

CORIAN® ENDURA™ HOT/COLD FOOD SERVICE

Introduction

This fabrication bulletin addresses the design, fabrication, and installation of Corian[®] Endura[™] High Performance Porcelain in food service applications with hot and cold elements. Prior knowledge of basic Corian[®] Endura[™] fabrication is required. For topics not covered by this application specific bulletin, general fabrication guidance bulletins apply.

There are many elements in a successful design, fabrication, and installation. Multiple companies may be involved. It is important that all parties are aware of and follow the guidance in this bulletin.

Overview

Successful food service countertop designs require careful attention to detail. This application involves additional thermal stresses due to hot and cold elements as well as additional mechanical stresses due to equipment and many cutouts. This bulletin is intended to provide guidance for fabrication and installation of [®] Corian[®] Endura[™] in food service applications.

The requirements and recommendations in this technical bulletin will help ensure long lasting food service installations. The critical concepts of a food service installation are: Insulate, Isolate, and Support.

- Insulate Corian[®] Endura[™] from all potential heat sources, such as food wells or cooktop inserts, with Nomex[®] insulation and heat reflecting aluminum tape where specified to protect the Corian[®] Endura[™] from thermal stresses.
- **Isolate** the Corian[®] Endura[™] from stresses caused by the weight of appliances or equipment placed on top of the surface by providing independent structural support. Isolation also applies to insulation from thermal elements.
- **Support** the countertop and all equipment or appliances with sturdy, correctly installed materials.



Insulate, Isolate, and Support Illustrations

To better understand Insulate, Isolate, and Support, picture the food service application without the Corian[®] Endura[™] installed. All equipment (appliances, hot wells, ice bins, etc.) should be supported by the support frame so that no additional support is needed from the countertop. Corian[®] Endura[™] is a durable surface, however, it should be treated as a decorative surface that must be insulated, isolated, and supported to avoid excessive thermal and mechanical stresses.

Note: DuPont provides a product only warranty for Corian[®] Endura[™] in commercial applications.

A. Safety

Corian[®] Endura[™] high performance porcelain contains some crystalline silica. Operations such as sawing, routing, drilling, and sanding can generate respirable silica dust. Wet cutting, coring, and polishing minimize the generation of dust. All fabricators of Corian[®] Endura[™] are required to take silica safety training. Contact your local Corian[®] Endura[™] distributor for more information.

Use proper safety equipment when working with Corian[®] Endura[™], including safety glasses, gloves, steel-toe shoes, and ear plugs. Lifting devices or carts may be used to improve safe handling of larger pieces. Additional information is available in K-30203 *Corian[®] Endura[™] Handling and Storage*.

B. Design

A successful food service installation involves many elements, and, in many cases, multiple parties are involved in the project. Food service equipment is often heavy and food safety requirements impose a wide range of temperatures that could create stress in the countertop. The design must support equipment loads, minimize thermal stress, and allow for thermal movement.

The design basis starts with the standard guidance for Corian[®] Endura[™] and is then adapted to provide additional support and insulation for equipment. Design should start with the equipment needed. The support structure needs to independently support equipment as well as the countertop surface. Cutouts need to be sized and spaced to allow for equipment support and insulation requirements.

Food equipment should not be sub-mounted. It should be surface mounted to prevent steam or condensation from being trapped below the countertop.

The design basis for this bulletin is 20 mm thick Corian® Endura™.

CORIAN® en dura

C. Common Causes of Failures

Most failures come from a combination of insulation and support errors, generally near heat sources. These are avoidable with proper design, fabrication, support, insulation, and installation.

Common problems include:

Support related

- Improper support
- Support structure is not flat and in-plane
- Loads improperly supported

Temperature related

- Improper insulation
- Direct contact with heat sources
- Excessive heat (heat lamp, poorly controlled equipment)
- Thermal cycling
- Large temperature gradients

Fabrication related

- Smaller than recommended inside corner radii
- Improper seam placement

Installation related

- Restricting movement, not allowing expansion and contraction
- Not inspecting support and insulation prior to installing the countertop. Once the countertop is installed flaws may be hidden.

Other

• Moisture, particularly steam trapped under top from improperly installed steam trays

D. Pre-Job Planning

- Confirm the route to install location. Can large pieces be transported along route?
- Will the facility be operational during install? This may impact work hours, dust/fume control requirements, etc.
- Support structure who's designing, building if you're not? It is essential that the support structure provides proper support for the countertop
- Who is doing the installation, is the installer adequately trained?
- Who is installing the hot/cold (food service) equipment? Is the installer aware of installation requirements?
- Does the color selected have a directional pattern? This may affect slab utilization and affect seam locations.

- Consider "abuse". Is there overhead lighting or equipment where the countertop may be a convenient place to stand to access them. Does a tray slide make a convenient "seat"? Is there a flat location close to an oven where hot trays might be set that should have a hot pad installed? School environments may see rougher treatment. More robust support may be indicated in these situations.
- Consider dividing the top into smaller sections to ease transportation and installation and prevent breakage.
- Consider attaching support to the top prior to transport and installation.

E. Thermal Isolation

To reduce stresses on the countertop from hot and cold food equipment, the countertop should be thermally isolated from the equipment. This is done through maintaining physical gaps between the food equipment and the countertop. This is discussed in F.2 Hot and Cold Food Wells.

Avoid bridging physical gaps, particularly with metal such as flanges, aluminum tape, etc.

Food equipment in cutouts is insulated from the countertop and support structure using Nomex[®] insulation and aluminum tape. This is discussed in H Insulation.

F. Cutouts

Cutouts are a common element of food service installations. These cutouts can be a source of stress on the surface. This section focuses on proper creation of the cutout. Support and insulation are covered in separate sections.

There are three common types of cutouts. Each with their own considerations for proper fabrication and installation.

- Standard ambient temperature cutouts such for silverware or waste bins.
- Cold Wells for cold food storage below (40°F/4°C)
- Hot Wells for hot food storage above (140°F/60°C)

Note: These temperatures are provided as general guidelines for countertop design. Local regulations may vary. Specifier should provide equipment temperature setpoints.

