in an acid bath, sprayed by power-washer, or scrubbed with a scrub brush. Take special care not to get the acid on you are anything that could be damaged by it. When washing the part you're looking to work off the top layer, similar to sandblasting. After washing rinse part off with clean water. The Acid Wash Finish will leave smoother pits than sandblasting.

Traditional Molds: Polished Finish

Let the part sit for approximately 24 hours before removing from the mold. After the part has been removed from the mold wait 24-48 hours before you buff it, the longer the part cures the better the finish. Using the Envision Polishing Pad attached to a Makita 7" GV 7000 C Vertical Sander, or equivalent, work pad in a slow back and forth motion until desired polish is achieved. The higher the RPM the better the polish.

Curing

An important last step, and one that should not be overlooked, is the proper curing of parts. After finishing, depending on heat, humidity, size and shape the parts should be re-covered with plastic for minimum of (3) days. Parts should not be moved or shipped to a job site for minimum of (7) days. This allows parts time to properly cure out and achieve suitable strengths. Moving parts when they're still green can cause micro-cracking.

Shipping and Handling

Tuscan Cast Stone lightweight architectural cast-stone may be packaged, shipped and handled based on the size and quantity of the profiles and shapes produced. Many of the same sized products may be packed in a single box that will fit on a standard pallet, and then filled with pre-cut foam strips to prevent the products from rubbing on themselves or the box sleeve. If the size or shape of the product to be shipped is large or different, they may be placed on a pallet individually or as a group depending on their size. These would be banded to the pallet for shipping. Custom foam cut outs may be designed out of a large foam block to accept products that are meant to be delivered as a unit such as a fireplace.

DISCLAIMER

The architecture, engineering and design of any project using Tuscan Cast Stone parts are the responsibility of the project's design professional. All systems must comply with state and local building codes and standards. Tuscan Stoneworx disclaims any liability for the architecture, design, engineering or workmanship of any project using Tuscan Cast Stone parts. Information contained in this specification conforms to standard detail and product recommendations for the installation of the Tuscan Stoneworx products as of the date of publication of this document and is presented in good faith. Tuscan Stoneworx USA, LLC assumes no liability, expressed or implied, as to the architecture, engineering or workmanship of any project. To insure that you are using the latest, most complete information, contact Tuscan Stoneworx at:

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