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Durasein Fabrication & Installation Manual

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Key Elements for Success

Throughout the Durasein® Fabrication & Installation Manual, look for text boxes like this. They contain important elements that will help you make trouble-free countertops.



Introduction

This document is designed for the person who is familiar, if not experienced, in fabrication and installation of solid surface products. This document is not intended to teach the fundamentals of fabricating solid surface. It is rather to reinforce the very well established guidelines of solid surface fabrications and installation so you may avoid potential failures. The recommendations in this document pertain to all Durasein® solid surface products.

Relang International produces a variety of Durasein® solid surface products including:

- Durasein® 100% Acrylic Sheets (in ½" and ¼" thickness)
- Durasein® Cast Acrylic Sinks & Bowls
- Durasein® Acrylic Blend Sheets (in ½" and ¼" thickness)
- Durasein® Cast Acrylic Blend Shower Pans and Accessories
- Durasein® Custom Specialty Blanks & Components
- Durasein® Wide Sheet Products

Standard sheet dimensions are 30 inches (762 mm) up to 60 inches (1524 mm) in width and up to 12 feet (3.66 m) in length. In North America, Durasein® products are sold through a network of experienced distributors. Worldwide, Durasein® products are sold in over 55 countries as part of our extensive international network.

For detailed information about the variety of Durasein® products available in your area, contact your local Durasein® distributor.

Durasein® recommends that all persons working with solid surface products receive proper training in the techniques of working with these products. The International Surface Fabricators Association, ISFA, conducts hands-on training programs in through their Total Fabrication Training for solid surfacing. For more information on the ISFA Total Fabrication Training see the ISFA web site at www.isfanow.org.

Product Data

The following information lists independent test report results for Durasein® 100% Acrylic Products.

TEST	METHOD	RESULT
Surface Burning	ASTM E84-08	FSI=15; SDI=10; CLASS A
Flexural Strength	ASTM D790-10A	Flexural Strength (psi) = 10,100
Flexural Modulus	ASTM D790-10A	Modulus of Elasticity (psi) = 1,434,000
Density	ASTM D792-08 B	1.729 g/cm ³ (108 lb/ft ³)
Thermal Expansion	ASTM D696	3.49 x 10 ⁻⁵ in/in/C (2.08 x 10 ⁻⁵ in/in/°F)
IZOD Notched Impact Strength	ASTM D256-10 C	2 J/m
Tensile Strength	ASTM D638-10	45.9 MPa
Elongation at Break	ASTM D638-10	0.50%
Tensile Modulus	ASTM D638-10	9890 MPa
Water Absorption	ASTM D570-98(2010)	0.10%
Color Fastness	ANSI Z124.1.2-2005	1.21 Pass
Stain Resistance	ANSI Z124.1.2-2005	34 Pass
Cleanability & Wear	ANSI Z124.1.2-2005	Dirt Specimen 2.35%, 2.77%, 3.56% Slurry Specimen 0.64%, 1.02%, 1.83%
Cigarette Test	ANSI Z124.1.2-2005	0 Pass
Chemical Resistance	ANSI Z124.1.2-2005	Pass
Ignition Test	ANSI Z124.1.2-2005	Less than 30 sec. Pass
Thermal Shock Resistance	ANSI Z124.1.2-2005	No cracking, crazing, blistering or spalling Pass
Water resistance	ANSI Z124.1.2-2005	Total Rating 1, Pass
Barcol Hardness	ASTM D2583-07	67
Impact Strength	ASTM D5420-10	Mean Failure Height 803mm, Mean Failure Energy 28J
Heat Deflection Temperature	ASTM D648-07 B	111.7°C

TEST	METHOD	RESULT
Fungal Testing/Resistance	ASTM G21	Does not support microbial growth
GREENGUARD	UL 2818	Certified
GREENGUARD Gold	UL 2818	Certified
NSF 51		Certified
Weatherability	ASTM G155	Passes for Exterior Application

Certifications

GREENGUARD Certified: UL 2818 - 2013 Standard for Chemical Emissions for Building Materials, Finishes and Furnishings

GREENGUARD Gold Certified: UL 2818 -2013 Gold Standard for Chemical Emissions for Building Materials, Finishes and Furnishings

Certified by NSF International for Food Contact and Splash Zone under NSF 51 Food Equipment Materials

Certified under ISO Standard 9001:2008

Certificate of Compliance
89/106/EEC CONSTRUCTION PRODUCTS DIRECTIVE
EN 14688:2006

Durasein® products contain 13% post-consumer recycled materials based on third-party verification

EN 14516:2006 Baths for Domestic Purposes
CSA B45.5/IAPMO Z124 Certified

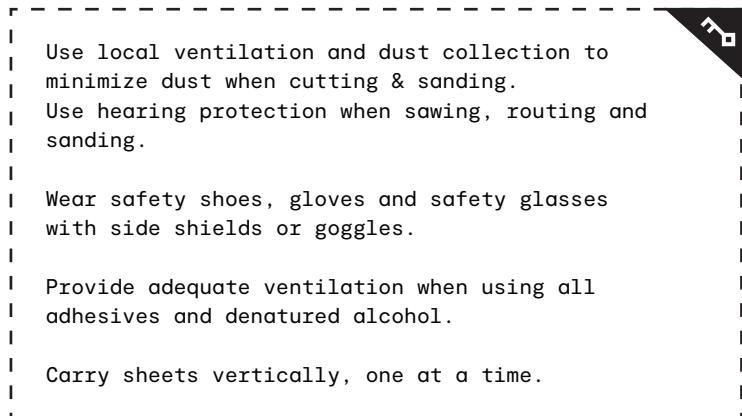


Safety

Durasein® solid surfaces is committed to encouraging safe practices in the work place. The following pages are recommendations for safe handling, storage, fabrication and installation of Durasein® Solid Surface products. We encourage you to be familiar with the safe practices required by local, state and national organizations such as OSHA. Many states have free services to help you review your workplace safety program. An additional resource is the ISFA Federal OSHA Compliance Manual for the Surface Industry.

Durasein® solid surface dust is classified as Nuisance Dust and is non-hazardous. During fabrication processes such as sawing, routing and sanding, dust consisting of the non-toxic cured resin and filler is generated. It is preferable to collect the dust in impervious bags. Dispose of dust and scrap in accordance with local, state and federal regulations. Remember – dust collection at the source will create a better work environment and ultimately increase the quality of your product. Federal law establishes acceptable levels of exposure to workplace dust. Consult local, state or federal agencies for other health and safety requirements regarding exposure to dust.

Wear appropriate protective gloves, safety glasses, and safety shoes when installing or fabricating Durasein® solid surface material.



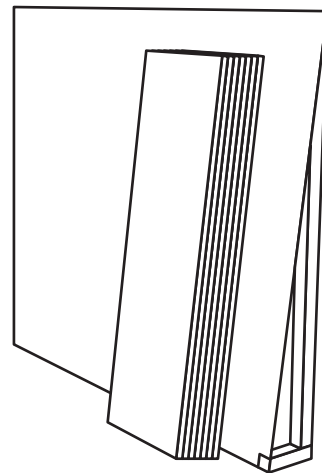
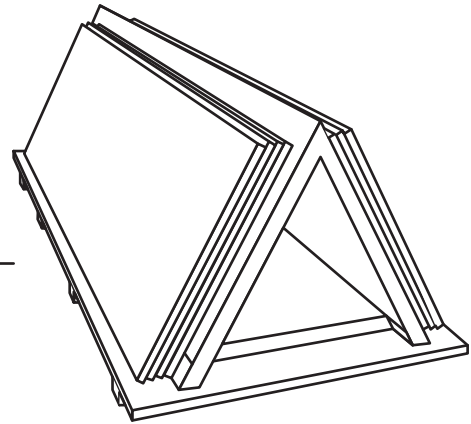
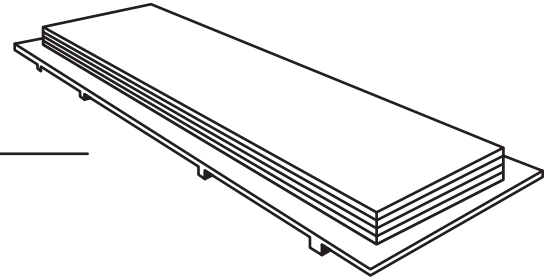
Handling & Storage

Durasein® solid surface should always be stored FLAT and evenly supported. Your shop conditions and procedures may determine the appropriate configuration of your storage

Flat storage on well supported pallets is probably the most common acceptable solution. To reduce flexion of the sheets while transporting with a fork lift, approach the pallet from the short end and use fork extensions.

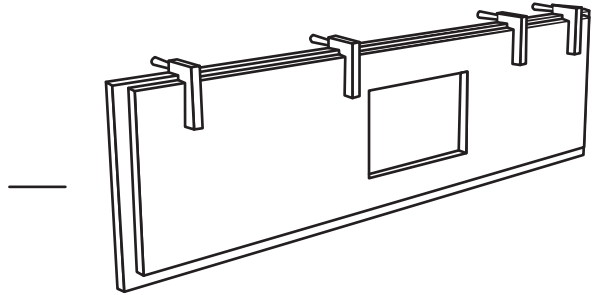
In some cases, an A-frame can be used to store and transport sheet material. The A-frames can be approached either from the short or the long side, with standard forks

In areas where floor space is an issue, some shops have adopted a vertical storage arrangement as shown here. Although this method saves floor space it generally requires a higher degree of handling. There is also a need to be sure that the sheets are totally supported throughout their entire length to avoid the potential for warping.

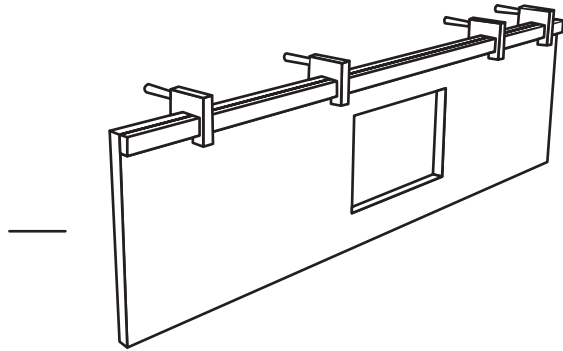


Handling & Storage

Always carry sheets in a vertical position. To avoid chipping and scuffing, do not drop or drag sheets. Fabricated sections with angles or seams should be handled carefully with support at the angled or seamed area. A carrying board or clamp system should be used for tops with cut outs.



Durasein® solid surface sheet stock can be transported on an evenly supported and padded surface. Large fabricated sections should be transported on edge. Pad the edges to prevent damage and brace to prevent movement.



During transportation and delivery, pieces should be wrapped to prevent damage from extreme temperature changes. Avoid exposing fabricated pieces to extreme temperatures and harsh weather. At the jobsite, pieces must be acclimated to room temperatures prior to cutting, seaming and other installation processes.

Always store sheets well supported and flat.
Carry sheets in a vertical position.
Shop-made or purchased support devices can aid in supporting fabricated tops during transportation.

Inspection

Durasein® Fabricator Product Quality Inspection Requirements

Please note that Durasein® will replace any Durasein® material not conforming to product specifications when delivered to your facility.

Durasein® prides itself in having state of the art systems to ensure the products we deliver meet the highest standards in the industry. However non-conforming products may slip through our system and reach our downstream customers. Should this happen we encourage our customers to work with us and incorporate a stringent inspection protocol in your organization to ensure the non-conforming product does not go all the way through to a final installation. Please inspect all product before final delivery or any fabrication processes. If you catch this material, contact your Durasein® representative for replacement. If non-conforming material is fabricated and installed, Durasein® will not be held responsible for any labor costs.

1. Sheet Inspection – Listed below are different items you should look for when you make a visual inspection of Durasein® sheets:

- Sheet to Sheet Color Match
- Color Inconsistency Within Sheet
- Particles Pattern Irregularity
- Length Warp
- Warp: Smiles / Frowns
- Black or White Spots
- Face-side Pinholes / Voids / Ripples
- Underside Pinholes / Voids / Ripples
- Edge Cracks / Chips

2. Color Match – Durasein® will produce the best color match possible from our state of the art technology. However, sometimes the composition of solid surface produces slight color variations between production cycles due to the blending of the product. This is an inherent characteristic of Durasein® aesthetics. Therefore strict guidelines have been set as follows:

Durasein® does not guarantee color match. Since color match cannot always be guaranteed, it is up to the fabricator to inspect and insure acceptable color match between sheets.

Inspection

Color match can be checked in three ways:

- Using sheets from the same pallet.
- Making sure the code or run-number on the sheet edges is within the specified range of
- ± 25 numbers of each other.
- Conducting a trial color match

For warranty claim purposes, we expect the fabricators to record the run numbers of each sheet of material used on each job. This may be useful in trying to achieve color match in the future.

If color match is found to be unsatisfactory after fabrication, yet run numbers are within range, contact your Durasein® representative immediately.

3. Color Inconsistency Within Sheet – Inspect sheets for any color inconsistency. If blotches, hue variations or other inconsistencies are apparent and cannot be worked out, please contact your Durasein® representative for a replacement.
4. Particle Pattern Irregularity – If any irregular distribution of particles is visible to the naked eye, set aside sheet for inspection and contact your Durasein® representative for a replacement. In some cases, variances in particle distribution can appear as a color mismatch.
5. Length Warp – Where warp is greater than 1/16" per 48" (1.5 mm per 1220 mm), set aside sheet for inspection and contact your Durasein® representative for a replacement.
6. Warp: Positive/Negative– Where warp is concave to the finished face side, it is classified as positive warp. If warp is concave to the backside, it is classified as negative warp. For sheet with positive or negative warp greater than 1/16" per 48" (1.5 mm per 1220 mm), set aside sheet for inspection and contact your Durasein® representative for a replacement.
7. Face-side Black and/or White Spots – Where large groups of spots occur that are not considered part of the material aesthetic and detract from the visual appearance of the solid color sheet, set aside sheet for inspection and contact your Durasein® representative for a replacement.

Allowable Surface Defects:

Black Spots	Less than 0.01" (0.25 mm)
White Spots	Less than 0.008" (0.20 mm)
Foreign Matter Particles	Less than 0.01" (0.25 mm)

Inspection

8. Face-side Pinholes, Voids and/or Ripples – When minor scratches, pinholes, voids or ripples occur on the face-side of the sheet, orbital sanding with 180-grit sandpaper might resolve the problem.

Allowable Surface Defects:

Voids Not to exceed $1 \geq 0.25$ mm per sheet or $5 \geq 0.10$ mm per sheet

9. Underside Pinholes, Voids and/or Ripples – Small voids or pinholes on the back of a sheet are generally not a problem unless they interfere with joining pieces for edge build-up. Set aside any questionable sheet for inspection and contact your Durasein® representative for a decision regarding replacement.

Acceptable Pinholes, Depressions and Ripples:

- o Pinholes & Depressions Not to exceed $1 \geq 0.25$ mm per sheet or $5 \geq 0.10$ mm per sheet
- o Ripples & Bumps less than 1/6" (1.5 mm) deep

If serious irregularities occur, set aside sheet for inspection and contact your Durasein® representative for a replacement.

10. Edge Cracks and/or Chips – Cracks or chips can occur during transportation and handling. Inspect shipments and report damages to the delivery carrier as necessary.

Acceptable Chips / or Nicks:

- o Corner Chips $\text{Less than } 3/16'' \text{ (4.76 mm) wide/deep}$
- o Edge Chips / Nicks $\text{Less than } 3/16'' \text{ (4.76 mm) wide/deep}$

If serious irregularities occur, set aside sheet for inspection and contact your Durasein® representative for a decision regarding replacement.

11. Shape Product Inspection – Listed below are different items you should look for when you make a visual inspection of Durasein® sinks:

- o Broken
- o Cracks
- o Black / White Spots
- o Physical Non-uniformities
- o Face-side Pinholes / Voids
- o Drain Holes

Always inspect before fabricating
Trial fit the seam areas for flatness
Record the sheet numbers used on each

Color Matching

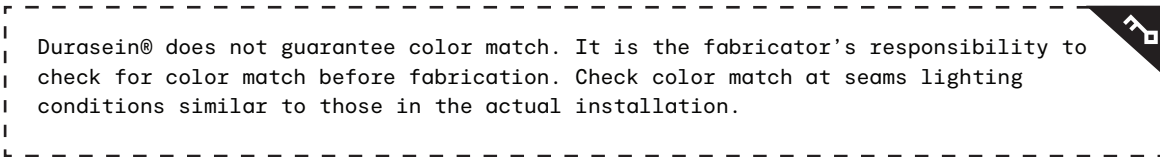
Durasein® does not guarantee color matching of its products.

The best assurance of a color match is to view the prepared seam in lighting similar to the actual installation before applying the seam adhesive

When seaming sheets together, we recommend that you use sheets from the same lot and sequence numbers that are not greater than twenty-five (25) numbers apart. Although this does not guarantee a color match, it is generally an indicator that the two sides of the seam will match. Always visually check for color match before applying adhesive.

Due to the unique characteristics of backside-sanded products, visually check for acceptable backside aesthetics prior to and fabrication steps.

Durasein® does not guarantee color match. It is the fabricator's responsibility to check for color match before fabrication. Check color match at seams lighting conditions similar to those in the actual installation.



For the best results we recommend a visual inspection of the sheets adjoining a seam. The pieces should be prepared as normal for a seam. The tops of the sheets at the area to be inspected should be clean and should have the same finish. Place the pieces together and inspect under lighting conditions similar to those in the actual installation. Inspect the area from all angles including from a normal height and from a low angle perspective.