When sizing cutout account for the space required for the support structure, insulations and gaps to cutout edge and equipment. This may be larger than the cutout size recommended by the equipment manufacturer.

F.1. STANDARD CUTOUTS

All standard ambient temperature Corian® Endura™ cutouts must have:

- At least a 5 mm (3/16") inside corner cutout radius. Larger is more robust.
- Been made with a 10 mm (³/8") or larger diameter router bit to prevent chatter

- 3 mm (1/8") clearance between the food well support and both the countertop and countertop support edge. NOTE: This clearance includes corners. As the countertop requires an inside radius and food well supports often will have square outside corners, maintaining a 3 mm (1/8") clearance at the corners means the clearance will be greater on the sides.
- Ease all top and bottom edges of straight edge profiles to a minimum of 2 mm (1/16") radius or chamfer.
- Smooth or hone around the interior of the cutout to remove cut lines and chipping. Minimum 120 grit diamond is recommended.
- Support within 50 mm (2") from the cutout edge.

Note: Cutouts exposed to temperature extremes, like hot and cold food wells, have additional requirements.

F.2. HOT AND COLD FOOD WELLS

Support and insulation requirements in addition to all standard cutout requirements for hot and cold food wells include:

- 3 mm (1/8") nominal overlap of the food well flange over the countertop
- 1.5 mm (¹/16") vertical clearance between the food well flange and the countertop surface which is to be filled with silicone sealant.
- 3 mm (¹/₈") expansion clearance for the entire perimeter of the food well equipment (distance between food well equipment and insulation).
- Insulate between food well and both the food well support and main support structure
- Use dedicated support to isolate the weight of drop-in food well equipment from the Corian[®] Endura[™].

F.3. CUTOUT SUPPORT

All cutouts should have full perimeter support within 50 mm (2") of the cutout. Circular cutouts may be supported with square supports tangent to the edges at within the same 50 mm (2"). Due to the integration required with the general support structure cutout support is covered in more detail in G. Support and J. Cutout Support Examples.

F.4. CUTOUT SPACING

Cutouts have spacing requirements to allow adequate room for insulation and support. Cutouts spacing requirements (Figure F-1) are as follows:

- 64 mm (2.5") between all cutouts for wells of same temperature.
- Recommended 305 mm (12") distance, 2 layers of Nomex[®] insulation and flexible soft seam between all adjacent hot and cold food wells to allow for the temperature differential OR alternative 64 mm (2.5") and 3 layers of Nomex[®] Insulation.
- 64 mm (2.5") between all cutouts and all deck edges
- 64 mm (2.5") between all cutout edges and all seams. More details are available in Figure M-1: Seam Location Guidelines.



CORIAN® ENDURA



F.5. ALTERNATIVE TO MULTIPLE CUTOUTS

As an alternative to multiple cutouts appliances may be mounted in a stainless-steel mounting tray. This mounting tray must be independently supported. Having one large versus many small ones can ease fabrication and reduce risk of cutout failure.





G. Support

Corian[®] Endura[™] is a durable surface but is not a structural material. Full support is required to reduce mechanical stresses. The support guidelines outlined in this section are for zero-load installations. Additional equipment or loads located on the counter will require additional support as detailed below.

In addition to meeting the structural support requirements, having adjustable feet to accommodate deviations from floor planarity is recommended.

G.1. EQUIPMENT SUPPORT

Following the principle of isolating Corian[®] Endura[™] from the weight of equipment, equipment should have dedicated support.

G.1.1. Equipment in Cutouts

Equipment in cutouts should never be supported by Corian[®] Endura[™]. While it may share a common support structure, the equipment should always be directly supported by the support structure. The main support structure should be designed to accommodate the weight of the equipment and contents.



In most cases equipment should not be undermounted. The equipment flanges should be above the countertop to avoid trapping heat and/or moisture below the countertop.

G.1.2. Pass Through Support

Equipment mounted above the countertop such as lighting, sneeze guards, etc. should be installed by the pass-through method. In this technique support is provided from the main support structure by passing the support through a penetration in the Corian[®] Endura[™] surface.

Provide a minimum 3 mm (1/8") perimeter clearance around the penetration to allow the material to expand and contract freely. For longer tops or greater temperature ranges additional clearance may be required to accommodate movement. Sneeze guard supports that pass through the countertop and do not attach directly to it are a common example of the pass-through method. Examples of equipment that may be mounted by this method are discussed in P Additional Design Elements. Any collars for the support rod should allow the rod to move with thermal movement. Do not secure to or clamp to the countertop surface in any way as this will restrict countertop movement.

When equipment is attached by the pass-through method to a common support structure, the weight of any equipment needs to be accounted for in any deflection determinations and support structure design.

When a pass-through support is near a cutout it is preferrable to place the hole for the pass-through support along a side, not at a corner.

G.1.3. Equipment on Surface

When equipment is to be placed on top of the countertop the weight of the equipment, whether it is hot or cold, and whether the weight of the equipment will restrict movement needs to be considered. In extreme cases, it may be better to have a cutout, so the equipment is isolated from the countertop.

Heavy equipment should have dedicated support directly below the point of contact to prevent countertop deflection. All forces on the countertop should be compressive, avoiding bending and/or shear forces.

When there is a heavy load on the surface this should be considered a movement constraint. From this fixed point, the rest of the countertop needs to be able to move in response to temperature changes. If there is more than one movement constraint, then an expansion joint (silicone seam) may be required between the constraints to accommodate thermal movement.

Temporary (movable) equipment is generally acceptable if it doesn't exceed 25 lb./sq. ft. (122 kg/m²). Deflection should not exceed 3 mm ($^{1}/^{8}$ ").

Insulation between the countertop and equipment may be warranted if the device is excessively hot or cold.

G.2. GENERAL ZERO-LOAD SUPPORT REQUIREMENTS

The basics of support for Corian[®] Endura[™] is K-30201 *Corian[®] Endura[™] Structural Support*. This guidance may also be used for sections of the top without cutouts or heavy equipment. Equipment should be independently supported.

Spans for Surface Supported on all Four Sides

Corian[®] Endura[™] requires full perimeter support and front-to-back and side-to-side support with maximum spans of 91 cm (36") for zero load design. Heavy equipment requires dedicated support directly underneath the equipment.

