



**STONE
DESIGN**

Your Passport to the World of Stone

IceStone[®]

Fabrication Guidelines

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SECTION 1: ICESTONE, LLC & ICESTONE® DURABLE SURFACES

IceStone, LLC is a triple bottom line, mission-driven company. We actively reduce the waste stream by redirecting millions of pounds of glass from landfills for use in our durable surface slabs, made of 100% recycled glass in a cement matrix. Designed to be VOC-free, IceStone is the first and only durable surface material in the world to be Cradle to Cradle Certified (CM) for human health, environmental health, and recyclability. IceStone slabs are manufactured in Brooklyn, New York in a restored day-lit factory.

DISCLAIMER

IceStone durable surfaces are only sold to fabricators who are bonded and/or licensed and insured in the states they do business. The fabrication and installation of IceStone slabs is similar to mined stone, but has unique requirements that must be followed for optimum performance.

Variation in size, shape, color, gauge, surface texture and finish are inherent to IceStone slabs which are hand made and finished from recycled materials. IceStone, LLC is not responsible for variation between samples or printed materials and slabs received upon delivery. Please make sure that you or your clients have reviewed recent samples, which accurately reflect IceStone's current production. All samples are dated for your convenience.

All slabs must be inspected accordingly upon receipt. Make sure slabs match in color before laying out and cutting. Layout should be determined before packing up for delivery. Slabs should again be examined for overall quality while dry-fitting at the job site. Any defective areas in the slab must be reported to IceStone, LLC immediately with slab ID number, color, shipment date, nonconformity details and digital photos.

IceStone, LLC will not reimburse for labor or material when defective slabs are cut and installed without adequate inspection. After installation, please have the customer inspect the job to ensure satisfaction. Provide the customer with the most recent IceStone Care and Maintenance Guidelines, which can be obtained by contacting IceStone, LLC.

NOTE: THIS MANUAL IS NOT FOR GENERAL DISTRIBUTION

We have tried to make these guidelines as detailed as possible. Many of you operate high quality fabrication shops with years of experience and much of the information in the following document may be basic; but we wanted to cover all the bases, as not everyone follows the same procedures in all shops. Let us know if we missed something!

This manual is published by IceStone LLC to enable fabricators to be informed of the recommendations of IceStone, LLC for fabricating countertops from IceStone slabs and supersedes all previous manuals. Content is subject to change at any time without notice. The use of the term "we" throughout this document refers to IceStone, LLC.

IceStone® durable surfaces is a registered trade mark of IceStone, LLC of Brooklyn, NY.



APPLICATIONS

IceStone durable surfaces are ideal for commercial and residential kitchen countertops, bathroom vanities, backsplashes, bar tops, reception areas, conference tables, fireplace surrounds, window sills, flooring, and other interior and exterior applications.

IceStone surfaces are considered high-performance concrete and are twice the strength of marble. Our fire-resistant surfaces are an environmentally preferable material because they are non-toxic and use recycled content otherwise destined for landfills.

STANDARD ICESTONE SLAB SIZE AND WEIGHT

- 52 ½ inches wide x 96 inches long
- 1 ¼ inches thick
- 16.3 lbs/sq ft. weight
- Typical slab weighs 570 lbs.

SAFETY AND PROTECTIVE WEAR

Employers are responsible for providing a safe and healthy workplace for their employees. When fabricating or installing IceStone slabs, it is essential to follow OSHA guidelines and the following safety precautions.

DUST INHALATION EXPOSURE

Fine particles that may be generated during certain fabrication operations with IceStone surfaces fall within the category of nuisance dusts rather than toxic dusts. The OSHA Permissible Exposure Limit (PEL) for nuisance dust is 5 mg/m³ (respirable fraction) or 15 mg/m³ total dust. (29 CFR 1910.1000, Table Z3).

Wet diamond tools or water jets must always be used when cutting and polishing IceStone slabs, as well as proper local ventilation and collection, to minimize dust concentrations in breathing zones of fabrication employees. When the use of wet diamond tools or water jets and ventilation measures are inadequate to keep dust levels below these limits, a properly fitted particulate respirator approved by NIOSH/MSHA for this use should be worn. The American Conference of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV) for Nuisance Particulates of 10 mg/m³. As of September 1987, OSHA has not changed its PEL for either the total or respirable fraction.