The Durasein® Sheet Numbering System

GRAPHIC REPRESENTATION OF DURASEIN® VEINED COLOR SHEETS

DURASEIN®DM5009 ROYAL CARRERA 230144 01132016 01 40 PASSED →

BRAND NAME	COLOR CODE	COLOR NAME	SHEET SIZE	DATE	BATCH SHEET	QC	DIRECTION
------------	------------	------------	------------	------	-------------	----	-----------

Color Matching

Standard colors:

Both the back of the sheet and the long side of the sheet have print codes.

At the back of sheet, the last two numbers mean batch number.

For example the number on the **back** of the sheet

230144 01132016 01 means

- ◆ 2 (1/2" thickness)
- ◆ 30 (width)
- ◆ 144 (length)
- ◆ 01 (month)
- ◆ 13 (day)
- ◆ 2016 (year)
- ◆ 01 (batch number)

At the long edge of the sheet, the number sequence will be similar, however, the last two numbers represent the sequence of sheets from one batch

For example the number on the **edge** of the sheet

230144 01132016 01 40 means

- ◆ 2 (1/2" thickness)
- ◆ 30 (width)
- ◆ 144 (length)
- ◆ 01 (month)
- ◆ 13 (day)
- ◆ 2016 (year)
- ◆ 01 (batch number)
- ◆ 40 (sequence or sheet number)

Vein colors:

Only the long side of the sheet has printing

For example the number on the **edge** of the sheet

230144 01132016 01 40 PASSED → means

Color Matching

- ◆ 2 (1/2" thickness)
- ◆ 30 (width)
- ◆ 144 (length)
- ◆ 01 (month)
- ◆ 13 (day)
- ◆ 2016 (year)
- ◆ 01 (batch number)
- ◆ 40 (sequence or sheet number)

Note: The arrow following the numbers (" → ") means pattern direction.

Therefore, sheet numbers are indicated by the last two numbers printed on the side **edge** of the sheet.

230144	01132016	01	40
230144	01132016	01	39
230144	01132016	01	38

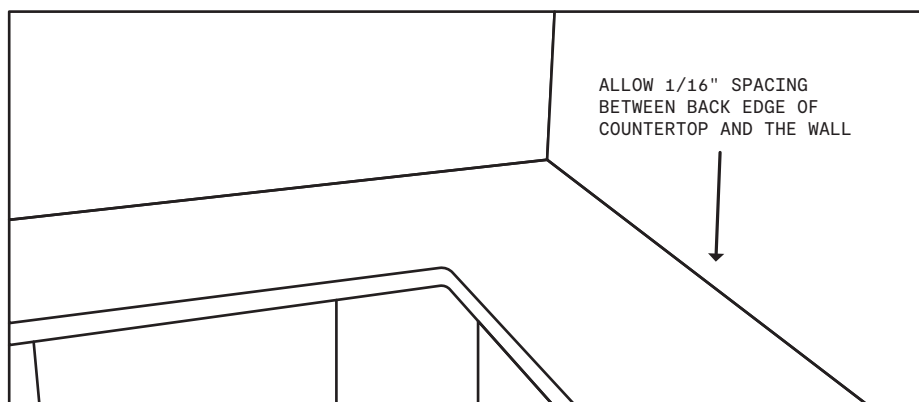
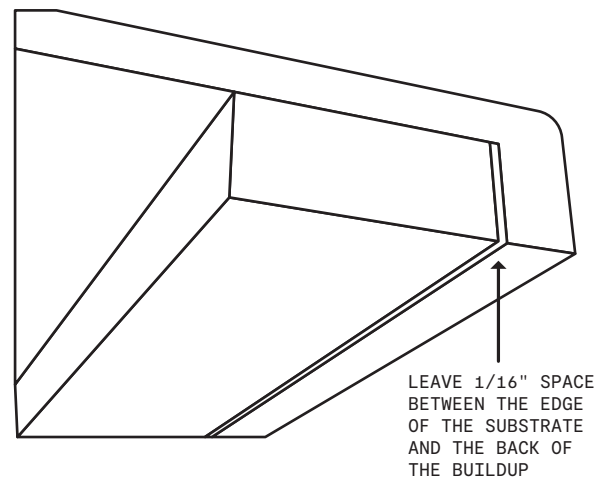
Planning & Layout

Expansion & Contraction

Like all solid surface material, Durasein® solid surface expands or contracts with temperature changes. For typical interior kitchen and bath installations, ambient temperature changes (ΔT) could be as much as 25-30° F (14 to 17° C). For a countertop length of 12 feet, this could result in a change of overall length of about 1/8" (3 mm).

Because of this potential change of overall countertop dimension, some details in the layout, fabrication and installation of the top need to be followed. For example:

- Leave a 1/16" (1.5 mm) gap between the countertop support strip and the rear of the countertop edge build-up.
- Leave a 1/16" (1.5 mm) gap between the back edge of the countertop and adjoining walls.
- Use flexible adhesives to attach Durasein® to dissimilar materials. 100% silicone is recommended.



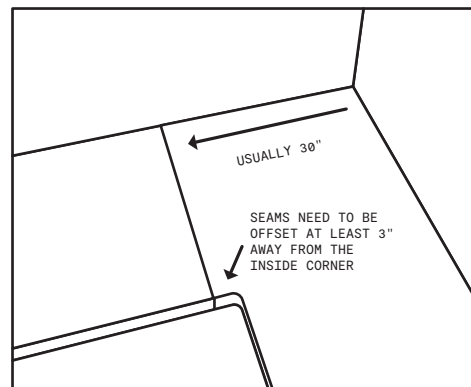
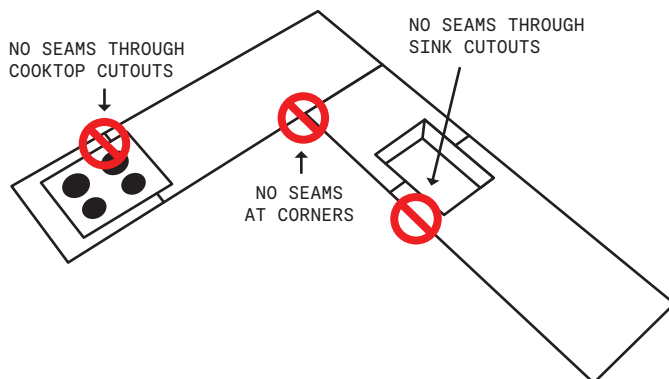
Planning & Layout

Locating Seams

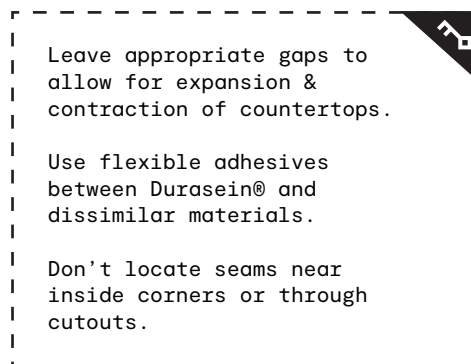
From the perspective of both design and structure, the location of seams is a critical part of the fabrication and installation process. Since a seam is potentially weaker than the Durasein® sheet itself, a seam could be located where stresses in the installed top could result in a failure if proper fabrication and installation procedures are not followed. More details about seams are presented in the “SEAMS” section later in this manual. Here are recommendations about the actual locations of the seams.

Avoid placing seams in the following locations:

- Inside corners. (Exception for veined and directional aesthetics. See below)
- In cutouts or within 3” (75mm) of cutouts.
- Over dishwashers or other heat producing appliances.



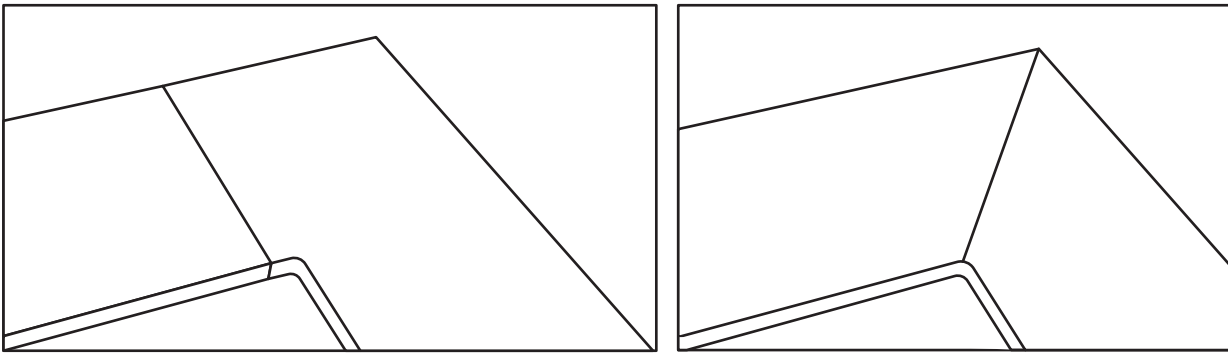
Seams also need to be offset from the inside corner. Corners are an area where stresses can focus, so placing the seam away from the corner reduces the possibility of problems. We recommend that seams be placed at least 3” away from the inside corner.



Planning & Layout

Veined & Directional Products

The aesthetics of veined and directional products can present challenges when applying the traditional techniques of layout and seaming. The images below show some possible solutions for the detail at inside corners.



The aesthetics of veined and directional products can present challenges when applying the traditional techniques of layout and seaming. The images below show some possible solutions for the detail at inside corners.

The inside corner is cut at a 45 degree miter. This results in an acceptable aesthetic. The deck seam, however, is located right at the corner and may be susceptible to additional stresses, Therefore, take steps to be sure the cabinets and deck are flat and well supported. The inside corner radius must be at least 1/2".

Backside Sanded Products

Certain products may be available with a factory fine-finished/sanded backside. Consult your Durasein® representative for details. Due to the particular process and aesthetics, the backside-finished products will have a different look from the front side. When using the back side as a visible detail, check the layout, pattern and color prior to taking any fabrication steps. The Durasein® Ten-Year Limited Warranty does not include covering consistency of design, color, visual texture or finish on the bottom side.

Tools & Supplies

Durasein® solid surface material can typically be machined with ordinary woodworking tools, such as circular saws, table saws, routers, drills and sanders. For productivity and industrialization, other equipment such as vertical and horizontal panel saws, V-grooving equipment, thermoforming equipment, CNC routers and other task-specific machinery can be utilized. For most applications blades and bits should be carbide tipped. For more advanced applications, solid carbide and diamond tooling can be considered.

The following tools are not appropriate for fabricating solid surface materials and should not be used for fabrication and installation of Durasein® products:

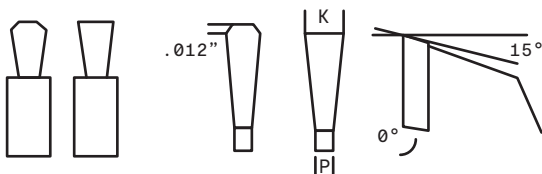
- Jigsaws
- Ripping & Combination Blades
- Reciprocating Saws
- Hacksaws
- Rotary Cutters
- Auger Bits



Belt sanders are not to be used on finished surfaces of Durasein® Solid Surface.

Tooling manufacturers have developed specific types of blades and bits for the fabrication of solid surface products. Traditional ripping or combination blades using an alternate top bevel grind will cause rough cuts and chipping. Always use “triple chip” blades or similar styles that are specifically designed for use on solid surface materials.

Typical Examples of the Triple Chip Grind & “Cobra Cut”



The triple chip blades have a tooth arrangement of alternating profiles as shown here. Check with the blade supplier to assure suitability for solid surfacing.

Durasein® solid surface material should be properly supported during all phases of fabrication.

Tools & Supplies

Table Saws

A table saw with a minimum 3 HP motor should be used for cutting the solid surface material. The sheets should be cut face up. A good quality rip fence is necessary for accuracy. For larger pieces and/or better productivity, sliding table saws and vertical panel saws are recommended. Follow all recommendations for solid surface circular saw blades

Circular Saws with Straightedges

Particularly for work in the field, there are several types of systems that include a hand-held circular saw with high quality straightedges. These systems can produce excellent cuts on solid surfacing when operated properly with the right tooling. Be sure to follow all tool manufacturer safety and operational recommendations.

Routers & Bits

For general purpose routing, a 1 1/2 to 2 HP router may be used. For heavier cutting of thick edges and cut outs a 3 1/4 HP router is recommended. A 1/2" (12mm) shank carbide bit is needed to minimize chatter for all routing with the exception of small details like a 1/4" (6.3mm) round over or a pin stripe inlay. Most manufacturers recommend a double-fluted 1/2" bit for producing a high-quality cut for seams. In some circumstances a 3/8" single flute carbide bit can be used for utility cutting with a router. The reduced width saves material and energy on the cut and, for most cases, produces a fine quality cut. With a good router & straightedge system, the 3/8" bit can produce a seam-quality cut but is highly dependent on the skill of the operator.

Miter Saws

A triple chip bevel solid surface saw blade should be used for clean cuts. Generally these saws require a 10" (254mm) diameter blade with 60-80 teeth or a 12" (305mm) diameter blade with 70-100 teeth. All blades need to be manufactured specifically for use with solid surface products.

Dust Control

For both health and quality considerations, good dust control is a top priority.

Sanders

For finishing Durasein® countertops, good quality random-orbital sanders are recommended.

Vacuum Clamps

Seam quality and reduced labor are the two important results that are received when using vacuum clamps.

Tools & Supplies

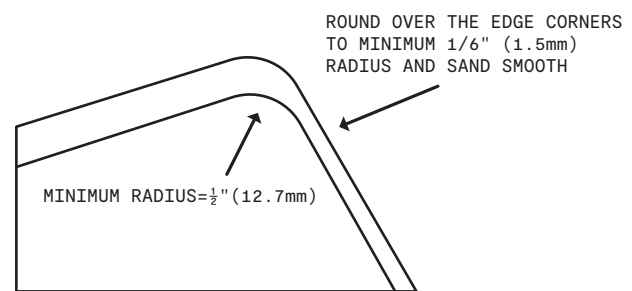
Here is a basic list of typical tooling & supplies used during installation of fabricated products:

- 1/16" shims (laminated samples or similar)
- Appropriate grit sandpapers (120, 180 and 240 grits or similar) and polishing pad
- Bar clamps
- Belt sander (for scribing only). Do not use belt sanders on the surface of Durasein® materials.
- Carpenter's square
- Caulking gun
- Circular saw with straightedge rail and solid surface blade
- Clean, white rags, paper towels
- Color-appropriate silicone caulk
- Combination square
- Denatured alcohol
- Drywall square for panel layout
- Dust extractor (shop vacuum – preferably 2-stage filtering)
- Dust mask
- Extension cord(s)
- Flexible panel adhesive
- General purpose spray cleaner
- Glue blocks & clamps for hard-seaming sheets
- Glue gun and hot-melt glue
- Hearing protection
- Levels (2 foot, 4 foot and 6 foot)
- Masking tape
- Pencil(s)
- Portable work station (sawhorses with 2 x 4 rails or other suitable work table)
- Power drill with hole saw(s)
- Random orbital sander for finishing
- Roundover router bit for exposed finished edges
- Router and bit for making cutouts
- Safety glasses or protective goggles
- Sheets of plastic film, tarps and or drop cloths
- Spring Clamps
- Suction cups for panel lifting
- Tape measure
- Templates for making cutouts
- Utility knife
- Vacuum Clamps for Seams

Cutouts

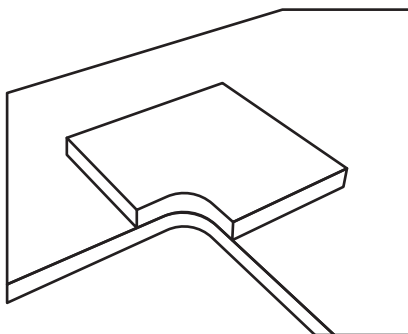
All cutouts in solid surfacing need to be made with a router. The minimum required radius for an inside corner of a cutout in Durasein® solid surface is $\frac{1}{2}$ " (12.7 mm). For consistency and quality control, all cutouts should be made with a template and appropriate router bits and guides.

The top and bottom edges of all cutouts should be smoothed with a router bit and/or sandpaper. This is to remove any stress risers created in the cutting process. The elimination of stress risers is critical to the successful performance of a cutout.



The use of quality fabrication techniques and state-of-the-art methods and details is critical for worry-free performance of cooktop and range cutouts. Durasein® expects that fabricators will be committed to always using the best fabrication practices for cutouts in Durasein® products.

Bevel edges are not a requirement for high strength cooktop corners. However, the block size is required to be at least 4" x 4" x $\frac{1}{2}$ " thick (102 mm x 102 mm x 12.7 mm thick).

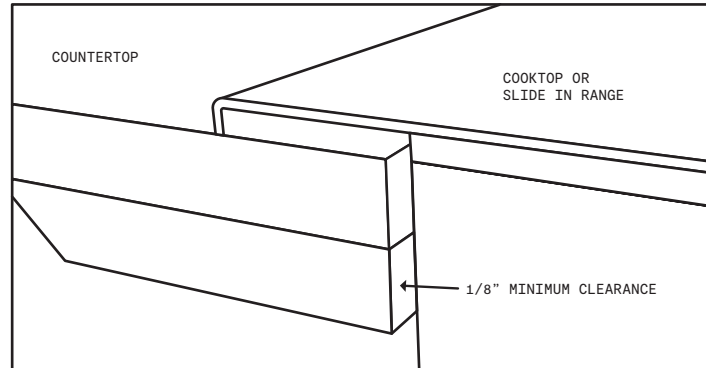


Always make cutouts with a router.
Smooth all edges of cutouts.
Use high-strength corner blocks.
Corner blocks must be at least 4" x 4".
Bevels are not required.