Spans for Surface Supported on Three Sides

Support is required across the opening. The support must be part of the main support structure. The maximum span is 61 cm (24")

Heavy equipment should not be located where there is only support on three sides. Cutouts should not be adjacent to the opening.

Spans for Surface Supported on Two Sides

Support is required across the opening. The support must be part of the main support structure. The maximum span is 61 cm (24")

Heavy equipment should not be located where there is only support on three sides. Cutouts should not be adjacent to the opening.

Other Support Guidelines

The support structure must:

- Be level, specifically, it must be in the same plane without deflection. Any welds, etc. must be flush with surface. Any shimming must be done between the perimeter support and the underlying structure (often cabinets), not between the perimeter support and the porcelain slab. For longer runs multiple shims should be used to provide support versus just one in the middle of the curvature.
- Extend around the full perimeter of the countertop
- The wood cabinet perimeter may be used as support if designed to support the required weight
- Perimeter support strips may be used to create a larger, broader base to support the countertop (Reference Underlayment and Support Strip Material section for more information)
- Include full perimeter support for each hot and cold food well cutout
- Provide support directly under all equipment or countertop loads to prevent deflection after the equipment is installed
- Attach the longer support rails to the main cabinet support frame and attach smaller support rails to the longer support rails.

Locations for typical support system components are shown in Figure G-1.



Figure G-1: Food Service Support Location Requirements

G.3. TYPES OF SUPPORT

There are two types of support and the acceptable materials vary based on the intent of the support.

G.3.1 Structural Support

Structural support is the main, load bearing structure. This support can bear loads over spans.

G.3.2 Spacer/Underlayment

Spacer/underlayment support cannot bear loads over a span. The primary role is to transfer loads vertically to structural support directly below. For compliance with support span requirement the spacer/underlayment support must be over a structural support element. For example, for a 610 mm (24") ladder structure, the primary support needs to be directly below the spacer/underlayment material with same spacing.

G.4. ACCEPTABLE SUPPORT MATERIALS

G.4.1 Structural Support Materials

Metal supports are preferred

- Metal angle iron
- Tube steel, minimum 25 mm x 25 mm (1" x 1") with 3 mm (¹/s") wall thickness
- Steel C Channel
- Steel I-Beam

Wood based

- Wood framing (minimum 2"x 6" may be required to meet deflection guidance) should be used in vertical orientation. Horizontal orientation will not provide enough stiffness.
- Moisture resistant plywood must be a minimum of 19 mm (¾") thick and used in a vertical orientation for structural support.
- Never use particleboard, wafer board, chip board, or equivalent products.



CORIAN® ENDURA

Figure G-2: Acceptable Food Service Support Material Frames Spacer or Underlayment and Support Strip Materials

G.4.2. Spacer or Underlayment and Support Strip Materials

Reminder – these materials are for vertical transfer of load to a structural support member.

Metal based

Tube steel

Structural (Tile) Foam Underlayment - as full underlayment or support ladder

Cementitious Backer Board (Cement Backer Board) - as full underlayment

H. Insulation

H.1. INSULATING MATERIALS

Insulation of hot or cold cutouts as well as cook-top inserts is required and uses two materials, Nomex[®] nonwoven insulation and heat reflective 3M[™] Aluminum Foil Tape 425 or 427. The Nomex[®] insulation provides insulation for the countertop and support structure. The aluminum foils tape reflects radiant heat and is used to attach the Nomex[®] insulation to the support structure. Note that the aluminum foil tape also conducts heat. It should not be applied to the Corian[®] Endura[™], only to the support structure. The aluminum foil tape should cover the Nomex[®] insulation completely and extend at least 6 mm (¹/₄") beyond the Nomex[®] insulation.

Nomex[®] insulation specifications

- 9.5 oz./yd.² (at least 0.11" (2.8 mm) thick)
- 1 ¹/₂" (38 mm) wide roll

3M[™] Aluminum Foil Tape 425 or 427

• 2" (51 mm) wide roll

H.2. INSULATION INSTALLATION

Insulation is important to help protect the Corian[®] Endura[™] countertop and the underlying support structure from temperature extremes and reduce the effects of temperature fluctuations that exist in a food service application. Insulation is required for all hot and cold food wells and cook-top inserts. It is also important to try to keep the cabinet or casework temperature down to reduce the thermal loading on the countertop.

The number of layers of Nomex[®] insulation required for the installation depends on the distance between two adjacent cutouts and the temperature of each of these cutouts. Table H-2: Nomex[®] Insulation Guidelines provides guidance for the correct number of layers of Nomex[®] insulation that must be installed to adequately protect the Corian[®] Endura[™] surface.

TABLE H-2: NOMEX® INSULATION GUIDELINES

Cutout Spacing (edge to edge)	Nomex® Insulation
Adjacent wells of same temperature	2 layers
Adjacent Hot and Cold wells at least 305 mm (12") apart with flexible seam separating wells	2 layers
Adjacent Hot and Cold wells less than 305 mm (12") apart and/or no flexible seam separating wells.	3 layers

Attach the Nomex[®] insulation and aluminum tape as shown in Figure H-1: Insulation Assembly. Wrap the first Nomex[®] insulation layer over the top and down the side of the food well support. The aluminum tape should be fastened to the support structure., do not fasten the tape to the countertop. Additional layers of Nomex[®] insulation should be placed over the prior layer(s). Cover the Nomex[®] insulation completely with aluminum tape and allow excess aluminum tape to hang vertically and extend at least 6 mm (¹/4") beyond the Nomex[®] insulation.



CORIAN® ENDURA

Figure H-1: Insulation Assembly

Do not locate seams in Nomex[®] insulation at corners where the stress is highest. Seams should be along the side of a cutout.

I. Clearances

Corian[®] Endura[™] expands and contracts when exposed to fluctuating temperatures. It is important to never restrict the thermal expansion and contraction movement by holding the material in place or by failing to provide an expansion gap between Corian[®] Endura[™] and any other dissimilar material.