OTHER SAFETY GUIDELINES

- Workers should be properly trained and instructed for their particular task.
- Read all instruction manuals, warnings and safety information for all equipment and tools used during the fabrication or installation of IceStone surfaces before operating such equipment and tools. Learn the tool's applications, limitations, and specific hazards.
- Follow a respiratory protection program. Provide workers with a written hazard communication program and training.
- Blades and tools must be sharp and well-maintained to avoid accidents.
- Avoid dry cutting and dry sweeping when fabricating IceStone slabs.
- Waste must be stored, handled, recycled and/or disposed of safely and legally.
- Wear an approved face mask and eye, hand and foot protection when fabricating IceStone surfaces.

HANDLING AND STORAGE

- Slabs must be stored in a covered area and covered with a tarp to protect the unsealed material from the elements such as rain, snow, warehouse leaks or drastic temperature changes.
- Slabs must be inspected prior to lifting. Slabs may receive damage from transport and caution is always required when moving slabs.
- Slabs must be moved using one of the following means: overhead cranes, forklifts, stone transport carts and stone dollies.
- The slabs weigh approximately 570 lbs, and a pack of twelve (12) can weigh as much as 7,100 lbs including crate.
- Slabs must be stored vertically on a rack system or on A-frames, stacked face to face and back to back.
- Slabs must be clamped while stored to prevent bowing, maintain integrity of the slab and provide a safe working environment. We recommend using four clamp points for each stack of slabs.

REMOVING BOW FROM WARPED SLABS

IceStone surfaces are made of a cement-based material that may continue to cure and bow if not properly clamped while stored. It is recommended that all slabs be secured during storage to maintain integrity of the slab as well as a safe working environment.

The bow of an IceStone slab should **not exceed 1.5mm**. Check the length warp using a full-length straight edge when the slab is placed horizontally. If you find a bow exceeding 1.5 mm in your slab, please contact IceStone, LLC at (718) 624-4900 for directions on removing bow from slabs.

SECTION 2: FABRICATION INSTRUCTIONS

FABRICATION TOOLS AND SAFETY EQUIPMENT

Below is a list of critical and highly desired tools and safety equipment that fabricators must have to produce a quality finished product safely and efficiently.

Basic Tools

- Bridge saw
- Electric/pneumatic polisher (variable speed preferred)
- Diamond grinding wheel
- Diamond polishing pads
- Grinding stone
- Core bits
- Diamond contour blade
- Wet profiling machine (edge router)
- Stone carts/dollies
- A-Frame/storage racks
- Stone (pony) clamps
- Fabrication stands
- Air compressor
- Seaming clamps
- Water source
- Steel rods and binder

Advanced Tools

- Water jet
- CNC
- Automated profiler
- Diamond jig saw

Basic Safety Equipment

- First-Aid kit
- Safety glasses
- Steel-toe footwear
- Respiratory protection
- Work gloves
- Aprons
- Ear plugs
- Face masks

MARBLE INSTITUTE OF AMERICA STANDARDS

Generally, IceStone, LLC recommends following the Fabrication and Installation Guidelines of the Marble Institute of America (MIA) (<http://www.marble-institute.com>), as applicable to mined stone. Traditional stone fabrication equipment, such as CNC machines, bridge saws, routers, and polishers (with diamond pads and bits) should be used with water.

For best results, we recommend using a marble blade with a continuous rim (smooth cut) for cutting. Spin the blade at a high revolution per minute (rpm) and move it across the IceStone panel at a slower linear speed. Avoid using higher linear speeds, which may result in chipped glass.

COLOR MATCHING

Due to the unique nature of recycled glass, no two IceStone slabs are exactly alike. While we strive to manufacture as consistent a product as possible, IceStone panels will nevertheless exhibit variations in color, shade and glass size and glass particle distribution. This is part of the inherent character and beauty of the material. These variations are not structural; however, consideration should be given when planning the layout. Taking care to match glass distribution and color at seams will yield the best results.