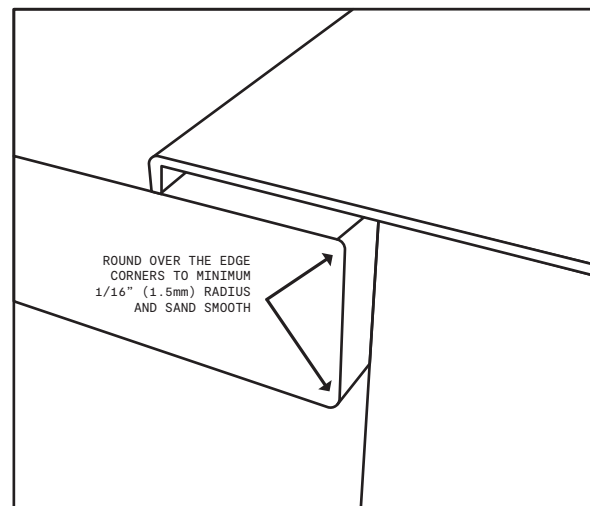
Cutouts

Always allow room for expansion and contraction of the Durasein® top and the cooktop unit. Ensure that edges have a 1/8" (3mm) minimum clearance on all sides around cook-top or range top allow for expansion, contraction and an air gap to release heat.

(NOTE: Heat tape not shown for clarity)



Always remove stress risers by routing or sanding smooth both the top and bottom of the edge of the cutout with a minimum 1/16" (1.5 mm) radius edge. Follow up by sanding smooth with 150-180 grit sandpaper. This will minimize stress risers and create a stronger cutout.



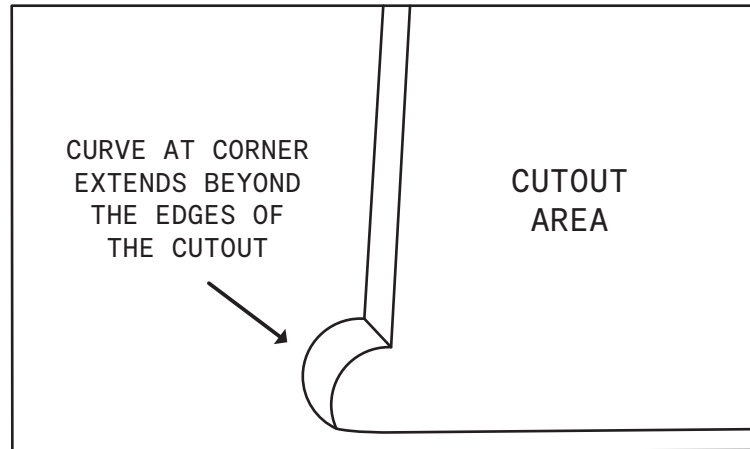
Always use reinforcement blocks at all four corners of cooktop cutouts. Durasein® does not require beveled edges for the high strength corner blocks. However, the minimum size requirement for the blocks is 4" x4" x 1/2" thick (102 mm x 102 mm x 12.7 mm thick).

Always provide the largest possible radius in the corners of cooktop cutouts. A 1/2" (12.7 mm) radius is the recommended minimum cutout radius. The objective is to get the largest possible radius without extending beyond the flange of the cooktop. The corner blocks also need to be the same shape.

If the cooktop flange size and other dimensional requirements allow, stronger corners can be achieved with a corner cutout shape as shown here:

Cutouts

By using this shape, the radius of the corner can be made as large as the overhang of the cooktop flange will allow.

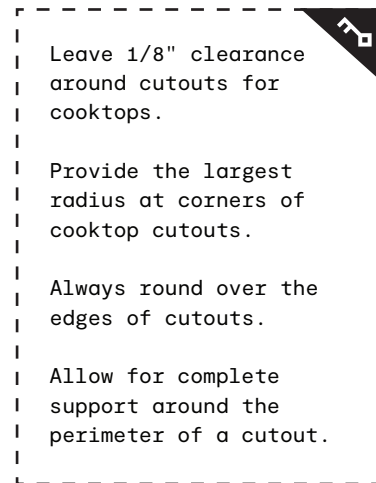


Potential Problems with Cook-top and Range Cutouts:

1. Excessive Heat
2. Stress points in the cut-out
3. Not enough space between the cook-top appliance and the countertop
4. Insufficient support
5. High-strength blocks are not large enough or thick enough

Prevention:

1. Make the cut-out as big as possible to provide space between the cooktop appliance and Durasein®.
2. Apply a heat barrier tape that will deflect heat away from the Durasein® surface and provide a protective barrier against heat.
3. Always use a router for the cut-out and smooth edges to release heat and avoid stress risers ("crack starters").
4. Always sand smooth all edges of the cutout and corner blocks.
5. Use solid surface reinforcing blocks at the corners of cooktop cutouts.
6. Make the radius at the corners of the cutout as large as possible with a minimum of ½" radius.
7. Completely support the perimeter of the cutout area. No full underlayment.



Bowl Mounting

In this section, we will present suggested methods for mounting sink and vanity bowls in a Durasein® countertop. These methods are:

- Seamed Undermount Bowl
- Stainless Steel Undermount Bowl
- Undermount Generic Bowl
- Cast Iron Undermount Bowl
- Top Mount Bowl
- Vessel Bowl

Seamed Undermount Bowl

Seaming a solid surface bowl to the underside of a Durasein® top

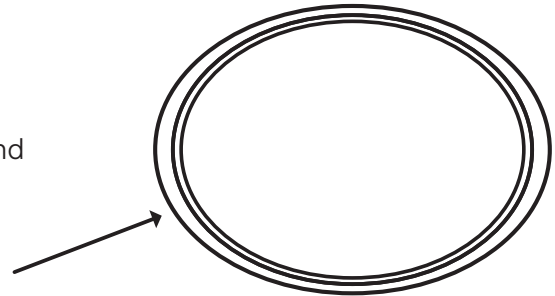
Positioning

- Turn the solid surface sheet back-side up on a well-supported surface. Position the bowl on the sheet. Be sure to allow for the front rail of the cabinet and for plumbing considerations.
- Draw a pencil line on the sheet around the perimeter of the bowl. Drill a 1"-2" (25-50mm) pilot hole, with a hole-saw or plunge router, in the sheet in line with the drain hole of the bowl.
- Mark the location of 4 positioning blocks as shown. These blocks can be scrap pieces of wood or solid surface approximately 1"x 1 1/2" x 1/2" (25mm x 37.7mm x 12.7mm) thick.
- Fasten the blocks to the back of the sheet using hot melt adhesive or other suitable adhesive. Leave a slight gap between the block and the sink to allow the sink to be placed without scraping the block.
- Clean and, if necessary, sand the underside of the sheet where the bowl is to be bonded. This removes factory sanding lines or scuff marks.
- Clean and, if necessary, sand the top flange of the bowl. Do not round over or nick the inside edge of the rim.

Bowl Mounting

Bonding

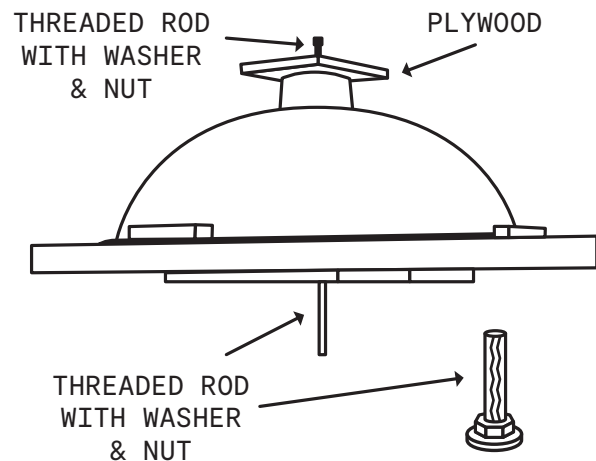
Remove the bowl and clean the sheet bonding area and the bowl flange with denatured alcohol and let it dry. Mix the seam adhesive and apply it to the bowl flange. Apply carefully and use a healthy bead of adhesive to assure 100% coverage.



There are several different methods when it comes to clamping the bowl or sink in place. A few common methods are:

Use all-thread, two blocks of plywood, and a wing nut to clamp the bowl to the sheet. Tighten the clamp until the seam adhesive squeezes out evenly. Allow the seam adhesive to harden.

A similar clamp can also be constructed using standard pipe clamp hardware or sliding bar clamp. Do not over tighten. This will starve the seam of adhesive and lead to seam failure. It could also build stress into the bowl. Use only hand pressure to tighten the clamp.



Bags of sand or a very dense granular material can be placed on top of the drain thus providing an even force on the bowl flange. Be sure the sheet is properly supported so it will not bow or flex thus not allowing the bowl to properly seat.

Bowl Mounting

Deep jawed clamps such as mechanics vice-grip pliers can be strategically placed around the perimeter of the bowl flange.

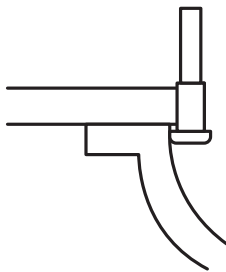
Vacuum plug clamping system

- A specially designed vacuum plug is installed in the drain hole after the bowl with adhesive has been positioned.
- The vacuum is created by either a vacuum pump or a venturi built into the unit.
- This method is performed prior to drilling with the hole saw into the sheet.

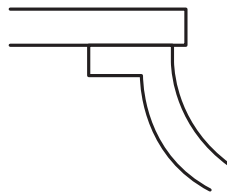
Note: With whatever clamping method used always keep in mind the amount of labor involved and do everything possible to minimize your labor costs.

Shaping the Edge

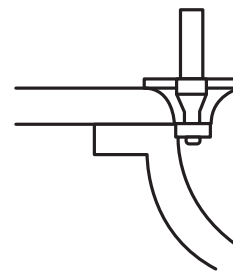
Turn the top over and cut the sheet material from the center of the bowl area with a special flush-cut router bit with an oversized nylon bearing. Start from the pilot hole and rout clockwise around the bowl. Hold the cutout steady as it separates from the top to avoid damage to the edge. Select desired bowl profile bit and rout clockwise around the bowl. Sand to the desired finish.



Flush Cut with Oversized Bearing



Flush Cut showing Overhang



Profile Bit Cut

Bowl Mounting

Undermount Bowls

Joining an Undermount Bowl to the underside of a Durasein® top

Undermount bowls follow generally the same process as the seamed undermount bowl with the following exceptions:

1. The bowl is usually a different material than the top
2. The cutout needs to be cut and finished prior to the installation of the bowl
3. The cutout needs to be sanded to the same finish as the countertop
4. The cutout sometimes has a routed profile
5. The bowl utilizes a flexible adhesive to bond the bowl to the top
6. Mechanical fasteners are used to clamp the bowl to the top

Positioning

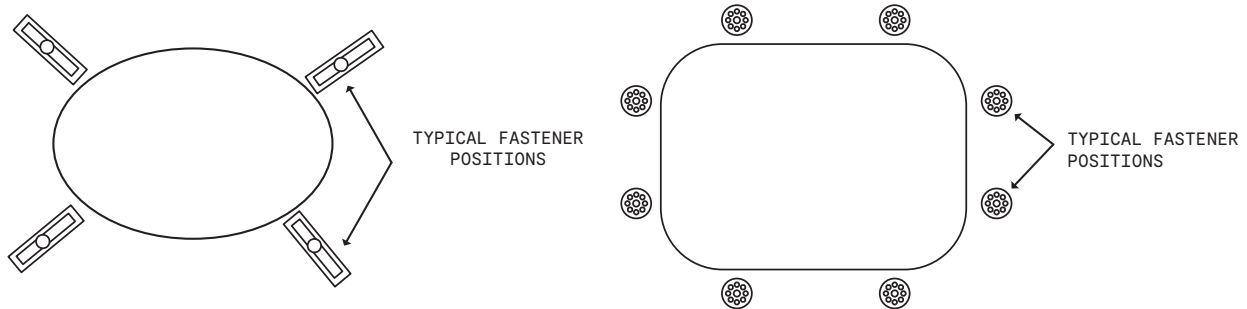
- Lay out the position the bowl on the sheet. Be sure to allow for the front rail of the cabinet and for plumbing considerations. This step can be done with either side of the sheet facing up.
- Cut the bowl opening using a router and template, CNC router or other appropriate routing machinery.
- Profile the finished cutout with appropriate router bit. Be sure the top and bottom edges of the cutout are sanded smooth to eliminate stress risers and to achieve the desired aesthetic.
- Turn the solid surface sheet back-side up on a well-supported surface. Position the bowl on the sheet. Layout the locations for appropriate mechanical fasteners. Positioning blocks, if desired, can also be put in place at this time.

Bowl Mounting

Typical Fasteners

Mechanical fasteners are recommended for undermounting most bowls to a Durasein® top. The most common method is to adhere a device to the top using seam adhesive or an appropriate adhesive engineered specifically for this purpose. Then a fastening clip is connected to the device.

The following drawings show typical locations for mechanical fasteners



Cast iron undermount bowls are very heavy and require additional support. There are several styles of support bars or cradles on the market. When installed properly, these devices support the weight of the bowl and water when in use

Bowl Mounting

Bonding

- Remove the bowl and clean the sheet bonding area and the bowl flange with denatured alcohol and let it dry.
- Install the mechanical fasteners using seam adhesive or an appropriate adhesive engineered specifically for this purpose. Allow to cure completely.
- Use 100% silicone adhesive to bond the bowl to the countertop. Apply carefully and use a healthy bead of adhesive to assure optimal coverage.
- Put the bowl in place on the countertop being sure the reveal is uniform around the perimeter of the bowl.
- Install the fastening clips and tighten. Clean any unwanted adhesive squeeze-out on the inside of the bowl.

Top Mount Bowls

Joining a Top Mount Bowl on a Durasein® top

Most top mount sinks are simply adhered in place with flexible adhesive or clamped using a fastening system supplied by the manufacturer. Always follow the manufacturer's instructions.

Positioning

- Lay out the position the bowl on the sheet. Be sure to allow for the front rail of the cabinet and for plumbing considerations. This step can be done with either side of the sheet facing up. When available, use the manufacturer's template for laying out the cutout.

Bowl Mounting

- Cut the bowl opening using a router and template, CNC router or other appropriate routing machinery. Do not use jig saws.
- Be sure the top and bottom edges of the cutout are sanded smooth to eliminate stress risers.

Bonding

- Clean the sheet bonding area and the bowl flange with denatured alcohol and let it dry.
- Follow the sink manufacturer's instructions for installation.
- Use 100% silicone adhesive to bond the bowl to the countertop. Apply carefully and use a healthy bead of adhesive to assure optimal coverage.
- Put the bowl in place on the countertop being sure the position is uniform around the perimeter of the bowl.
- If required, install the fastening clips and tighten. Clean any unwanted adhesive squeeze-out.

Bowl Mounting

Vessel Bowl

Joining a Vessel Bowl on a Durasein® top

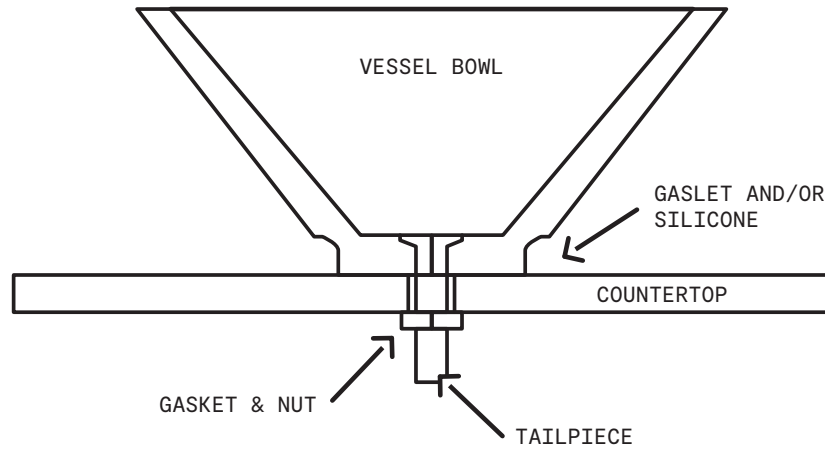
Positioning

- Lay out the position the bowl on the sheet. Be sure to allow for the front rail of the cabinet and for plumbing considerations. This step can be done with either side of the sheet facing up. When available, use the manufacturer's template for laying out the cutout.
- Cut the tailpiece opening using a hole saw or router and template. Do not use spade bits or auger bits.
- Be sure the top and bottom edges of the cutout are sanded smooth to eliminate stress risers.

Bonding

- Clean the sheet bonding area and the bowl base with denatured alcohol and let it dry.
- Follow the sink manufacturer's instructions for installation.
- Use 100% silicone adhesive to bond the bowl to the countertop. Apply carefully and use a healthy bead of adhesive to assure optimal coverage.
- Put the bowl in place on the countertop being sure the position is uniform around the perimeter of the bowl.
- Install the drain and tailpiece hardware and tighten. Clean any unwanted adhesive squeeze-out.

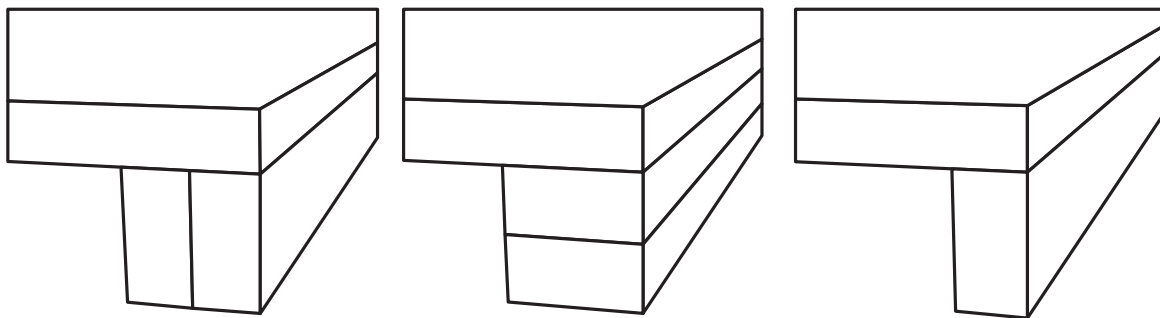
Bowl Mounting



- Always make bowl cutouts with a router.
- Always sand smooth the top and bottom edges of any cutouts.
- Support cast iron sinks with a mechanical support.
- Use only seam adhesive for adhering undermount solid surface bowls.