Provide clearance between Corian[®] Endura[™] and any materials that could possibly restrain movement, like adjacent walls, support frames, and underlayment. The coefficient of thermal expansion for Corian[®] Endura[™] is 6.23 x 10⁻⁶ mm/mm °C (3.46 x 10⁻⁶ in./in. °F). Note: Due to the low coefficient of thermal expansion of Corian[®] Endura[™] it is likely to have lower expansion or contraction than the materials it is attached to. Suggested clearances are:

- 3 mm (1/8") minimum perimeter or radial clearance for any penetration passing through the surface.
- 3 mm (¹/₈") minimum clearance between buildup edges and any support structure or underlayment.
- 3 mm (1/8") minimum clearance at all walls (gap may be filled with silicone sealant.)

These are minimum clearances. Longer runs of countertop or greater temperature changes may warrant larger clearances.

J. Cutout Support Examples

The following examples illustrate support with equipment load isolation (equipment does not rest on the countertop surface) as well as thermal isolation and insulation.

The following examples illustrate support with equipment load isolation (equipment does not rest on the countertop surface) as well as thermal isolation and insulation.

Figure J 1 through Figure J 3 illustrate cross sections of food well support structures made from tube steel, angle iron, and wood. The figures display the cross- section support through both the corner block as well as the underlayment between the corner blocks. Full perimeter support is required within 2" (50 mm) of the cutout edges for all cutouts.



The drawings illustrate:

- 1. Mechanical isolation of equipment loads. While the equipment shares the same main support structure, the countertop and the food well are independently supported.
- 2. Thermal isolation of the countertop from the food well. The food well flange should not rest on the countertop. Caution: Do not allow aluminum foil tape to create a heat transfer path directly to the Corian[®] Endura[™]. This is to minimize the heat transfer to the Corian[®] Endura[™].
- 3. Thermal insulation of the countertop and support structure with Nomex* insulation. This minimizes stresses due to thermal expansion or contraction.



Figure J-1: Cutout Cross-Section View with Tube Steel Support



Figure J-2: Cutout Cross Section View with Angle Iron Support - High-Strength Corner Block



Figure J-3: Cutout Assembly Cross Section View with Wood Support – Underlayment



Figure J-4: Support Structure Example



K. Overhang Guidelines

Overhangs in food service applications must be supported properly. Use Table K-1: Overhang Support Types to determine the necessary support required for zero-load overhangs. If equipment or loads are going to be located on the overhang, additional support is required and must be incorporated into the design and installation.

This guidance mirrors that in K-30201 *Corian® Endura™ Design*. Please see that document for additional guidance.

TABLE K-1: OVERHANG SUPPORT TYPES

20 mmm (³/₄") Corian® Endura™ Countertop			
Overhangs Extending	Suggested Support		
<305 mm (<12") No adjacent cutout	No additional support required for zero load		
<75 mm (<3"). Cutout within 150-600 mm (6-24").	No additional support required for zero load		
<450 mm (<18")	Use solid substrate and corbels evenly spaced at no greater than 36" (90 cm) intervals. Corbels must cover 2/3 of overhang, mechanically attach to cabinet, silicone to top.		

L. Edge Treatments

L.1. INSIDE CORNER (L OR U-SHAPED COUNTERTOP)

L- and U-shaped designs bring consideration of managing the pattern as well as transportation and support considerations. The pattern will also influence how L- and U- shaped tops will be designed, whether an offset butt seam, miter, or euro/stepped miter is required for the best appearance. Again, photo layout software will be useful in design and obtaining customer acceptance of the layout.

Whether the edge is mitered or not will also impact design. A mitered edge will prevent cutting the top as a single piece. The sharp inside corner will require a seam.

L- and U-shaped designs require additional care during transportation and installation. Consider cutting and transporting each section individually and assembling on site.

If cutting from a single slab, increase the radius of the inside corner to 20 mm (3/4") to increase durability. This should only be done for designs with shorter legs. The requirement for an inside corner radius will preclude the use of mitered edges in this case.

The minimum allowable inside corner countertop radius for an edge is 13mm $(^{1}/^{2"})$, though a larger radius is preferred to provide additional strength.

Single section (e.g., L, U, etc.) shaped pieces are required to have a minimum radius of 6 mm (1/4") to reduce corner stresses. A larger radius will reduce stress and increase durability. Multiple section (e.g., two-piece L and three-piece U) shaped pieces with seams in the corners (i.e., full 45°miter or European/stepped miter) do not need to have a radius in the corner.

L.2. OUTSIDE CORNER

Outside corners are required to have a minimum radius of 3 mm (1/8"). Larger radii will provide additional impact resistance in heavy duty applications.

L.3. TOP AND BOTTOM EDGES

Endura[™] and other porcelain or ceramic products are susceptible to chipping at sharp edges. A bevel or radius greatly improves the durability. Edges and outside corners must be rounded to a minimum 2 mm (¹/₁₆") radius or chamfer for all edges. The radius method is preferred. A 3 mm (¹/₈") minimum radius or bevel should be used for edges exposed when installed.

Food service installations may be exposed to more frequent impact from carts or other equipment. Edges that may be prone to impact should have even larger radii or bevels to improve impact resistance. Radius edges will be more impact resistant then bevel edges.

M. Seams

Seams may be used to extend the countertop beyond the dimensions of the slab or to relieve stress due to temperature gradients. There are two types of seams, soft flexible seams or. hard rigid seams

M.1. HARD SEAMS

A hard seam creates a rigid seam. This seam is created by using Corian[®] Joint Adhesive or other adhesives approved for Corian[®] Endura[™] to bond the two edges of the countertop deck together.

M.2. SEAM LOCATIONS

Seam location requirements (Figure M 1):

- Minimum 64 mm (2.5") from all deck and cutout edges.
- Seams may be placed through a cutout if absolutely necessary but is not recommended. If the seam must be placed through a cutout, it is recommended to place the seam through the center of the cutout.
- Seams may be placed through a cutout if absolutely necessary but is not recommended. If the seam must be placed through a cutout, it is recommended to place the seam offset from the corners on diagonally opposite edges of the cutout.
- Seams should be located over structural support. See M.4 Seam Reinforcement for additional details
- 38 mm (1-1/2) minimum offset from all inside corner radii
- Consider additional seams to reduce the size of individual pieces, reducing the risk of breakage during transportation and installation. This is particularly relevant in sections with a number of cutouts. Don't create a countertop with cutouts in the middle and large amounts of surface on either side. This will create excessive stress on the cutout sections. If there is one large cutout (creating a "picture" frame) consider creating as two "L" shapes, or even four separate straight strips. This will ease transportation and reduce the potential for breakage.