Glass variation may be greater between batches. Ideally slabs throughout an installation should be from the same batch and be marked with similar batch numbers to improve color consistency. For example: 012807001 and 012807003.

VISUAL SLAB INSPECTION

Performing a visual inspection for imperfections and color matching is essential when working with IceStone surfaces and should be a standard practice before cutting. Use the following as a checklist to visually inspect for variation:

- Hairline cracks
- Slab-to-slab color match
- Color inconsistency within the slab
- Glass dispersion pattern
- Warping/bowing
- Irregular spots
- Consistent gloss levels
- Glass segregation and porosity on the edges
- Face side pits/voids/knicks/pop outs
- Inspect in lighting conditions similar to those at the installation site

NOTE: We will not accept claims for any of the above defects if the slab is modified in any way. The fabricator is responsible for determining if the slabs are fit for purpose. If they are not, they should be exchanged before the slabs are cut or modified in any way. Once a slab has been cut and/or installed, it can no longer be returned to IceStone, LLC.

STRUCTURAL SUPPORT

Four-Sided Perimeter Support

IceStone surfaces are strong enough that they do not require a substrate if a four-sided perimeter frame exist for a countertop installation. However, front-to-back support is required for every 36 inches, in addition to the strong perimeter support for spans within cabinets.

Three-Sided Perimeter Support

For structures that have perimeter support on three sides, desks, and frameless cabinets, additional support is required. IceStone with a depth of less than 26 inches require supports every 24 inches. IceStone with depths of over 26 inches require supports every 18 inches.

Dishwasher Support

Dishwashers should not be attached directly to IceStone surfaces. Attach the dishwasher to cabinets using a wood strip at the top of the cabinets to align and connect with the dishwasher brackets.

Cantilevers

Cantilevers less than 9 inches do not always require additional support, but discretion should be used. Cantilevers of 9 to 12 inches require either corbels or front to back rod support every 24 inches. Cantilevers greater than 12 inches require legs, columns or steel rods every 24 inches.

CUTOUTS AND ROD SUPPORTS

- Cutouts must have front bridge depths of 4 inches or greater.
- Support cutouts with ¼ inch steel rods that span 2 feet to the left and 2 feet to the right of the cutout.
- Undermount sinks can be supported with brackets or cradles attached to the cutout perimeter or cabinets.
- All undermount sink cutouts must have the inside edges polished to match the surface.
- All undermount sinks should be sealed to the countertop using 100% silicone.

- Stainless steel sinks and lavatory undermounts must be secured with clips attached to the underside of the counter. Slip fit and glue inserts are required, pressure fit inserts cannot be used. Mechanical inserts should not be installed directly into IceStone surfaces.
- All cutouts for sinks, faucets, etc. must be available for measurement or the manufacturer's templates must be supplied at time of fabrication.

RADIUS CORNERS

- IceStone strongly recommend radius corners on all cutouts.
- All outside corners of IceStone tops must be machined at a minimum radius of 1/8 inch.
- The inside corner radius of IceStone must be shaped to a minimum of 1/4 inch to relieve the corner stress. Mitered or corner seams do not need a radius.

EDGE PROFILES

Always avoid installing IceStone with straight edges. This may lead to glass chipping and pop-outs. We strongly recommend using the following edge finishes:

- Bullnose (half or full)
- Pencil
- Eased
- Planter

Glass segregation in IceStone edges can be unattractive to some clients; this can be addressed using a bullnose, pencil or planter edge.

RECOMMENDED EDGE POLISHING SEQUENCE

Edge polishing should be performed with sufficient pressure; use polishers that have a high rpm (>2000).

We suggest the following sequence of increasingly finer pads to achieve a smooth, high gloss finish:

- #120, #220, #360, #600, #1200, #1800, buffing pad.

PITS, CRACKS AND HOLES

IceStone developed a patching method that we recommend to use in the unlikely event surface pitting occurs. This is the only approved method for patching IceStone surfaces. IceStone will not be responsible for results obtained by other patching methods.