Edge & Inside Corners

Although there are many styles of edges that can be accomplished with Durasein® solid surface, we will address in this section the three predominant styles of built-up edges:

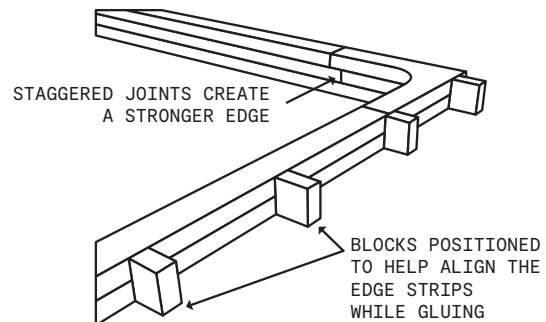


Vertical Stacked Edge

Horizontal Stacked Edge

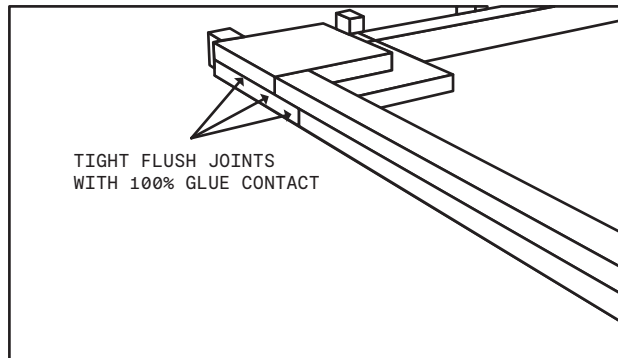
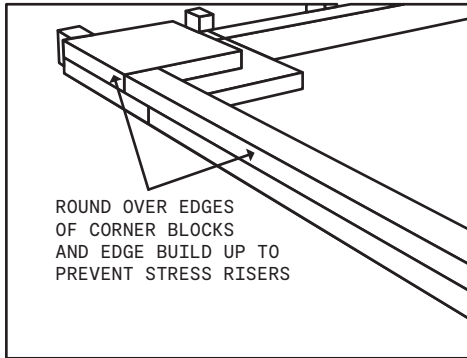
Single Vertical Drop Edge

Edges are generally created by attaching strips of material to the countertop deck using solid surface seam adhesive. When using either the vertical or the horizontal style, it is recommended that the seams in the strips be staggered wherever possible. This will create stronger joints in the build-up strips.

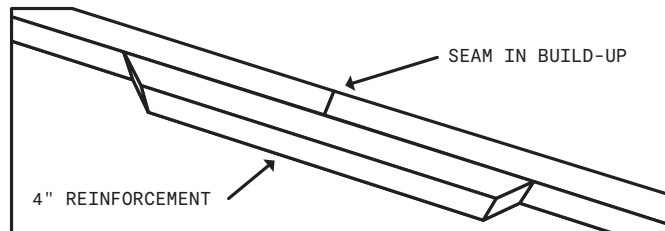
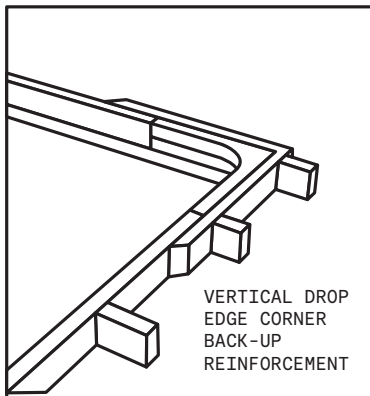


The inside corner blocks should be at least 3"- 4" square prior to fabrication. If your edges are layered as a vertical or horizontal stacked edge, ensure the joints are staggered in order to increase strength and integrity of this area. Varying the size of the two square corner pieces will help accomplish this.

Edge & Inside Corners

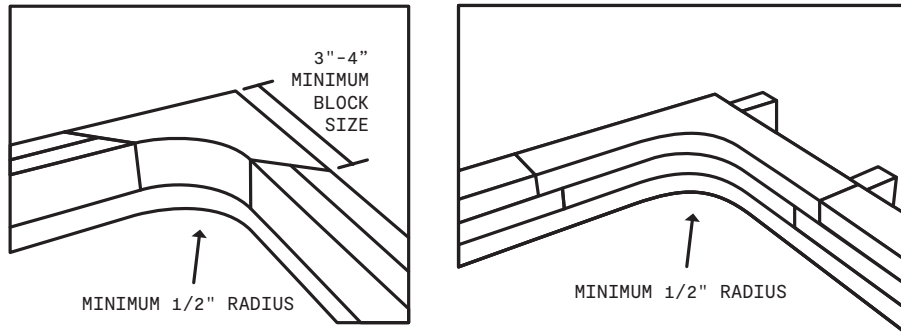


For single vertical drop edges, reinforce the inside corner with a backing strip that extends at least one inch (25 mm) beyond where the inside block and front edge strip meet. Additionally, reinforce any butt seams in the vertical edge strip with 4" long backer reinforcement with beveled ends.



Durasein® solid surface requires a minimum 1/2" (12mm) radius on countertop inside corners. In addition to other drawings in this section, the following diagrams show some suggested details of the corner build up.

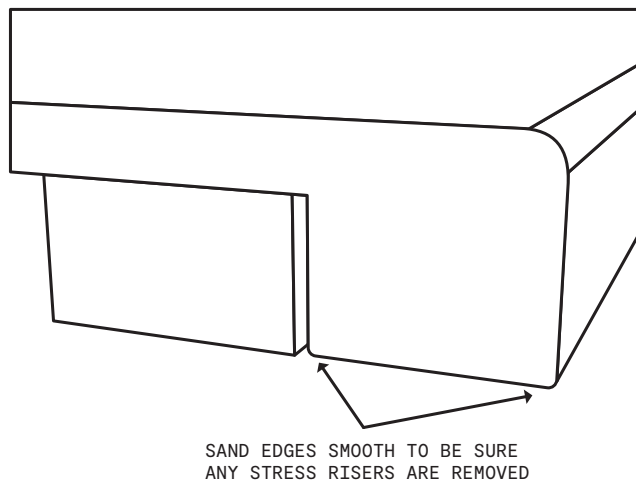
Edge & Inside Corners



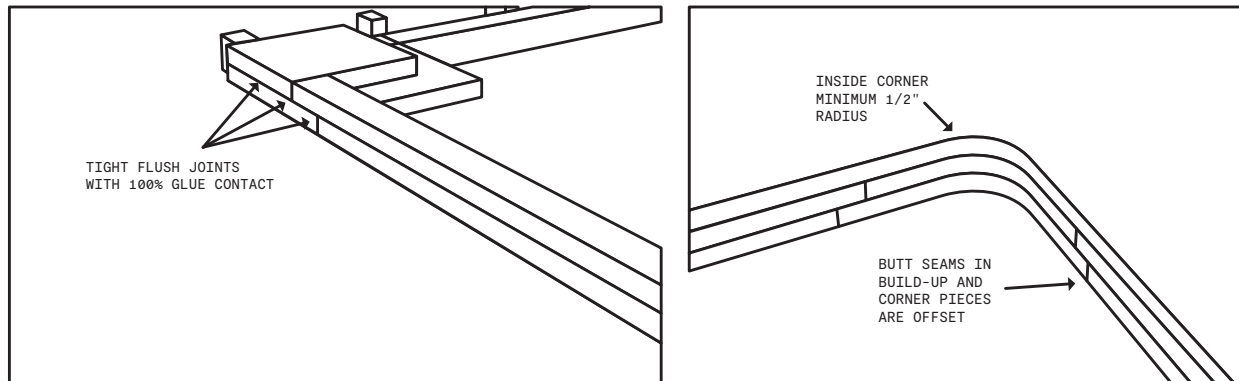
Inside corners of countertops can be sensitive to stresses and therefore need special attention. When planning, fabricating and installing “U” and “L” shaped configurations please follow these guidelines:

Make the radius of an inside corner as large as is practical to help to provide structural strength to the corner. We recommend a 1” radius to provide both aesthetic and structural benefits.

Be sure all corner blocks and edge build-up have been sanded to remove any potential stress risers. This includes the back face of the build-up pieces and the exposed outside corners of the build-up.



Edge & Inside Corners



Be sure that all joints in the edge build-up are flush at the rear of the build-up. Even small offsets can be areas where stress cracks can start

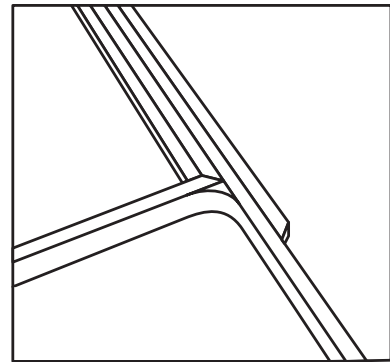
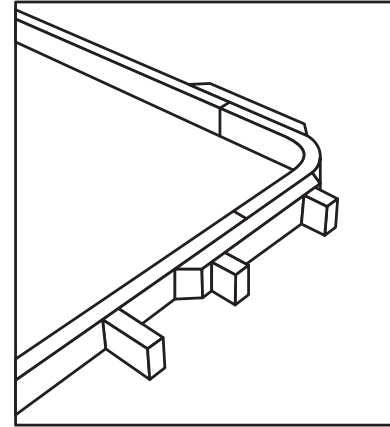
Tips for Edges & Corners

1. Be sure that all joints in the edge build-up are flush at the rear of the build-up. Even small offsets can create areas where stress cracks can start.
2. Be sure seams are 100% filled with seam adhesive. Voids in joints can be severe stress risers. A crack can start in the joint and migrate up into the deck.
3. Support corner areas properly. Be sure the cabinetry and support pieces can prevent flexing of the countertop at the corner.
4. Be sure that both sides of the countertop at an inside corner are level and flat.
5. Use flexible adhesives to adhere the countertop to supports and cabinetry.
6. Be sure to leave room for expansion and contraction between the support components and the countertop

Edge & Inside Corners

Thermoformed Corners

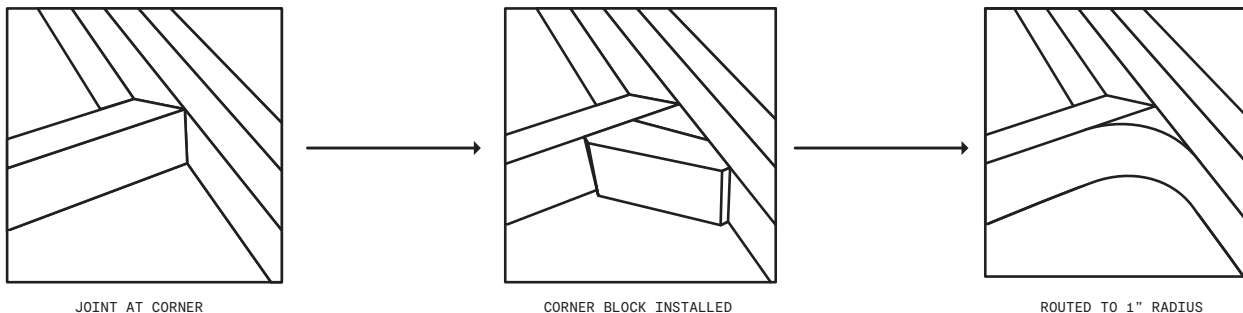
This method is similar in construction to standard vertical edges only the strips for the corners are heated and bent into the proper radius. When performing this operation ensure the edge which meets the underside of the deck is sanded or machined flat in order to produce a proper inconspicuous seam. When a thermoformed corner is combined with the single vertical drop edge, reinforcements must be placed at each location where the end of the thermoformed corner meets the straight vertical build-up. The reinforcement strips must be beveled 45° at each end. This procedure applies to both inside and outside radius corners.



V-grooving Technology

The main difference is that this process is used to join two countertops that have been V-grooved. This requires that the seam is now located at the inside corner. In order to accomplish an appropriate inside corner, you will need to add extra support strips to help reinforce the inside corner. For the shorter section of the countertop, the support strip needs to run completely from front to back of the countertop depth. The other longer supporting strip needs to extend at least 1" (25 mm) beyond the inside corner block.

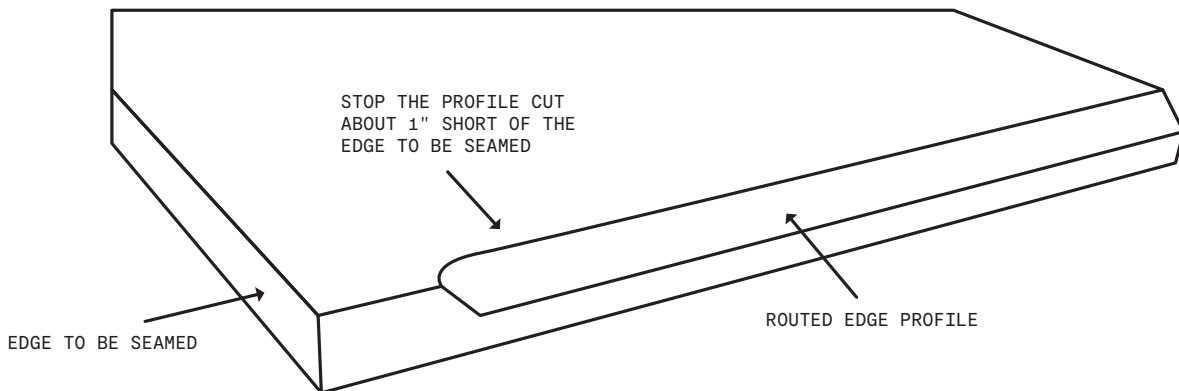
Additionally, a block will need to be seamed into the inside corner and routed to create the required 1" (25mm) inside corner radius.



Edge & Inside Corners

A wide variety of router bits are available to create the desired aesthetic for the countertop edge. For hand routing, size your router appropriately for the type of bit being used. Smaller diameter profiles require less horsepower than larger profiles. Also, for larger profiles, use a plunge router and cut the profile in steps. This will create less chatter in your final cut.

If you need to do a field seam, you might find it useful to stop your routed profile an inch or so short of the edge to be seamed. By doing this on both sides of the seam, you may find it easier in the field to match the front edge and profile. Be sure to use the same profile bit and router depth setting to rout the remaining section after the seam has been made



- Stagger joints in built-up strips for stronger edges
- Reinforce joints in single vertical drop edges
- Keep back faces of build-up strips flush to eliminate stress risers
- Sand smooth all exposed edges of build-ups
- Use 1/2" (12mm) inside corner radiuses for inside corners of countertops

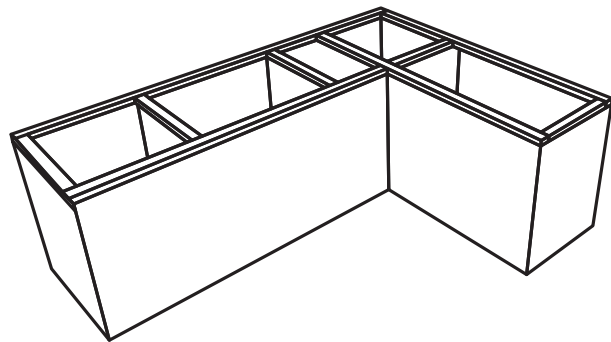
Support

Correct support is a factor that is often overlooked in solid surface countertops. A properly supported countertop will resist flexion and the stresses that accompany it. This results in a countertop that is resistant to the normal wear and tear and mild abuse of a typical kitchen installation.

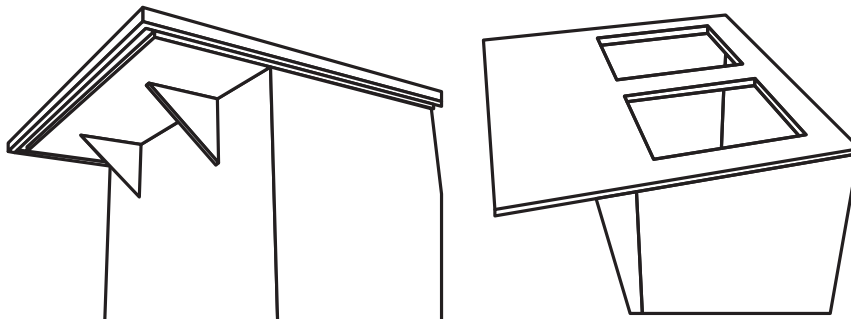
Here are the key factors for successful countertop support:

1. Use support materials that are appropriate for the application. For the best results, use MDF, moisture resistant MDF (MRMDF), plywood, solid wood and similar products. Metal can also be used in cases where superior strength is needed. Particle Board and Oriented Strand Board (OSB) typically do not have the flexural strength required for good support. They also expand excessively with contact to moisture

2. For a typical kitchen installation, use support strips at the front and rear of the cabinets plus front-to-back pieces at each cabinet side. The support strips are generally applied in the shop to the underside of the countertop. This illustration shows how the support strips should be mounted in conjunction with the cabinet boxes.