Figure M-1: Seam Location Guidelines

M.3. SEAM REINFORCEMENT

Seam reinforcement for Corian[®] Endura[™] is the same for soft and hard seams.

Corian[®] Endura[™] may be installed with full underlayment (tile foam substrate or cement board. Seams in the Corian[®] Endura[™] surface should be offset from seams in the underlayment.

• Full front to back support (preferred) or cross supports every 305-460 mm (12" to 18") of full support is not possible. Short seams, less than 305 mm (12"), require only a cross support at the middle of the seam reinforcement strip.

Alternatively support strips may be used. Secure support strips made of moisture resistant MDF or moisture resistant plywood (at least19 mm $(^{3}/4")$) thick and 50 mm (2") wide) to the countertop with 100% silicone adhesive. Support reinforcement strips from main support frame by providing:

• Full front to back support (preferred) or cross supports every 305-460 mm (12" to 18") of full support is not possible. Short seams, less than 305 mm (12"), require only a cross support at the middle of the seam reinforcement strip.



Figure M-2: Soft Seam (Expansion Joint) Support

N. Transportation and Installation

Food service installations involve many cutouts. It is essential to properly support countertops during transportation and installation as stresses will be concentrated in sections with cutouts. In some situations, it may be better to add additional seams to reduce the size of segments and ease transportation and installation. Support may be attached to the countertop prior to transport prior to transport to reduce the potential for damage during transportation and installation.

CORIAN® ENDURA

Avoid strapping that wraps around the top of a slab. Having the strap wrap around the top of a taller A-frame will avoid having the straps apply stress to cutouts.

Cutout carriers and lifting devices will assist with transport as will carts for the installation site. Always transport vertically on edge with cutouts at the top.

Corian[®] Endura[™] has specific guidance for packaging and transportation. This is especially important for designs with multiple cutouts. Additional guidance can be found in K 30204 *Corian[®] Endura[™] Transportation and Installation*.

O. Installation

O.1. VERIFY SUPPORT STRUCTURE

Issues with the support structure can be a primary contributor to countertop failure. It is important to verify that the support structure meets the requirements and resolve any issues before installation of the countertop.

O.2. VERIFY INSULATION

Installing the insulation and aluminum tape will be easier before the countertop is installed. It is recommended to install and inspect installation before installing the countertop.

O.3. THE UNEXPECTED

Is there unexpected heating or cooling equipment such as ice pans, overhead lamps, strip heaters, surface heaters, etc.? These add-ons can create temperature conditions that may require special attention including additional insulation, hot pads, expansion joints, temperature isolation stainless steel collars, etc.

Were there any field changes to hole size or spacing, support locations, millwork integrity, equipment designs or capacities, etc., that might change either the temperature or stress patterns in the Corian[®] surface?

O.4. SECURING CORIAN® ENDURA™ TO THE SUPPORT FRAME

Secure Corian[®] Endura[™] to the support structure (or full underlayment if used) with dime-sized 20 mm (0.75") dabs of silicone adhesive every 30-45 cm (12"–18"). If installing over tile substrate (cement board, foam tile substrate) use tile adhesive to attach to the tile substrate.

O.5. MECHANICAL FASTENING

The primary method for fastening equipment should be the pass-through method, previously discussed in G.1.2 Pass Through Support. For non-load bearing, light duty requirements, mechanical fasteners may be used.

Corian[®] Endura[™] has special requirements when it comes to the types of fasteners used. Never mechanically fasten a screw, bolt, or nail directly to Corian[®] Endura[™]. The only acceptable ways to mechanically fasten to Corian[®] Endura[™] are:

 Waffle style – Secure a waffle style fastener, such as Rotaloc[®] fasteners, to the Corian[®] Endura[™] with Corian[®] Joint Adhesive.

P. Additional Design Elements

P.1. HEAT LAMPS

Heat lamps can generate extremely high surface temperatures. They are designed to heat items on top of a surface and should never be used to heat a Corian[®] surface. Make sure they are fixed in the proper position and can't be moved. If heat lamps are used, the Corian® surface must not be restrained from expansion and contraction. Clearances must be left between the Corian[®] surface and any potential restraints, including walls, penetrations, etc. Most health authorities require food to be kept at a temperature of at least 60°C (140°F). The distance between the lamp and the Corian® surface will depend on lamp characteristics. The distance should be determined to achieve food temperature requirements and minimize hot spot creation on the Corian® surface. Placement should be optimized so the heat lamps are focused on the food only. Typically heat lamps should be at least 508 mm (20") above the Corian® surface unless actual field measurements prove that a lower position will not heat the surrounding Corian® surface in above 66°C (150°F) Do not place seams in areas under heat lamps. Heat lamps should be supported by the passthrough method (G.1.2 Pass Through Support). Holes for accessory support rods should be made along the sides of cutouts, not the corners.

If heating a location where plates of food are placed momentarily then this area is best designed with:

- No penetrations, inside corners, and other stress risers
- · Soft silicone seams separating this section from adjoining areas
- · Consider providing trivets or install hot pad rods

P.2. SNEEZE GUARDS

As with heat lamps, sneeze guards should be mounted by the passthrough support method (G.1.2 Pass Through Support) to allow the Corian[®] Endura[™] to expand and contract. Holes for accessory support rods should be made along the sides of cutouts, not the corners. Seal the gaps with silicone sealant to allow expansion and contraction.



Figure P-1: Typical Sneeze Guard Assembly

P.3. HOT PADS

If desired, steel rods ("hot rods") may be installed to prevent hot food pots from resting directly on the Corian[®] surface. See Figure P-2 for details.