The IceStone patching kit contains a bag of patching powder mix (cement, fine glass, rockite cement and pigments and a bit of ad mixture). In addition to the powder, you will need the following materials or tools:

- A small metal bowl to mix material
- A spatula or scraper for stirring
- A rubber grout float
- A smooth wood block to push the patching mix around
- A soft, lint-free cloth or chamois

When patching, please use the following procedure:

To mix the IceStone patching material:

1. In a clean metal bowl, add approximately 30cc (30 grams) of water for every 100 grams of patching powder mix.
2. Combine the mixture using flat spatula or scraper. Please mix the patching material thoroughly to assure all of the pigment is blended in (there should be no streaks of pigment left).

To apply the patching material:

1. Cover the panel with water. Sponge the panel down until it is moist but not soaked with water.
2. Make certain all of the pores are damp and penetrated by water.
3. Apply the IceStone patching mixture onto the panel using a rubber grout float.
4. Make certain a thin layer of IceStone patching material covers the entire surface of the panel.
5. Wrap a flat, smooth wood block (that can fit easily in your hand) with a soft, lint-free cloth. A chamois cloth works best.
6. Once the thin layer of IceStone patch has dried to a chalky residue (this should take approximately 20 minutes), wipe the surface with the chamois using large, circular motions, to remove the chalky residue. If there is an area that is difficult to remove, wrap a piece of wood in a lint-free cloth and tamp down on the residue until it is powdery. Then, repeat the circular motions with chamois to remove the residue.
7. Allow the remaining patching material to dry. This should take approximately 30 minutes. Look for any remaining porous areas and refill them with the remaining patching material using the instructions above. If needed, re-wet this remaining patching material before applying in order to achieve desired consistency.
8. Seal the surface after the patch has set for one hour.

APRONS & BUILT UP EDGES

IceStone slabs should not be laminated at visible edges. Laminating may create an undesired look if glass segregation is present in the slab edge. Not all IceStone colors have segregation; if segregation is present, all edges should be mitered at a 45° angle to ensure maximum strength. The joint should be clean, flush and parallel. All built up edges and 45° joints, must be mitered.

SEALING

You must seal IceStone surfaces with a recommended penetrating sealer, such as DryTreat's Meta-Crème Low-VOC Water-based penetrating sealer (Available at your local Stone Design retailer), to protect it from staining. We advise sealing IceStone prior to installation in order to reduce the release of fumes at the client site.

For flooring applications, you may seal IceStone before or after installation. Honed finishes require more sealant due to the greater exposed surface area. We also recommend waxing the surface with a concrete wax such as Cheng's Contrete Countertop Wax, also available at your local Stone Design retailer

Before sealing, make sure the slabs are dry and that the surface is clean and all stains are removed.

RECOMMENDED LOW-VOC SEALERS FOR ICESTONE SURFACES

NOTE: Review and follow any instructions, warnings, and safety information provided with any sealant product used with IceStone durable surfaces prior to its use. As previously mentioned, IceStone recommends the following penetrating sealer for use on IceStone durable surfaces:

DryTreat's Meta Crème Low-VOC Water-based penetrating sealer

Where to buy:

Stone Design, Inc.; Studio Stone Design; Wisconsin Stone Design; Stone Design of Indiana, LLC
www.stone-design.com
www.drytreat.com
Call 1-800-424-1332 to find a Stone Design location near you.

WAX FINISH

Depending on the usage of the IceStone surface, you should suggest that your customers to provide extra protection by applying a wax (often called a “polish”) a few times a year. Waxes are particularly effective at preventing stains. The wax barrier provides additional time to wipe up spills before they can stain. Please review the Care & Maintenance Guide and our recommended wax products with your customers so they understand the importance of maintaining their IceStone surface.

IceStone recommends using a carnauba wax because it is one of the hardest waxes available. Carnauba has a melting point of about 185° Fahrenheit, 40 degrees higher than the melting point of beeswax. The best wax to use is Cheng's Concrete Countertop Wax, available at Stone Design retail locations.