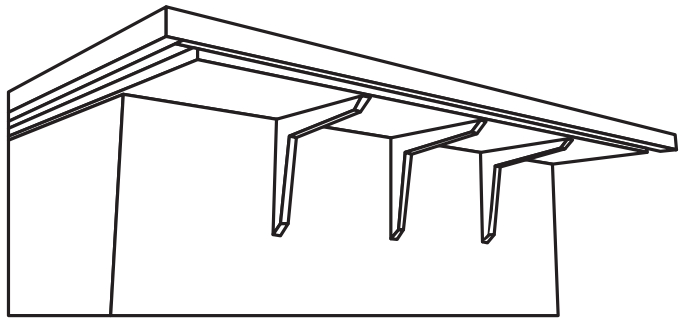


3. Support overhangs with additional elements so that the flexion at the farthest edge of the extension is minimized. This can be done best with cantilevered metal or wood supports. Continuous plywood with cutouts can also be used as long as it is independently supported by the cabinets. Do not use full underlayment in kitchen applications or other areas that may be subject to heat above 170° F.



Support

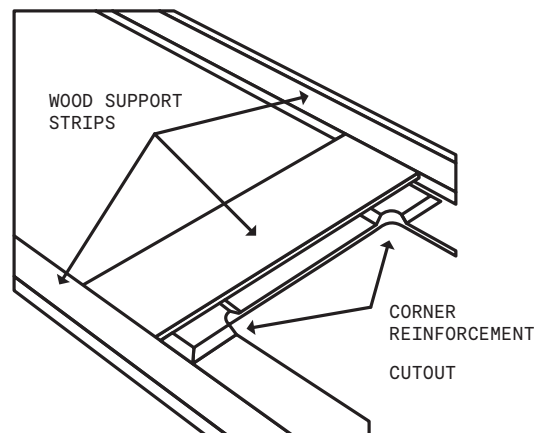
- Use support materials that are appropriate for the application. For the best results, use MDF, moisture resistant MDF (MRMDF), plywood, solid wood and similar products. Metal can also be used in cases where superior strength is needed. Particle Board and Oriented Strand Board (OSB) typically do not have the flexural strength required for good support. They also expand excessively with contact to moisture
- Corbels, brackets and legs can be used for overhang support in combination with the materials indicated above. The table below shows suggested support materials for various overhangs.



DURASEIN® SOLID SURFACE	LENGTH OF OVERHANG	SUPPORT RECOMMENDATION
Standard ½" (12mm) Countertop	Up to 6"	No additional support
Standard ½" (12mm) Countertop	6" to 12" (150-300mm)	1" plywood and/or corbels
Standard ½" (12mm) Countertop	12" to 18" (300mm-450mm)	Plywood with support brackets
Standard ½" (12mm) Countertop	Over 18" (450mm)	Plywood with legs or columns
Special Countertops	Varies	Welded steel Framework

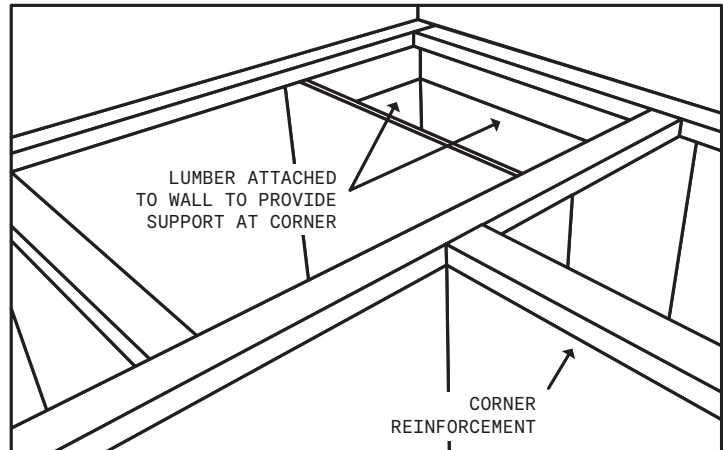
- Cutouts need support, particularly when weight, vibration and heat are factors. It is best to have good support within 2"-3" of all the edges of the cutout.

When corner reinforcement blocks are encountered special care needs to be taken to be sure that both the countertop deck and the corner blocks are supported



Support

7. Corner cabinets can have insufficient support for countertops. In “U” and “L” shaped configurations, be sure there is satisfactory support under the countertops at all corners. For corner cabinet configurations that do not provide a cabinet box in the corner, you will need to add strips of wood along the wall and tied into the wall studs. Inside corners are sensitive to stresses so the support needs to eliminate flexing of the corner area. This is frequently encountered with “Lazy Susan” cabinets.



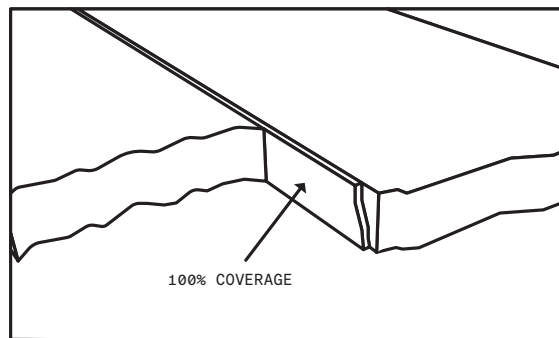
Appropriate support materials are MDF, MRMDF, solid wood and metal.
Support needs to be located within 2-3" (50-75mm) of all cutouts.
Do not use full underlayment.
Be sure inside corners are fully supported.

Seams

Seams are an essential element for solid surfacing. The monolithic look achieved by a well-done seam is a key selling feature and one of the factors that customers look for in a quality installation.

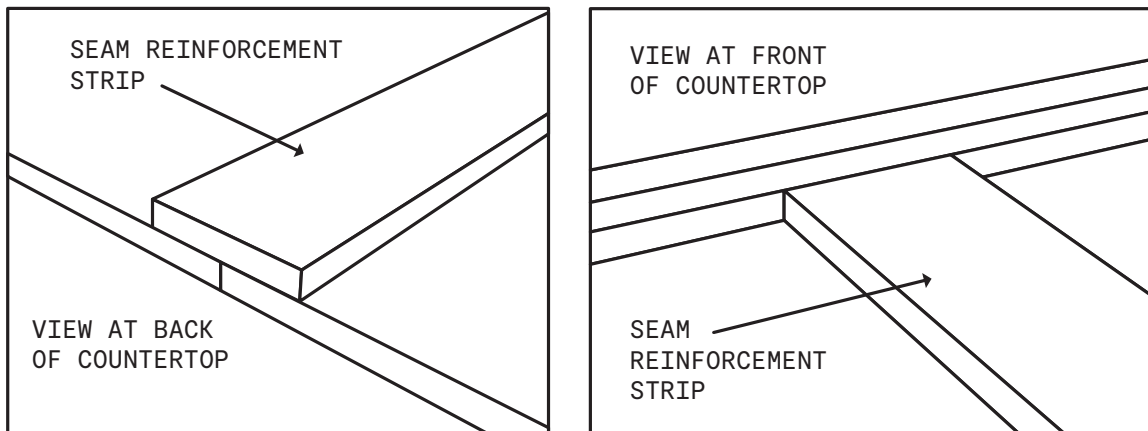
Factors contributing to a professional seam in solid surfacing include:

1. Always use the correct color adhesive. Consult the manufacturer's color match recommendations for the best results.
2. The best results for preparing the faces to be seamed include a router and accurate straight edges or a mirror-cut procedure. There are some saw blades that can make "seam-quality smooth" cuts, however these are dependent on the condition of the blade and the type of saw being used to make the cut. Guidelines for the best saw blade is one that is Triple Chip Tooth and a 10 degree rake having a minimum 6 teeth per inch. The router option is still the best to ensure a smooth cut.
3. Keep things clean. Clean the faces to be seamed thoroughly with denatured alcohol. Be sure dirt, debris, ink, marker or pencil marks are removed. This includes the sheet batch and sequence numbers printed on the sheet. Even marks on the bottom can show up as dark areas in the seam if they are not thoroughly removed before the seam adhesive is applied.
4. Apply the seam adhesive thoroughly and properly. 100% coverage is important. Consult the adhesive manufacturer's instructions.

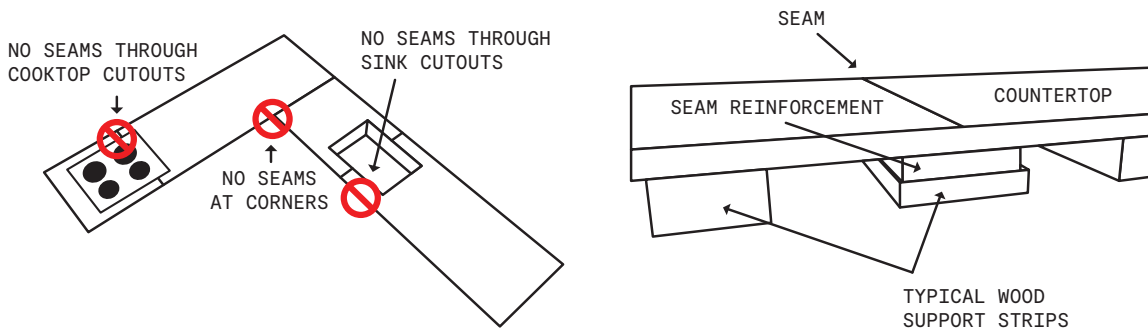


Seams

5. Clamp the seam properly. There are many clamping systems on the market today that will produce quality results. One factor to consider is that over-clamping can reduce the amount of material in the seam and consequently reduce the strength of the seam.
6. Align the sheets accurately for a deck seam. Using a vacuum clamping system can help to align the sheets from the top, thus reducing sanding time after the seam adhesive has cured.
7. Always use seam reinforcements. The reinforcement should be at least 2" (51 mm) wide and it needs to be continuous for the full length of the seam.



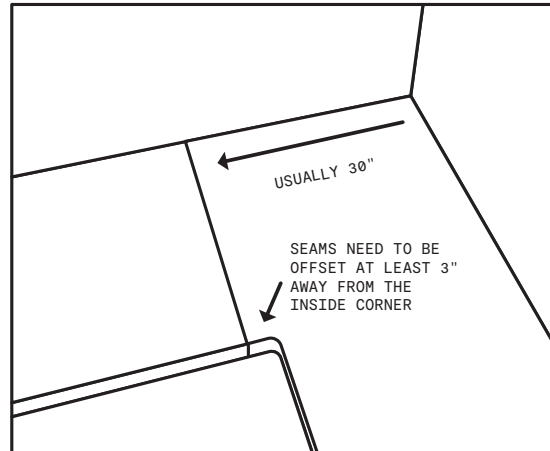
8. At a minimum, seams need to be supported at both ends. Continuous wood or metal support under the reinforcement piece is recommended.



Seams

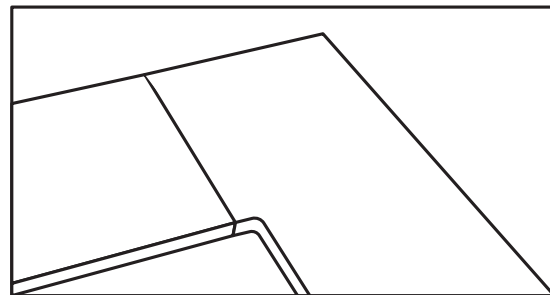
To reduce the potential for stress damage to seams follow these guidelines:

- Do not place seams at corners
- Place deck seams at least 3"(75 mm) away from inside corners
- Avoid seams through cutouts
- Place seams at least 3"(75 mm) away from cutouts
- Butt seams in edge build-up strips should be at least 2" (51 mm) away from inside corners.



Corner Details for Directional Patterns

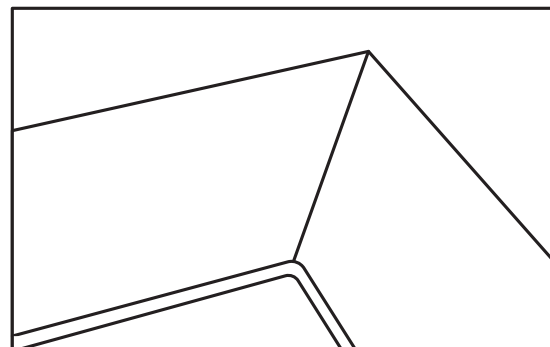
The inside corner using the traditional detail with the deck pieces on the return leg rotated so that the directional pattern is parallel with the corner piece. This may result in more deck seams to achieve the required length of the top.



Offset Corner

Or

The inside corner is cut at a 45 degree miter. This results in an acceptable aesthetic. The deck seam, however, is located right at the corner and may be susceptible to additional stresses. Therefore, take steps to be sure the cabinets and deck are flat and well supported. The inside corner radius must be at least 1/2".



Mitered Corner

Adhesives

How to Use Durasein® Surfacing Adhesives – Fabrication Techniques

Durasein® Surfacing Adhesives

Deck Seams

- Seams should fit tightly when dry fitted.
- Place a release material (clear packing tape) under the seam to prevent contamination of deck seam.
- Thoroughly clean areas to be seamed with denatured alcohol using clean white shop rag.
- Position sheets to be seamed 3/16" to 1/4" apart.
- Prepare clamping materials (Attach glue blocks if using this technique).
- Prepare seam kits. Purge cartridge before installation of mixer tip, then attach mixer tip and purge the tip to ensure proper mixture of adhesive.
- Fill the seam to 1/2 full.
- Slide the sheets together. Make sure there is adhesive squeeze out along entire seam.
- Clamp the seam together.
- DO NOT OVERTIGHTEN clamps. Over tightening will cause starved, weak seams.
- Remove cured adhesive squeeze out with router on “skis,” surface leveller, or random orbital sander. Do not scrape, chisel or use belt sander on seam.

Drop Edges - Stacked

- Sand backside of areas to be seamed.
- Dry fit edge strips and fasten hot melt blocks.
- Clean surfaces to be seamed thoroughly with denatured alcohol and clean white shop rag.
- Purge cartridge and tip to ensure proper mixture of adhesive.
- Apply adhesive and clamp with spring clamps at 2" - 3" intervals.
- Make sure there is adequate glue squeeze out along entire seam. Check carefully for voids.
- Do not sandwich other materials (wood, metal, laminate, etc.) between edges. Use these types of inlays in a routed groove.
- When cured it is ready for routing..

Adhesives

Mitre Fold Drop Edges

- Place sheet material face down on a solid, flat work surface. Clean mitre.
- Apply a 1/16" bead of adhesive in the entire length of the mitre fold seam.
- Also apply a 1/16" bead at one corner to be folded.
- Fold up drop edge and clamp into place. Clamps should be within 2" from each corner and located every 12". Place clamps 1/4" above the face of the panel to ensure proper pressure. NOTE: Once drop edge is folded into place, do not allow the edge to separate from the deck.
- Fold up the end caps and secure in place with spring clamps or 3 way clamps. Clamps should be placed every 2". Place 3 way clamps 1/4" above the face of the panel.
- Adhesive squeeze out is required along entire length of seam and at all corners.
- Allow seam adhesive to cure completely before machining.

Sink Fabrication Techniques

- Scuff area to receive sink using 80 micron or equivalent abrasive.
- Place wooden blocks with hot melt glue to position sink securely during glue up.
- Thoroughly clean areas to be seamed with denatured alcohol using clean white shop rags.
- Apply ample amount of Seam-It Surfacing Adhesives to sink rim.
- Clamp sinks in place
- Check for seam kit squeeze out around entire sink area.
- Remove clamps after seam adhesive hardens.

Thermo-Forming and Adhesives

- All seaming must be completed after the Thermo-Forming process

Adhesives

Here are some tips for proper use of Durasein®seam adhesives.

- Storage - Store in a cool dry place at a temperature between 50F-70 F. Do not use if the product has been exposed to high temperatures for an extended period of time. The cartridge should be stored standing upright and purged immediately after removing the nose plug to eliminate any air that might be trapped in the cartridge. Use within 18 months of date of manufacture. The product can be stored with the mixer tip attached as long as the outlet is clean before attaching a new mixer tip. Adhesives that have been stored in a refrigerator must be brought up to room temperature before use. The product may not mix correctly if it is too thick to pass through a mixer tip or may not achieve enough heat to trigger the chemical reaction. To avoid damage do not heat past 100F.
- Static Mixers - Only use the recommended and supplied mixer tips that have been engineered for the supplied cartridge. Use mixer tips that are clean and free of any blockage. If the material has started to gel in between jobs then discard and reuse a new mixer tip.
- Dispensing Guns – Use a recommended dispenser that is in good working order and free of broken parts. Dispensers with a higher mechanical advantage can cause problems of off ratio mixing. To minimize off-ratio mixing use light constant pressure on the trigger and do not force the adhesives out of the cartridge.
- Cold Sheet Goods - Bring the sheet goods to a temperature of 60F-70F before fabrication. Adhesives that are dispensed and used on cold sheet goods may not fully cure causing bonds of lower strength.
- Fabricator Action - Use the correct trigger action to achieve on ratio mixing. Apply and maintain constant pressure on the trigger, do not stop and let the adhesive run-on in between strokes. Once you come to the end of a stroke rapidly re-trigger the dispenser and maintain the constant pressure once again until either the job or cartridge is completed. If the dispenser is set down for any amount of time purge the contents of the mixing tip as it is possible for off ratio mixing while the cartridge is drooling.
- Seam adhesive is formulated for adhering solid surface to solid surface. Do not use seam adhesive for bonding solid surface to dissimilar materials. Solid surface seam adhesive may be used for the attachment of mechanical fasteners for bowl mounting. When you do need to adhere solid surfacing to dissimilar materials use 100% silicone adhesive or other flexible adhesives as explained below.