CORIAN® ENDURA



P.4. P.4. TRAY SLIDES

Trays are often made with mineral or glass fillers that can be very abrasive. Tray slides can be made of metal rods (stainless steel, brass strips, etc.). Do not route the surface to embed the tray slides. Slides are to be adhered with flexible silicone adhesive so they can expand and contract as needed. Examples are shown below.



Figure P-3: Tray Slide with Set-On Backsplash

P.5. STAINLESS STEEL ADAPTER

Not all food service equipment will come with a flange that will cover the required support structure. An adapter may be fabricated from 14–16-gauge stainless steel. This flange should be a minimum of 25 mm (1") wide.





Figure P-4: Stainless Steel Adapter

P.6. OTHER DESIGN CONSIDERATIONS

Corian[®] Endura[™] is a beautiful material that has been used for many beautiful designs. The following guidelines will enhance design success and durability.

- 1. Avoid stress risers such as square inside corners and abrupt changes in thickness or width of the Corian[®] assembly.
- Avoid direct contact between Corian[®] Endura[™] and hot water or steam. Never under mount hot wells, which cause the Corian[®] top to become part of the steam tray assembly.
- 3. Always allow for expansion and contraction. Ensure that overhanging or drop edges have 3 mm (¹/₈") minimum clearance to underlayment or other materials. This will allow expansion and contraction if it is stored in cold weather or if the metal casework expands faster than the Corian[®] Endura[™]. Provide 3 mm (¹/₈") clearance between the Corian[®] Endura[™] and columns or brackets penetrating through the surface. Clearances can be filled with silicone if desired.

Q. Cabinet Ventilation

If a cabinet containing a heating element is closed on all sides, ventilation is necessary to reduce the temperature inside the support cabinet. Convection and forced air cooling are two acceptable types of ventilation. Convection cooling is done by placing vents at the top of one side and the bottom of the opposite side to promote airflow. Forced air cooling is done by installing a fan in the cabinet and installing vents at the top of the cabinet. Fans should be tied into the heating power source, so they turn on automatically when the heat source is on.

Ventilation may also be indicated for cold wells to help prevent condensation buildup.



Figure Q-1: Convection Cooling



Figure Q-2: Forced Air Cooling

R. NSF/ANSI 51

Corian[®] Endura[™] 20-mm slabs are NSF/ANSI 51 Certified to the highest level, for food contact, for all food types. 6-mm and 12 mm slabs have a reinforcing mesh and are not NSF/ANSI 51 listed. All design guidelines are based on 20-mm product. Please see K-30218 *Corian[®] Endura[™] NSF/ ANSI 51 Certification* for additional details.

S. Customer Instructions

- Discuss equipment settings and usage with the customer.
- Steam trays that dry out can get too high in temperature.
- If the appliances have positive stops, set a maximum temperature.
- Make sure they understand not to lower the heat lamps from the proper settings. Moving the lamps closer can make the temperature exceed the design limits.
- Provide a printed copy or direct customer to download K-30206 *Corian® Endura™ Care and Maintenance* from endura.corian.com.

T. Referenced Documents

K-30200 Corian[®] Endura[™] Design
K-30201 Corian[®] Endura[™] Support
K-30203 Corian Endura[™] Transportation and Installation
K-30206 Corian[®] Endura[™] Care and Maintenance
K-30207 Corian[®] Endura[™] Properties
K-30218 Corian[®] Endura[™] NSF/ANSI 51 Certification

CORIAN® ENDURA

U. Appendix – Measurement Reference Tables

U.1. CUTOUT PARAMETERS

Торіс	Guidance	Reference
Inside Corner Radius (Ambient)	5 mm (³ /16") minimum. Use as large as equipment allows.	F.1 Standard Cutouts
Inside Corner Radius (Hot/Cold)	5 mm (³ /16") minimum. Use as large as equipment allows.	F.2 Hot and Cold Food Wells
Top & Bottom Edge Radii	2 mm (¹ /16") for unexposed edges 3 mm (1/8") for exposed edges	F.1 Standard Cutouts
Cutout Finish	Smooth or hone around the interior of the cutout to remove cut lines and chipping. Minimum 120 grit diamond is recommended.	F.1 Standard Cutouts

U.2. CUTOUT SPACING

Торіс	Guidance	Reference
Distance between cutouts of same temperature	64 mm (2.5")	F.4 Cutout Spacing
Distance between hot and cold cutouts	305 mm (12") distance and flexible soft seam between all adjacent hot and cold food wells to allow for the temperature differential. Note exception when 3 layers of Nomex® insulation are used.	F.4 Cutout Spacing
Distance between cutout and countertop edge	64 mm (2.5")	F.4 Cutout Spacing
Distance between cutout and seam	64 mm (2.5")	F.4 Cutout Spacing
Distance between seam in cutout-to-cutout edge	Putting a seam in a cutout is discouraged. If seam is necessary, reference discussion in text.	M.3 Seam Locations



U.3. CUTOUT GAPS

Торіс	Guidance	Reference
Standard Cutout	3 mm (¹ /8") clearance between the food well support and both the countertop and countertop support edge, including at corners	F.1. Standard Cutouts
Hot/Cold Cutout	3 mm (¹ /8") clearance between the food well support and both the countertop and countertop support edge, including at corners	F.2. Hot and Cold Food Wells
Hot/Cold Cutout	3 mm (¹ /8") expansion clearance for the entire perimeter of the food well equipment (distance between food well equipment and insulation)	F.2. Hot and Cold Food Wells
Hot/Cold Cutout	3 mm (¹ /8") nominal overlap of the food well flange over the countertop	F.2. Hot and Cold Food Wells
Hot/Cold Cutout	1.5 mm (1 /16") vertical clearance between the food well flange and the countertop surface which is to be filled with silicone sealant	F.2. Hot and Cold Food Wells
Clearances	3 mm (1/8") minimum perimeter or radial clearance for any penetration passing through the surface.	I. Clearances
Clearances	3 mm (¹ /8") minimum clearance between buildup edges and any support structure or underlayment.	I. Clearances
Clearances	3 mm (¹ /8") minimum clearance at all walls (gap may be filled with silicone sealant.)	I. Clearances