INSTALLATION OVERVIEW

Our surfaces have similar structural stability to mined stone. We recommend the installation guidelines specified in the Marble Institute of America's Dimension Stone Design Manual (<http://www.marble-institute.com>). However, the instructions provided below will offer you additional guidance as you install IceStone durable surfaces.

SEAMING

In order to achieve a minimally visible seam, IceStone surfaces should be seamed with a color matched two-part epoxy or acrylic joint adhesive. The adhesive must be pigmented to a color similar to that of the slab being installed. Seams should be no more than 1/8 inch in width.

Prior to installation, make sure that:

- Seams are supported to assure integrity over time. Unsupported seams may buckle or sag.
- IceStone materials are properly sealed.
- Base cabinets are permanently anchored in place and are on a true plane, leveled to within a 1/8 inch tolerance across an 8 foot span.
- A space of 1/8 inch exists between walls where the IceStone is to be installed (each countertop requires at least 1/16 inch at each wall for expansion and contraction).
- Countertops are placed on cabinets to ensure fit; shim if necessary.
- With any seaming product, make sure to review all safety instructions and warnings safety prior to use.

A clear, non-toxic, low-odor, water-based flexible adhesive should be used to secure the IceStone countertop to the cabinets. Space the beads of adhesive every 12 inches. Do not use rigid adhesive to fasten IceStone to cabinets, and/or tile backsplash.

To ensure accuracy before installing IceStone durable surfaces, use a template, just as you would with mined stone, and adhere to the following procedure:

1. Remove existing surface tops prior to template.
2. Mark all center lines on the template where there will be cutouts.
3. Note the dimensions from cabinet to cabinet throughout the kitchen.
4. Find and mark the center line (CL) of the principal cutout closest to the width wall. Make a mark at the front and rear of the cabinet.
5. Double check all of your markings.
6. Note squareness. Measure from CL to the leading edge of the counter.
7. Double check all of your markings at rear. Scribe to the wall when the back edge is not square.

ADDITIONAL INSTRUCTIONS FOR COUNTERTOPS IN COMMERCIAL FOOD SERVICE AREAS

For commercial food service areas, insulation material must be installed between IceStone counters and hot water pans and food warmers.

SECTION 3: CARE AND MAINTENANCE

Some food, chemicals and solvents can damage the surface. The following is a partial list of potentially harmful materials to be aware of:

- Abrasive cleaners
- Lemon/citrus juice
- Wine
- Dark Coffee
- Permanent marker/ink
- Rust/paint removers
- Lacquer thinner
- Oven/metal/toilet/tile and drain cleaners
- Fingernail polish remover

If any of these materials should contact your IceStone surface, wipe up immediately and wash the area thoroughly with a mild soap solution. Rinse with water. For more information about how to care for IceStone surfaces, please consult our Care and Maintenance Guide for tips to keep IceStone installations beautiful and well maintained.

ICESTONE DURABLE SURFACES: TECHNICAL SPECIFICATIONS & CERTIFICATIONS

PROPERTY	TEST STANDARD	IceStone RESULTS
Compressive Strength	ASTM C-109	13,000 psi
Flexural Strength	ASTM C-293	890
Specific Gravity	ASTM C-97	2.31
Porosity/Absorption	ASTM C-642	0.18% (unsealed)
Chemical Durability	ASTM C-1260 for ASR Reactivity	0.05%
Freeze Thaw	ASTM C-666	0.49% (300 cycles)
Stain Resistance		Yes (use recommended sealers)
Fire Rating	ASTM E-84	Class 1 (A) Flame Spread Index 0 Fuel Contribution 0 Smoke Density Index 0
Static Coefficient of Friction (slip resistance)	ASTM C-1028	0.69 polished dry 0.61 polished wet 0.71 honed dry 0.62 honed wet 0.82 sandblasted dry 0.77 sandblasted wet
Food Equipment Materials	NSF-51	Certified
Environmental & Human Health, Recyclability	Cradle to Cradle GOLD	Certified

CONTACT INFORMATION

If you have questions or suggestions about any part of the fabrication or installation process for IceStone durable surfaces, we would like to hear from you. Please contact your local Stone Design location at [1-800-424-1332](tel:1-800-424-1332) for all of your product needs and fabrication questions.