Adhesives

Flexible Adhesives

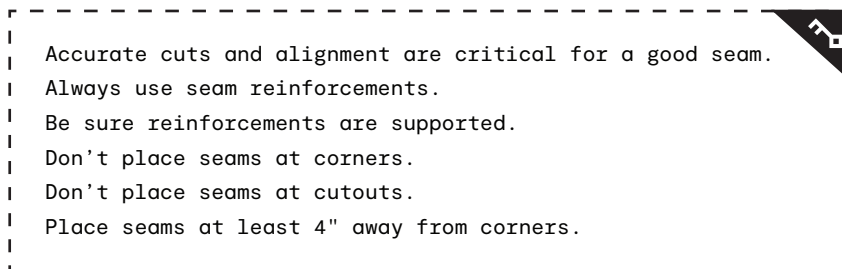
Flexible adhesives are used for joining solid surfacing to dissimilar materials because they have difference expansion and contraction rates. Generally, they allow for the normal expansion and contraction that occurs in each material due to either changes in moisture or changes in temperature.

Here are some tips on flexible adhesives:

- The standard in the industry is 100% silicone adhesive/caulk. This material is used for joining dissimilar materials and for caulking finished installations. When in doubt, use silicone.
- Traditional construction adhesives generally cure rigid and are not appropriate for joining solid surfacing with other materials. During the expansion and contraction process these adhesives may fail thus losing their ability to hold dissimilar material together.
- Recent advances in adhesive technology have resulted in a family of adhesives that result in a flexible joint that is compatible with dissimilar materials. Many of these are urethane-based adhesives that remain flexible after joining. Usually in a caulk tube for ease of application, these are quicker curing, but thicker than silicone. Some have fast tack characteristics. Check with the manufacturer's recommendations to be sure the application is appropriate.

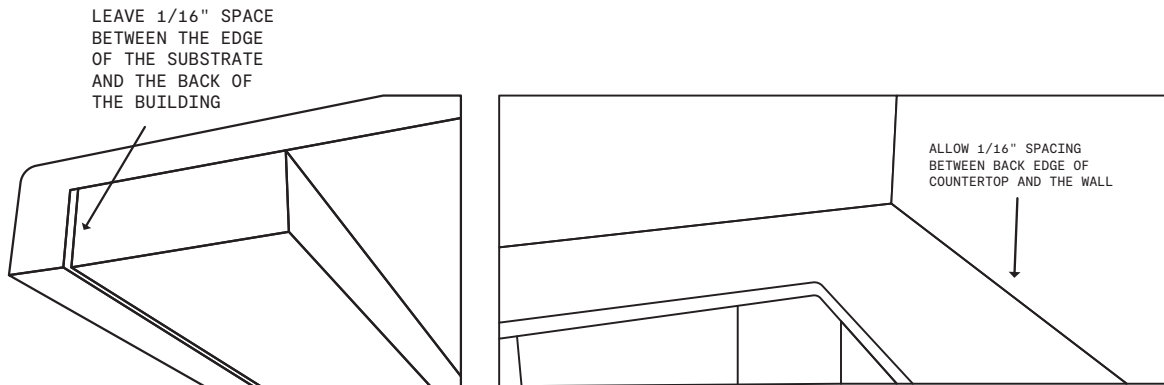
Caulking

For some applications, such as caulking a backsplash to a painted or wallpapered wall, water-based acrylic caulks are appropriate. Although these caulks are inexpensive and easy to work with, their performance properties are inferior to the silicones, and are only for limited, low performance use.



Installation

It is very important that the personnel installing Durasein® solid surface be properly trained and follow the recommended procedures. Improper installation may lead to problems in the future.



Clearances

Be sure to leave 1/16" (1.5 mm) between the edge of the substrate and the back of the buildup.

Leave a minimum 1/16" (1.5mm) between the countertop and the back wall. For wall to wall installations, allow clearance on each end for the expansion (see Expansion and Contraction in the layout section for more details). Allow as much clearance as possible at cook tops and drop-in sinks.

Methods of Support (Substrates)

Choose the substrate appropriate for different applications. Typical substrate materials are:

- MDF
- Moisture Resistant MDF
- Plywood
- Solid Wood
- Tubular Steel

A solid substrate, also known as full underlayment, cannot be used in kitchens and other food service installations because heat may be trapped in the countertop potentially causing warping and cracking.

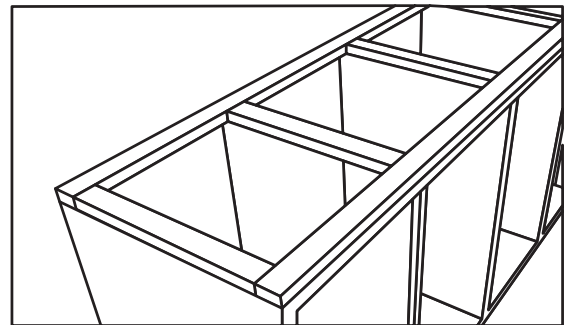
The following methods demonstrate alternatives to solid substrates.

Installation

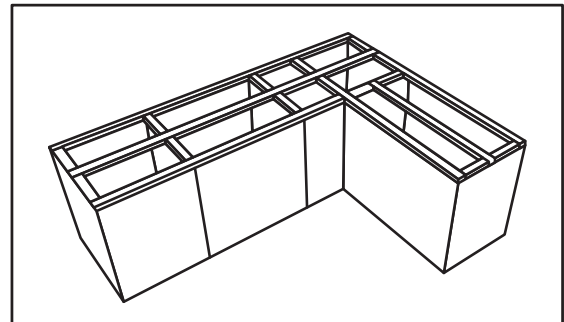
Frame Method

Please Note: Many of these drawings show the support material located on the cabinets. Most fabrication shops attach support strips to the solid surface countertops as part of the manufacturing process. This is acceptable as long as the support strips correspond to the locations of the front rails, cabinet sides and back rail of the cabinets. Additionally, the cabinet top edges need to be flat, level and in the same plane prior to installing the tops. By attaching the support strips during the manufacturing process the tops are less susceptible to damage during handling and transportation.

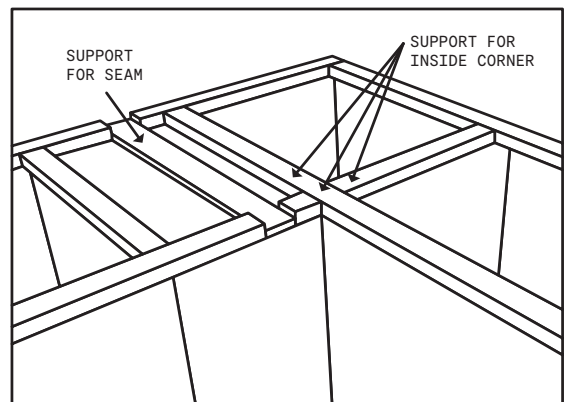
The frame method uses 1"x2" (25mm x 51mm) supports that run parallel to the length of the top. They are at the front and rear edges of the counter top, adhered with dabs of silicone every 18"-24" (457mm-610mm). The cabinets must have cross supports for the runners every 36" (915mm).



In some cases where special support may be indicated, an additional support strip can be placed in the center area of the cabinets, parallel to the front edge of the cabinets.

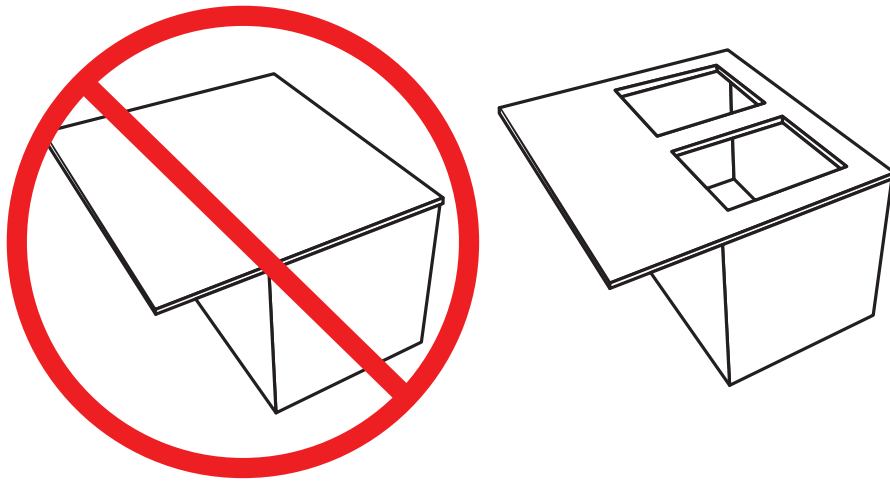
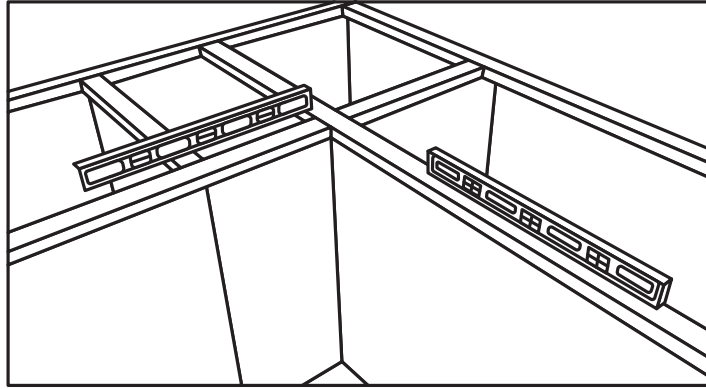


Support corner areas properly. Be sure the cabinetry and support pieces can prevent flexing of the countertop at the corner.



Installation

Be sure that both sides of the countertop at a corner are flat and lying in the same plane



Do not use a full underlayment under any countertops that may be subjected to heat above 170° F. This includes installed appliances like cooktops, warming drawers and commercial food service equipment. Additionally included are appliances that are set on top of the counter such as electric hotplates, coffee makers, electric woks, chafing dishes and similar devices. Even free standing ranges installed next to a countertop may have adverse effects. In any case where heat may be a factor, be sure to use a frame method or to cut out sufficient portions of any support panel to allow for adequate circulation of air to help release heat from the countertop.

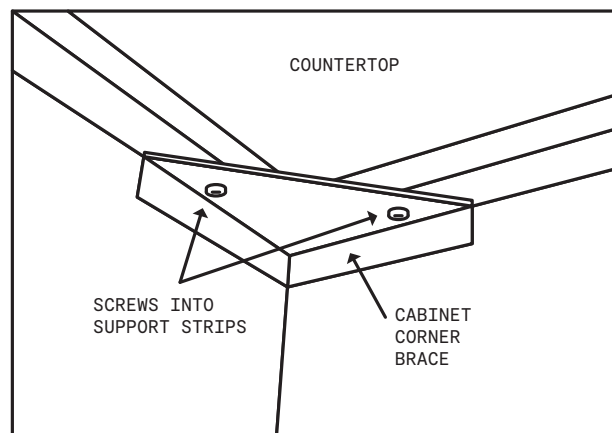
Always use approved substrates.
Don't use full underlayment in areas subject to heat.
Be sure cabinets are flat and in the same plane.
Provide adequate support at inside corners.

Installation

Securing Top to Cabinets

We recommend attaching substrate to the solid surface top first and then fastening it to the cabinets. This way if you ever need to remove the top, you may do so without destroying it. Set the top on pre-leveled cabinets. Screws or flexible adhesives may be used to attach the substrate to the cabinets.

We recommend attaching substrate to the solid surface top first and then fastening it to the cabinets. This way if you ever need to remove the top, you may do so without destroying it. Set the top on pre-leveled cabinets. Screws or flexible adhesives may be used to attach the substrate to the cabinets.



Using Flexible Adhesives

We recommend a high quality 100% Silicone as the best choice for bonding Durasein® solid surface to wooded substrates. NEVER USE STANDARD CONSTRUCTION ADHESIVES or other rigid adhesives. These do not allow for expansion or contraction of the top.

Recent advances in adhesive technology have developed adhesives that remain highly flexible after being cured. This type of adhesive may be appropriate for commercial installations, particularly where time constraints make working with the cure time of silicone a problem. Check with adhesive manufacturers and your Durasein® solid surface technical representative to be sure that you select the appropriate adhesive before using these to adhere Durasein® to wood or other dissimilar materials.

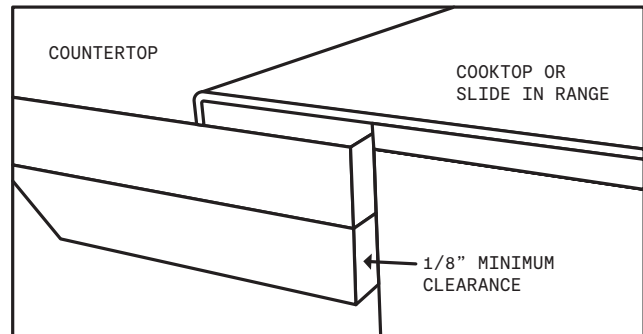
All cut outs should be made with a template and a router and have a minimum 1/2" (12mm) inside corner radius. Ease or radius the top and bottom edges of the cutout and reinforcing blocks and sand smooth. See the CUTOUTS section of this manual for more information.

Corners of cook top cutouts must be reinforced by bonding a 4" (102 mm) x 4" (102 mm) X 1/2" (12.7 mm) or larger piece of solid surface to the underside. Durasein® does not require that all sides of the corner blocks should have a 45° bevel. Beveled corner blocks are permissible but not required.

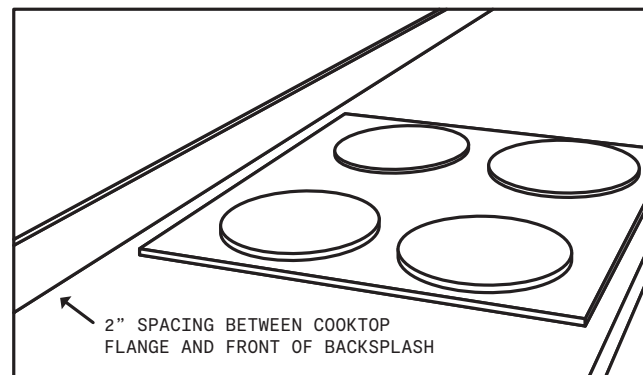
Installation

Use flexible adhesives to secure countertops

Due to excessive heat generated from cook tops and pans being heated, minimum clearances are required for Durasein® solid surface. A minimum 1/8" (3 mm) gap is required between cook top body and the countertop. Make the gap as wide as possible. Heat Tape not shown for clarity



Standard 4" (100 mm) tall splashes should have a minimum clearance of 2" (50 mm) between the splash and the cook top flange. This is to prevent overheating the backsplash from large pots or pans on the rear burners. Use of large oversized pans should be limited to the front burners only. Use of these pans on the back burners or against any wall will generate excessive heat on solid surface panels. This may result in the future failure of the countertop or backsplash.



Heat Reflective Tape

The use of high quality heat reflective tape is required for the prevention of damage due to excessive heat in the cook top cut outs. Failure to use proper tape will increase the potential for thermal stresses to build up and eventually cause a failure.

It is highly recommended to install heat reflective tape in the field at the point of installation. This will avoid the potential for the tape to become damaged or folded over during transportation, thus potentially rendering the heat reflective properties of the tape ineffective.

Installation

Use flexible adhesives to secure countertops

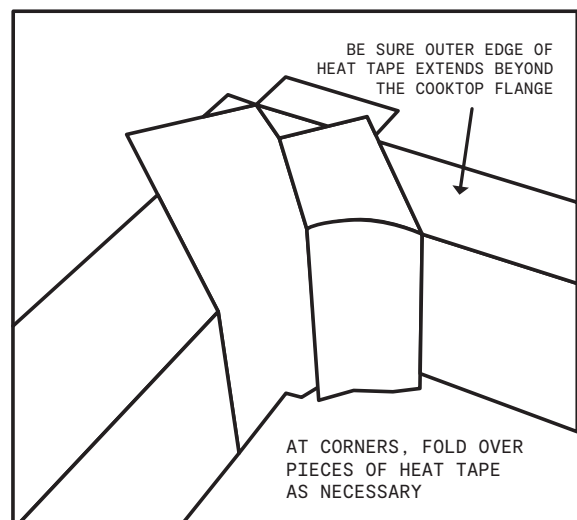
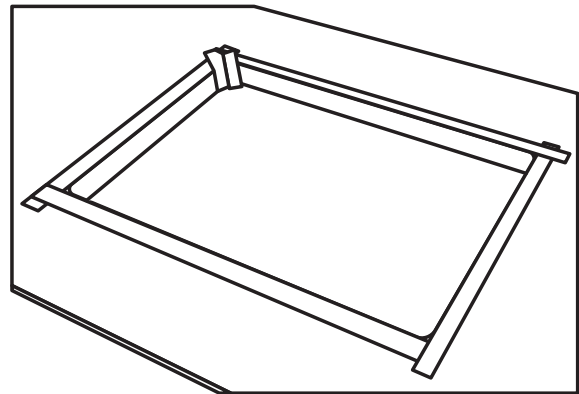
The appropriate tape is a solid aluminum product, 2" wide and approximately 3 mil in total thickness. Please be aware that not all aluminum tapes meet this thickness requirement. In order to conduct heat properly, the tape must be solid aluminum and not be a polymer or other material.

Be careful when working with this tape. It can be sharp and cause an injury. Follow all the manufacturer's safety instructions.