U.4. SEAM LOCATIONS AND TYPES

Торіс	Guidance	Reference
Distance between seam to cutout	64 mm (2.5")	M.3 Seam Locations
Distance between seam to countertop edge	64 mm (2.5")	M.3 Seam Locations
Offset of seam from inside corner (non-cutout)	40 mm (1 ½") for inside corners joining two sections of countertop	M.3 Seam Locations
Distance between seam in cutout-to-cutout edge	Putting a seam in a cutout is discouraged. If seam is necessary, reference discussion in text.	M.3 Seam Locations
Flexible seams between hot and cold cutouts	Flexible silicone seam recommended between hot and cold cutouts	F.4 Cutout Spacing

U.5. CUTOUT INSULATION

Торіс	Guidance	Reference
Adjacent Wells – Same Temp	2 layers of Nomex® Insulation and Aluminum Tape	
Adjacent Wells - More than 305 mm (12") – Hot/Cold	2 layers of Nomex [®] Insulation and Aluminum Tape Flexible seam separating wells	H.2 Insulation Installation
Adjacent Wells - Less than 305 mm (12") – Hot/Cold	3 layers of Nomex® Insulation and Aluminum Tape Flexible seam recommended but not required.	



V. Appendix – Checklists

V.1. S	SAFETY		
□ Y	es 🗌 Ne	o 🗌 NA	Safety glasses
□ Y	es 🗌 Ne	o 🗌 NA	Ear protection
□ Y	es 🗌 Ne	o 🗌 NA	Leather gloves
□ Y	es 🗌 Ne	D NA	Dust mask
□ Y	es 🗌 Ne	D NA	Hard hat when required
□ Y	es 🗌 Ne	D NA	Steel-toed work boots
□ Y	es 🗌 Ne	D NA	Chemical resistant gloves
□ Y	es 🗌 N	o 🗌 NA	Trained on tools
□ Y	es 🗌 N	o 🗌 NA	Attend job site safety meeting if required
□ Y	Tes No	o 🗌 NA	Safety measures in place for managing silica dust?
V.2. [DESIGN		
□ Y	les 🗌 N	o 🗌 NA	Does the sheet color require specific orientations (Private Collection/Metallic)?
□ Y	Yes No	o 🗌 NA	Equipment separately supported from sheet?
□ Y	Yes No	o 🗌 NA	Overhead equipment used proper pass-through support?
□ Y	Yes No	o 🗌 NA	Proper separation of cutouts of (same temperature, edges)?
□ Y	es 🗌 N	o 🗌 NA	Dedicated structural support for any equipment to be on surface?
□ Y	es 🗌 N	o 🗌 NA	Hot pads where hot pans/plates are likely?
□ Y	es 🗌 N	o 🗌 NA	Hot pads under heat lamps (pass throughs)
□ Y	es 🗌 N	o 🗌 NA	Tray slides installed?
□ Y	Yes No	o 🗌 NA	Wear plate installed behind tray slide?
V.3. (QUOTING		
□ Y	es 🗌 No	o 🗌 NA	Does the sheet color require specific orientations (Veined/Metallic) and have you accounted for extra sheet required in your quote?
□ Y	es 🗌 N	o 🗌 NA	Are there site-specific details (work rules, access, etc.) that will impact timing and cost?
□ Y	es 🗌 N	o 🗌 NA	Are you bidding per plan and specification?
□ Y	Yes N	o 🗌 NA	If you are responsible for the support structure, have you included all necessary support in your costs?
V.4. I	PRE-JOB		
□ Y	es 🗌 N	o 🗌 NA	Have you considered if the job is better done on-site/in the shop/combined?
□ Y	es 🗌 N	o 🗌 NA	Are you in a region that prohibits the use of denatured alcohol for cleaning? (Substitute acetone if air quality regulations prohibit alcohol)
□ Y	Yes N	o 🗌 NA	Do you have the right colors of Corian [®] Joint Adhesive?
Y	Yes 🗌 N	o 🗌 NA	Do you have the right colors of sealant?
ΓY	es 🗌 N	o 🗌 NA	Can you stage material on-site?
ΓY	es 🗌 N	o 🗌 NA	Do you have access to power?
ΓY	es 🗌 N	o 🗌 NA	Do you have access to compressed air?
Υ	Yes 🗌 N	o 🗌 NA	Will the site be climate controlled?
Υ	Yes 🗌 N	o 🗌 NA	Do you know the site rules? (Access, noise, dust, deliveries, hours, etc.?)
□ Y	Ves 🗌 N	o 🗌 NA	Are you doing the whole job from support to turnover? If not, who is responsible for the other portions and how will you ensure they do their part correctly?



V.5. SUPPLIES

Yes	🗌 No	🗌 NA	Color matched Corian® Joint Adhesive for hard seams
Yes	🗌 No	🗌 NA	Color coordinated sealant for finish caulking
Yes	🗌 No	🗌 NA	Clear 100% silicone adhesive
Yes	🗌 No	🗌 NA	Painter's tape
Yes	🗌 No	🗌 NA	Clear packing tape
Yes	🗌 No	🗌 NA	Denatured alcohol (Acetone)
Yes	🗌 No	🗌 NA	Clean white rags or paper towels
Yes	🗌 No	🗌 NA	Hot melt glue gun and glue sticks
Yes	🗌 No	🗌 NA	Plywood for ledger
Yes	🗌 No	🗌 NA	¹ /16" (1.5 mm) Shims
Yes	🗌 No	🗌 NA	¹ /s" (3 mm) Shims
Yes	🗌 No	🗌 NA	Nomex [®] Insulation
Yes	🗌 No	🗌 NA	3M™ Aluminum Tape
Yes	🗌 No	🗌 NA	Double sided tape
V6 FQU	IPMENT		
Yes	No No	🗌 NA	Seam adhesive dispenser
Yes	🗌 No	🗌 NA	Caulk gun
Yes	🗌 No	🗌 NA	Vacuum clamps
Yes	🗌 No	🗌 NA	Spring clamps
Yes	🗌 No	🗌 NA	Squeeze or screw type clamps
Yes	🗌 No	🗌 NA	Wooden blocks
Yes	🗌 No	🗌 NA	Tape measure
Yes	🗌 No	🗌 NA	Level 4' (1.22 m) or longer or laser level
Yes	🗌 No	🗌 NA	Straight edge
Yes	🗌 No	🗌 NA	Sharp chisel with rounded corners
Yes	🗌 No	🗌 NA	Scribe
Yes	🗌 No	🗌 NA	Block plane
Yes	🗌 No	🗌 NA	Sander
Yes	🗌 No	🗌 NA	Work light
Yes	🗌 No	🗌 NA	Sawhorses
Yes	🗌 No	🗌 NA	Ladder
Yes	🗌 No	🗌 NA	Drywall cart for transporting material on larger scale jobs
Yes	🗌 No	🗌 NA	4'x8' sheet of ¾" plywood for work bench
Yes	🗌 No	🗌 NA	Glazer's suction cups
Yes	🗌 No	🗌 NA	Plastic spray bottle