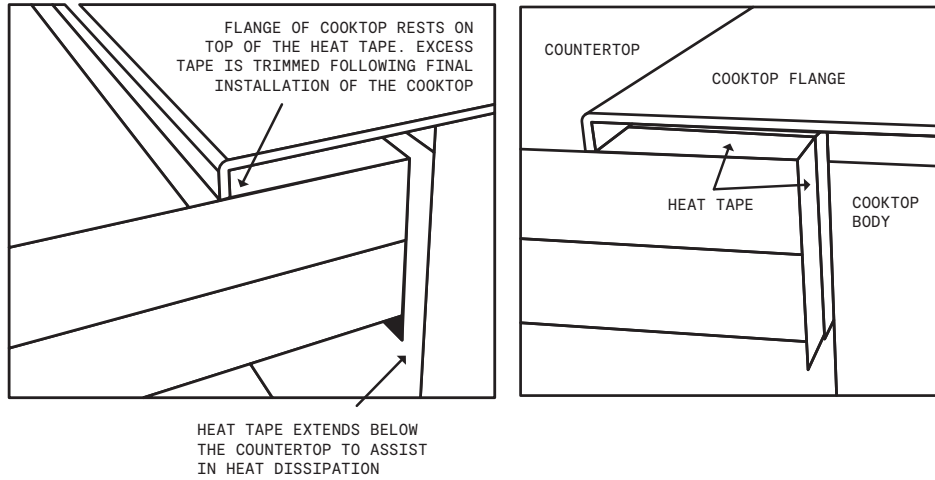
Install a layer of tape around the cut out as shown. The heat tape should extend below the bottom of the countertop to assist in heat dissipation. Do not fold the tape under the bottom of the cutout.

At the corners, use smaller pieces of heat tape. Conform the shape to fit the radius corner. Be sure the tape extends below the bottom of the countertop to help with dissipation of heat.

The flange of the cooktop should rest on the heat reflective tape. Be sure the tape on the deck will extend beyond the flange when the cooktop is installed. The excess is removed by carefully scoring the tape with a knife and removing the unneeded material.

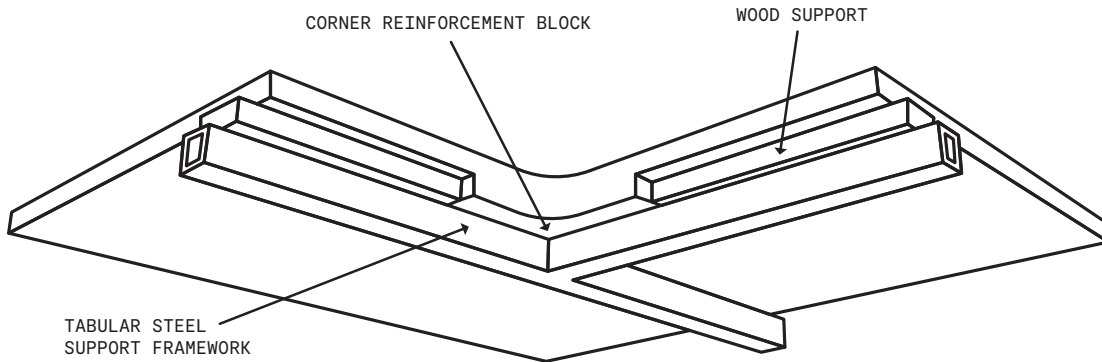
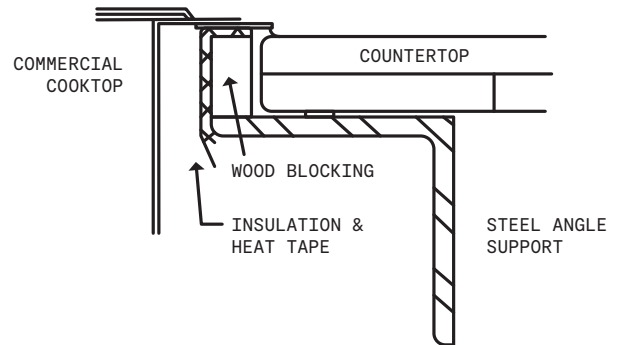


Installation

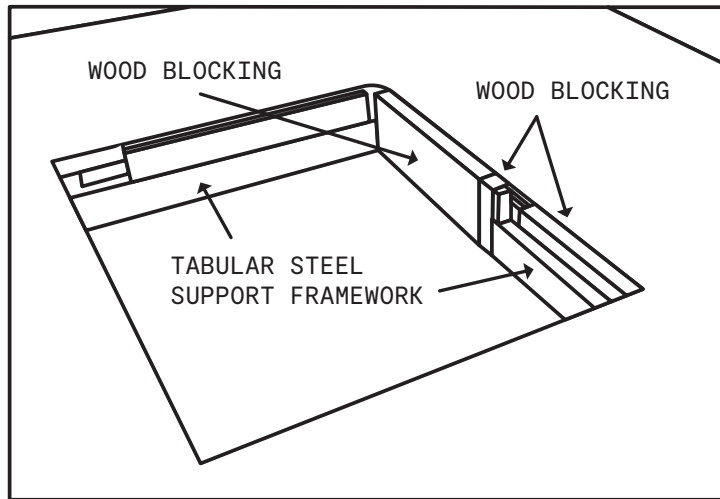


Commercial type cook tops for residential or commercial use need to be supported inside the cabinet base, so that the weight of the cook top is not supported by the countertop.

Some residential cooktops have equivalent heat output to commercial appliances. These may require a commercial type of support and installation to protect the countertop.



Installation



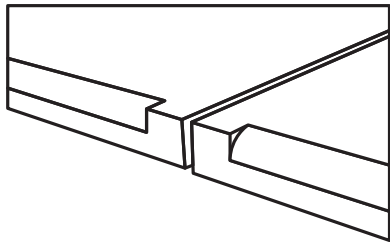
Making Field Seams

For detailed instructions for executing a field seam, refer to the SEAMS section of this manual. Here are the highlights contributing to a professional seam in solid surfacing:

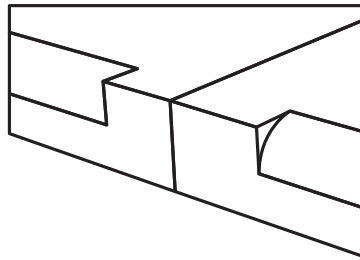
- Always use the correct color adhesive.
- Prepare the faces to be seamed with a router and accurate straight edges or a mirror-cut procedure.
- Keep things clean. Clean the faces to be seamed thoroughly with denatured alcohol.
- Apply the seam adhesive thoroughly and properly.
- Clamp the seam properly
- Align the sheets accurately for a deck seam
- Always use seam reinforcements.
- Seams need to be supported at both ends.

Here's a procedure that you can use to insure that the edge profile is properly aligned after seaming. When routing the edge profile, you can stop routing the profile a short distance from the seam on either side. After completing the seam and removing the flash you may then rout the profile across the seam.

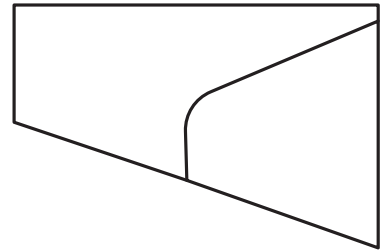
Installation



Profile Routed on Each Piece



Seam Pulled



Re-route Profile to Finish

Use correct heat tape around cutouts for cooktops.
 Always provide adequate space between cutouts and cooktops.
 Cutouts need support to prevent flexing.

Overhangs

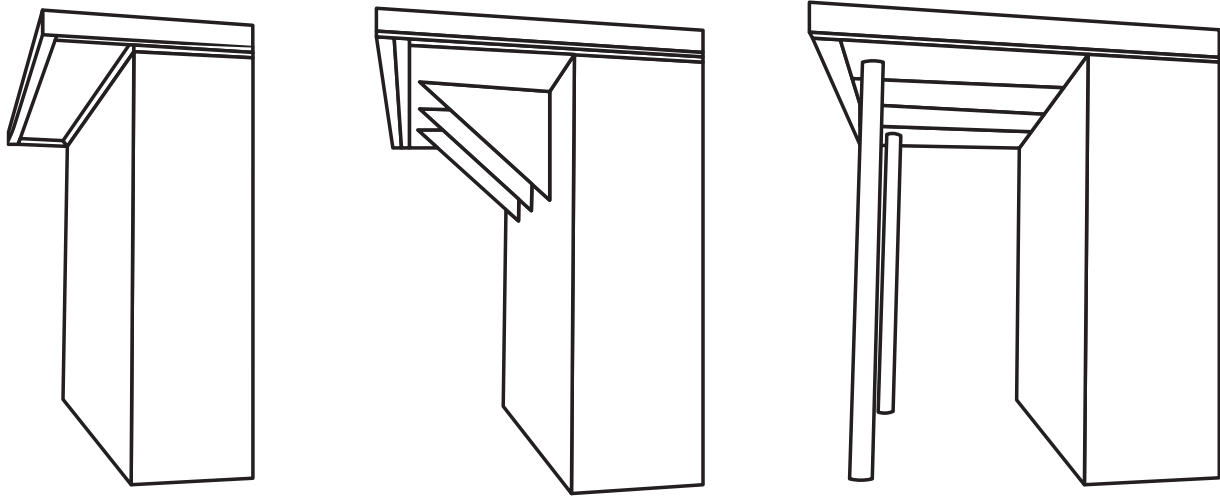
When installing overhanging countertops, support is required for 1/2" (12.7mm) thick overhangs extending more than 6" (152mm).

Support is provided by 1" (25 mm) plywood underlayment and/or brackets designed to . Brackets, when required, are placed no more than 24" (609mm) apart and should come to within 5" (127mm) of the countertop edge.

Refer to the chart below for the type of support to use:

DURASEIN® SOLID SURFACE	LENGTH OF OVERHANG	SUPPORT RECOMMENDATION
Standard 1/2" (12mm) Countertop	Up to 6"	No additional support
Standard 1/2" (12mm) Countertop	6" to 12" (150-300mm)	1" plywood and/or corbels
Standard 1/2" (12mm) Countertop	12" to 18" (300mm-450mm)	Plywood with support brackets
Standard 1/2" (12mm) Countertop	Over 18" (450mm)	Plywood with legs or columns
Special Countertops	Varies	Welded steel Framework

Installation



For special applications please contact your distributor or the Durasein® Technical Team.

Finishing

The appearance of the finish on a solid surface countertop is something that can vary dramatically. A variety of factors including equipment, abrasives, techniques, lighting conditions and even material color can have an effect on the final look of the countertop finish. It is the responsibility of the fabricator to develop the finishes and processes that they offer and to educate their customers about the details and expectations about those finishes. Although finishing can be thought of as an art form, there are procedures and techniques that can help to assure finishes that are efficient and consistently high quality.

Traditionally, the industry has established three categories of finish level – matte, semi-gloss and gloss. Although there are many variations, the typical steps of sanding are outlined here:

Matte Finish – 180 grit; maroon buff (sometimes 180; 280; maroon buff)

Semi-Gloss Finish – 180 grit; 280 grit; grey buff (sometimes 180; 280; 400; grey buff)

Gloss Finish – Semi-Gloss Finish followed by increasingly finer grits and polishing compounds

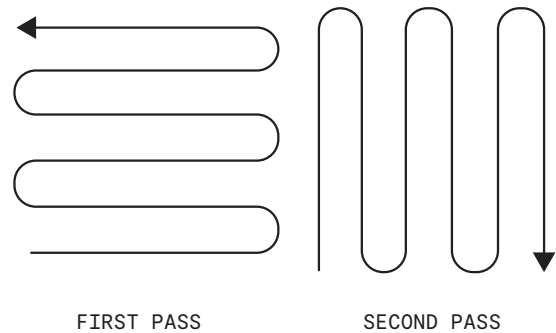
Keep in mind that these steps are just one suggestion of how to achieve the desired finish. The type of paper, style of sander, dust control, operator proficiency and other factors will contribute to the ultimate finish. Wet sanding, particularly during use of the buff pads, can aid in achieving a good finish.

Here are some pointers for finishing solid surface tops:

- Establish a uniform procedure used by every finisher in your company. Define a process that works for you and always use the same process with all your employees.
- Use the right equipment. In the first one or two stages (coarser grits) use more aggressive sanders with a rigid backer pad. As the grits get finer use more gentle finishers like the random orbital finishing sanders with a flexible backer pad.
- Use engineered abrasives with uniformly controlled particle size to reduce random scratches and pig-tailing. Examples are micron finishing papers and “P” grade abrasives that are engineered for solid surface and manufactured with controlled particle sizes. Typical “P” grade papers used in woodworking contain poorly controlled particle sizes for the type of finishes required for solid surfacing. They contain relatively large random particles that scratch the surface and produce visible scratches and cloudy areas. Be sure your abrasives are designed for solid surfacing.

Finishing

- Minimize the use of papers coarser than 180 grit. Although commonly used, abrasives with 120 grit and 100 grit can result in cloudy areas that are difficult to remove.
- Use “pattern sanding” with proper overlap techniques to assure uniform coverage at each stage of the finishing process.
- Check your sander pads. Wear-and-tear and abuse can lead to damaged pads that can result in a poor finish. Also, firmer pads should be used in the beginning steps but softer back-up pads can help achieve a better look with the finer finishing steps.
- Use sanders with dust extraction. This will keep the surface cleaner and allow the sandpaper to work more efficiently.
- Carefully clean the surface between grits. Dust can get trapped and result in scratches in the surface. Water in a spray bottle, with just one drop of liquid detergent added, will do the trick.
- Keep heat of friction at a minimum. Let the tools do their job without the operator pressing down excessively. Sanders will do their best job at design speeds. Pushing down to cut more results in uneven scratching and unwanted heat build-up as well as pre-mature wear and tear on the equipment.



Always use abrasives engineered for solid surface.
Use “pattern sanding” to ensure uniform coverage.
Use dust extraction while sanding.
Clean the surface with water between grit steps.
Use good quality random orbital sanders.

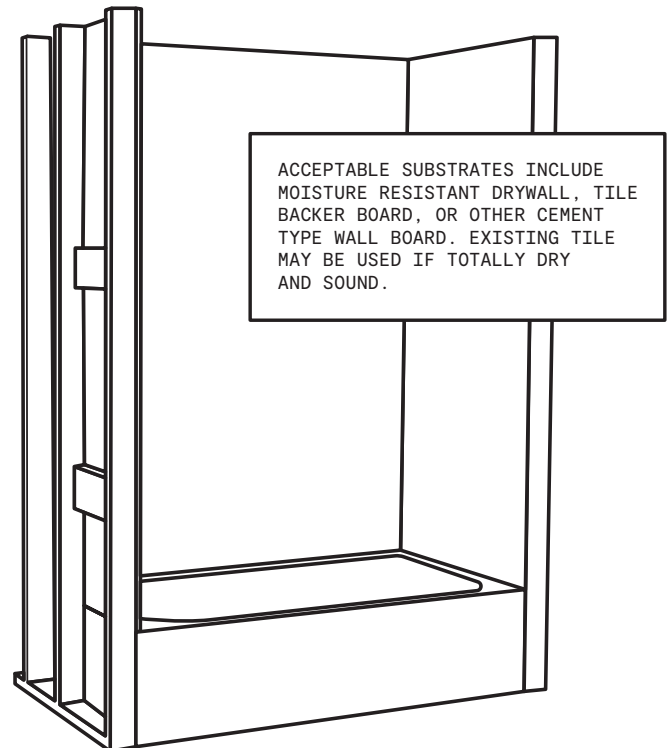
Vertical Wall Panels

For comprehensive instructions for installing either wet or dry location vertical wall panels, please consult your Durasein® Representative. Provided here is a summary of important aspects of vertical wall panels.

Wall Panel Insulation

Surface Preparation:

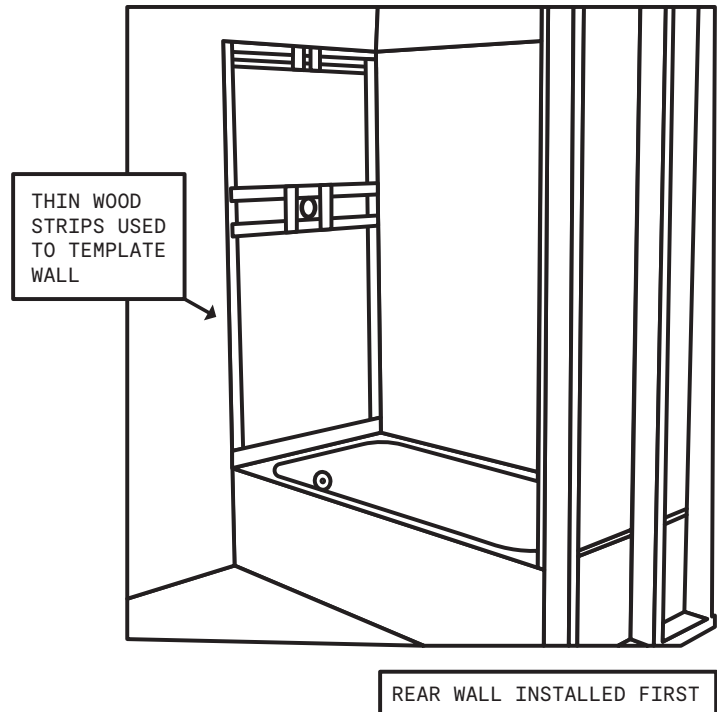
- Before beginning any vertical installation check to ensure that any existing substrate is dry and structurally sound. An acceptable substrate includes moisture resistant drywall, tile backer board, Durock, HardieBacker or other cement type wall board.
- Existing tile walls, if totally dry and sound may be used.
- Never install Durasein® wall panel directly on masonry, concrete, cinder block, or any wall that may become damp. If necessary, stud out the wall with 2x4's or other code-approved lumber and install an acceptable substrate.
- Be sure adequate wood blocking for plumbing or accessories is in place
- Remove any dust, loose debris or any other obstruction that may prevent sufficient adhesion of the wall panel to the substrate.



Vertical Wall Panels

Scribing & Cutouts for Wall Panels

- Scribing is usually required when walls are not square or plumb.
- Thin wood strips can be used to make a template of the wall panel. Straight cuts on panels can be made with a circular saw & straightedge.
- Test fit the wall panels to determine if scribing is necessary. Mark scribe lines on the wall panel as necessary. Use a sander or router to cut the material back to the scribe line.
- Sand the cut edges so that they are free of chips and scratches.



- Allow 1/16" at each corner to allow for expansion and contraction of the Durasein® wall panels and leave 1/16" at the tub or shower pan to provide for the shims that will be used during the installation of the panels.
- All cutouts should be made with a router and template or a power drill equipped with a hole saw and the cutout edges should be rounded over and sanded smooth.

Adhering Wall Panels to Substrate

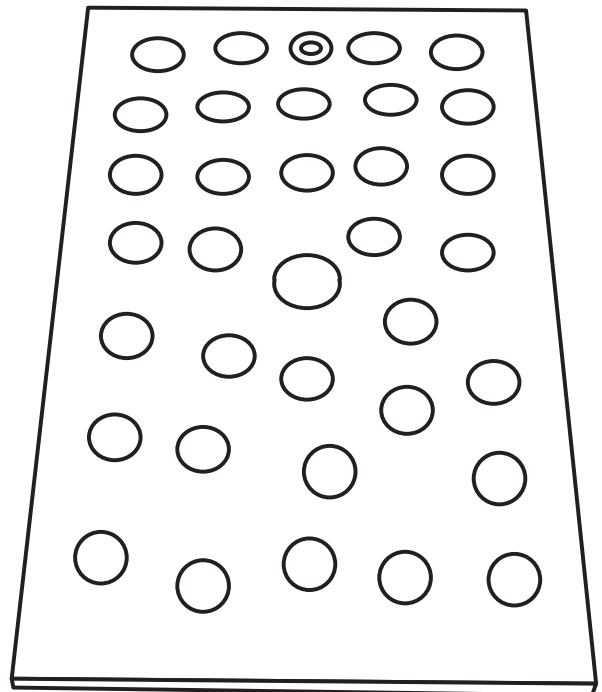
- Remove all dust, debris, etc. from the substrate and back side of the wall panel.
- Apply a continuous bead of silicone 1" to 2" (25 mm to 51 mm) from the edge around the perimeter of the backside of the wall panel.
- Apply 4 – 6" diameter circles of silicone over the remaining area of the wall panel.
- Apply circles of silicone around any cutouts, about 1" from the edge of the cutout.

Vertical Wall Panels

- Position the wall panel on the substrate and press firmly to evenly spread the silicone. Use a straightedge or level to push on the panel. If needed, hot melt glue may be used to hold the wall panel in place temporarily until the silicone cures.
- Repeat this procedure for the remaining wall panels and caulk all seam/joints with color-matched silicone.
- Accessories (i.e.: soap/shampoo holder) may be installed at this time using silicone and hot melt glue. Remove excess silicone with denatured alcohol.

SEAMING WALL PANELS

- Durasein® solid surfaces “veined” materials exhibit unique patterns between sheets. Customers must be made aware of this uniqueness and its’ effect on seams and overall pattern aesthetics.
- The recommended seaming procedures for wall panel installation are the soft (caulked) seam and the hard (joint adhesive) seam.

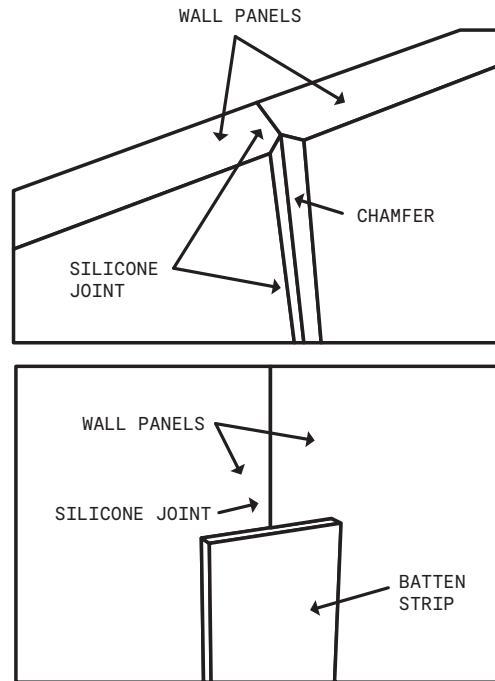


Vertical Wall Panels

Soft Seams

Test fit and scribe sheets that are to be seamed. Route a 45-degree bevel on the edges that are to be seamed together. Apply silicone to one wall panel and install. Apply a continuous silicone bead along the seam and install the next wall panel. Apply more silicone to the seam area if necessary. Remove excess silicone with denature alcohol.

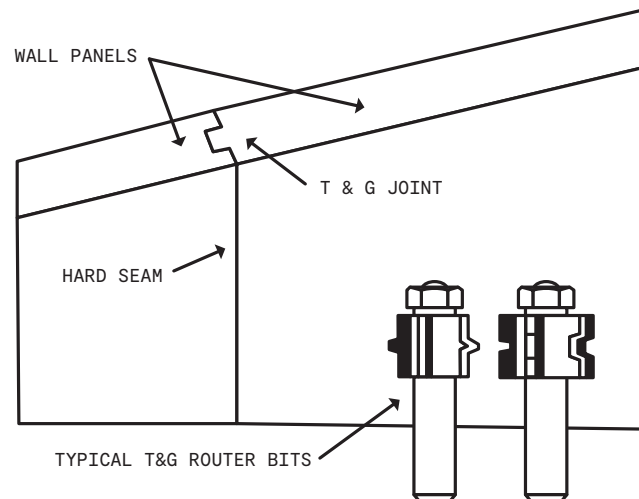
The use of batten strips is recommended when fabricating soft seams.



Hard Seams

Hard seams can be used to produce a monolithic look for wall distances requiring more than one sheet to span the space. Keep in mind that Durasein® offers wide sheet capabilities. Wide sheet formats may eliminate the need to perform hard seaming .

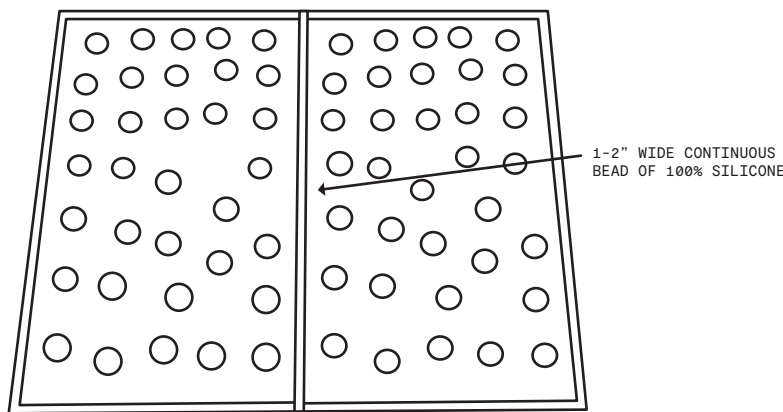
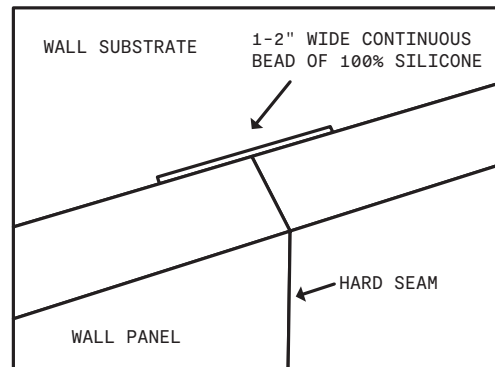
Test fit and scribe sheets that are to be seamed together. Horizontally seam the wall panels using standard seaming procedures. It may be advisable to use a tongue and groove method to assist in the alignment and installation of the sheets. The choice between a butt or tongue and groove seam should be based on ease of installation and fabrication cost. The potential advantage of a tongue and groove joint relative to a butt joint is easier sheet alignment. This can translate into labor savings by reducing the time it takes to finish sand the seam. The tongue and groove profile is used most frequently in larger projects where sanding time reduction can result in significantly less labor.



Vertical Wall Panels

Always remove excess adhesive and smooth the backside of the wall panel to avoid any potential stress when the panel is adhered to the substrate

When installing the seamed sheet, apply a continuous 1" to 2" (25 mm to 51 mm) wide silicone bead the full length of the seam to the back of the sheet or the substrate. This method is acceptable in lieu of a reinforcement strip which is required for horizontal countertop seams. When properly installed, the wide silicone bead will function as a reinforcement for the vertical seam. Adhere the seamed wall according to directions.



Acceptable substrates include moisture resistant drywall, tile backer board or other cement type wall board.

Existing tile walls, if totally dry and sound may be used.

Batten strips facilitate installation of soft seam projects.

Be sure to remove excess adhesive from the back of hard seamed panels

Shower Pans

Solid Surface Shower Pan Installation Instructions

Tools & Supplies Needed for Installation

- Level
- Wrench
- Hot melt glue
- Thin-set mortar (must meet ANSI A118.4 or A118.11 standards)
- Drain fitting
- Tool for mixing thin-set mortar · 1/2" - 3/4" Grooved trowel
- Self-leveling concrete (Optional)
- Shims
- 5 Gallon Bucket
- Silicone

PREPARING THE INSTALLATION SITE

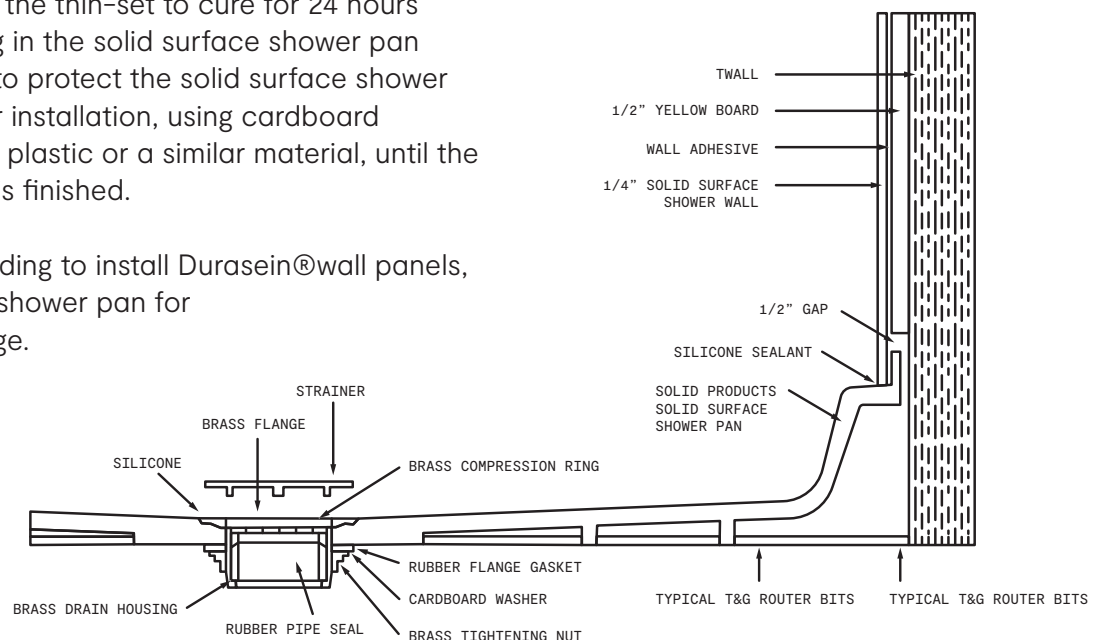
- Check the solid surface shower pan, Wall panels and all components for any damage during shipping.
- Check and confirm all dimensions.
- Scrape the floor of the shower pan alcove and clean it carefully. This space must be clear of debris in order to get proper adhesion with the thin-set mortar.
- Measure the alcove to insure that it is square and plumb, and that the pan and wall panels fit correctly.
- Trial fit the solid surface shower pan in the alcove and make sure that the drain location lines up properly with the shower pan. The pan should slide in easily with approximately 1/16"-1/8" spacing between the studs and the pan. Placing a level on the flat sides of the solid surface shower pan, check that it sits level on the floor. Use shims to level the pan in the alcove if needed. Hot melt glue the shims to the floor/substrate so the pan will sit level after applying the thin-set. Remove the solid surface shower pan from the alcove.

Shower Pans

INSTALLING THE SOLID SURFACE SHOWER PAN

- Install the drain fitting into the solid surface shower pan. Follow the installation instructions that came with the drain.
- For new installations, proceed to the next point. If the shower pan is being installed over old tile follow the next two instructions and proceed to the next point:
 1. A plumber must extend the existing drain pipe.
 2. Use self-leveling concrete to level the floor.
- Mix and apply thin-set mortar to the floor, using the 1/2" – 3/4" notched trowel. Spread the mixture to achieve a depth that fills the voids in the floor and enable the solid surface shower pan to sit level. All supporting points should have contact with the thin-set mortar. Pay attention to the drain area, and make sure there is mortar supporting it, especially when installing over a previous tiled shower. More thin-set is always better than less.
- Set the pan into place. Make sure the pan is resting level on the thin-set and shims and the drain is centered.
- Clean the area at the threshold of any excess thin-set. Allow the thin-set to cure for 24 hours before working in the solid surface shower pan area. Be sure to protect the solid surface shower pan floor after installation, using cardboard sheeting, thick plastic or a similar material, until the entire project is finished.

Before proceeding to install Durasein® wall panels, flood test the shower pan for proper drainage.



Care & Cleaning

Durasein® solid surface is resistant to heat, stains, and scratching. However, it is not heat, stain or scratch proof. Routine care and maintenance will keep Durasein® looking new and as great as the day that it was installed.

Routine Care

Cleaning with soapy water or ammonia-based cleansers will remove most dirt and stains. Stubborn stains can be removed with bleach or bleach-based cleansers or non-abrasive cleansers. Do not use harsh chemicals. The surface can be damaged by harsh substances, including chemicals such as paint thinner, mineral spirits, acetone or acetone based nail polish remover.

Prevent heat damage

As with all countertop materials, it is important to minimize direct heat exposure. High temperatures can damage the surface. To prevent damage always use hot pads or trivets under frying pans, hot pots or heat-generating appliances (see below)

To remove minor scratches

Gently rub entire surface with a green Scotch-Brite™ pad in a circular motion. Follow by scrubbing with a white Scotch-Brite™ pad and a non-abrasive cleanser. Use a countertop cleaner designed for solid surfaces to restore gloss.

Note: Dark colors tend to require more attention than lighter colors.

For severe scratches, consult your local Durasein® dealer, distributor or fabricator.

Due to their composition and strict manufacturing standards, Durasein® products are naturally heat resistant, but they are not indestructible. It is important to minimize direct heat exposure from appliances to protect your surface and investment.

We recommend the following precautions to maintain your countertop and investment:

Do not place pans from the burner or oven directly on your countertops. Prolonged or extreme heat can cause discoloring and the thermal stress may cause cracking.

Use heat trivets or hot pads when placing hot objects on any surface. Be sure these trivets or pads are designed to protect surfaces from heat. Towels or other cloths are NOT effective insulators.

Care & Cleaning

Use a trivet under portable heat generating appliances such as a toaster ovens, electric fry pans and similar devices.

Allow cookware to cool before placing it into a Durasein® sink or on a Durasein® countertop.



Durasein

Ten-Year Limited Warranty

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DATE
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Durasein® Solid Surface (hereunder “Durasein”) hereby warrants to the original residential and/or commercial purchaser of our solid surface materials to be free of manufacturing defects for a period of 10 years starting from the date of installation. Our solid surfaces must be fabricated and installed in accordance with the Durasein® Fabrication and Installation guidelines.

Durasein® at its sole option will repair or replace such products if they fail due to any manufacturing defect during the first ten years from the date of initial installation, with necessary and reasonable labor charges if justified. All repairs or replacements hereunder are to be performed by Durasein® or its designated agents. Although Durasein® shall make its best effort to repair or replace with the best possible color match material; Durasein® cannot guarantee the exact color in the event of repair or replacement.

This warranty excludes issues due to the following:

1. Minor conditions such as stains, scratches, water spots and burns, which due to the unique properties of our solid surfaces, may be corrected by techniques specified in our Cleaning & Maintenance instructions.
2. Failure not to comply with our instructions including fabrication, installation, cleaning and maintenance.
3. Any products moved from their original place of installation.
4. Failure or dissatisfaction with appearance of joints or seams, created with solid surface joint adhesive, caulk, or of any other adhesive product.
5. Color variation from any sample material.
6. Failure caused by improper cabinet or substructure support.
7. Misuse or abuse (intended or unintended including physical or chemical).
8. Damage caused by extreme heat.
9. Damage caused by an act of nature such as fire, flood, earthquakes, wind, rain and other natural causes.
10. Damages from other than manufacturing defect.
11. Normal wear and tear. The end user must advise Durasein® or their designated agent in writing of the product defect prior to the expiration of the warranty period. The end user must also furnish proof of purchase to Durasein® from the dealer where they purchased the product(s).
12. Dissatisfaction with the appearance of the design, color, visual texture or finish on the bottom side of Durasein® sheets included in the Lively Collection.

This warranty is transferable in the event that you sell your home or business. The warranty does not renew upon transfer of home or business ownership. Proof of purchase for the original installation date will be required before warranty service is rendered.

Durasein® neither assumes nor authorizes any person or company to act on behalf of Durasein® for any decisions regarding this warranty. Final decision will be the responsibility of Durasein® for our product(s).

To obtain service under this warranty, call the Durasein® at (877) 771.7712 Or contact us through our website at www.duraseinusa.com.

Thank you!