v./.	FABRIC	ATION.	4		
	Yes	□ N	0	NA	Are all slabs inspected for defects?
	Yes	□ N	0	NA	Are slabs sequenced for optimum color match?
	Yes	□ N	0	NA	Do you have silica dust control for on-site fabrication?
	Yes	□ N	0	NA	Do all slabs have a uniform finish?
	Yes	□ N	0	NA	Are all prefabricated pieces labeled for easy identification during delivery and on-site?
	Yes	□ N	0	NA	Do all cutouts have a minimum inside radius of ³ /16" (5mm)?
V.8.	INSTAL	LATIO	N		
	Yes	□ N	0	NA	Inspect support condition (correct support dry, flat)
	Yes	□ N	0	NA	Substrate cleaned with denatured alcohol (Acetone)?
	Yes	□ N	0	NA	Slab back cleaned with denatured alcohol (Acetone)?
	Yes	□ N	0	NA	Slab edges cleaned with denatured alcohol (Acetone)?
	Yes	No	0	NA	Is there any unexpected heating or cooling equipment (ice pans, overhead lamps, strip heaters, surface heaters, cooking stations, etc.? Design changes may be required.
	Yes	□ N	0	NA	Check for field changes to holes sizes or spacings, support locations, millwork integrity, equipment designs or capacities that may change temperature or stress patterns.
	Yes	□ N	0	NA	Check flat surfaces. Are they located where they may be a convenient place to put trays "just out of the oven"? Consider adding trivets or hot rods.
	Yes	□ N	0	NA	Are there surfaces that are likely to have someone stand on the countertop to reach lighting, signage, cabinets, or as a "shortcut"? Is the support adequate?
	Yes	N N	0	NA	Is all equipment in cutouts independently supported?
	Yes	□ N	0	NA	Are all seams properly supported?
	Yes	□ N	0	NA	Could the support structure support all the equipment without the Corian® surface installed?
V.9.	INSPEC	TION			
	Yes	□ N	0	NA	Do all cutouts have a minimum inside radius of ³ /16" (5 mm)?
	Yes	□ N	0	NA	Have all cutout edges been sanded smooth?
	Yes	□ N	0	NA	Soft seam quality checked?
	Yes	□ N	0	NA	Hard seam quality checked?
	Yes	□ N	0	NA	Finish quality checked?
	Yes	□ N	0	NA	Are gaps between tops and walls, etc. filled with silicone sealant.
	Yes	□ N	0	NA	Are all hot and cold cutouts insulated? With the proper # of layers?
	Yes	□ N	0	NA	Is all equipment properly supported?
	Yes	□ N	0	NA	Are all seams reinforced and completely filled?
	Yes	□ N	0	NA	Are all edge buildups completely filled? Do all edge inlays match up?
	Yes	□ N	0	NA	Is there adequate clearance between the Corian [®] Endura [™] top and all other parts to allow for expansion and contraction?
	Yes	□ N	0	NA	Did you install the sneeze guards, overhead lamps, brackets, etc.? If not, have you provided adequate instructions, so they are properly installed without damaging the top?
	Yes	□ N	0	NA	Do all of the heating pan temperature-control knobs have positive stops to prevent setting the temperatures too high? Food temperatures should be 160°F-170°F (71°C-76°C) to meet most health department requirements. Dry wells or heating units set to excessive temperatures will overheat the Corian [®] countertop, resulting in cracking failures.

CORIAN[®] en dura

PLEASE VISIT OUR WEB SITE: WWW.CORIANENDURA.COM OR CONTACT YOUR CORIAN® REPRESENTATIVE FOR MORE INFORMATION ABOUT CORIAN® ENDURA™.

This information is based on technical data that DuPont Specialty Products USA, LLC and its affiliates ("DuPont") believe to be reliable, and is intended for use by persons having technical skill and at their own discretion and risk. DuPont cannot and does not warrant that this information is absolutely current or accurate, although every effort is made to ensure that it is kept as current and accurate as possible. Because conditions of use are outside DuPont's control, DuPont makes no representations or warranties, express or implied, with respect to the information, or any part thereof, including any warranties of title, non-infringement of copyright or patent rights of others, merchantability, or fitness or suitability for any purpose and assumes no liability or responsibility for the accuracy, completeness, or usefulness of any information methods and process present no health or safety hazards. Do not attempt to perform specification, design, fabrication, or installation methods and process present no health or safety hazards. Do not attempt to perform specification, allower or results obtained from such information, whether or not based on DuPont's negligence. DuPont shall not be liable for (i) any damages, including claims relating to the specification, design, fabrication, or combination of this product with any other product(s), and (ii) special, direct, indirect or consequential damages. DuPont reserves the right to make changes to this information and this disclaimer periodically for any updates or changes. Your continued access or use of this information shall be deemed your acceptance of this disclaimer and any changes and the reasonableness of these standards for notice of changes.

Corian*, the Corian* logo system, Endura[™], and all trademarks and service marks denoted with [™], [™] or * are trademarks or registered trademarks of affiliates of DuPont de Nemours, Inc., [©] 2022 DuPont.

CORIAN[®] ENDURA[™] HOT/COLD FOOD SERVICE



