



Commercial Food Service Bulletin

Z-2007-001

INTRODUCTION

Successful food service countertop design requires attention to detail and often requires technical expertise. Hot and cold food service countertops require special fabrication and installation techniques. While DuPont™ Zodiaq® quartz surfaces is an excellent decorative surface for food service, consideration must be given for both normal and abnormal conditions such as hot wells running out of water, which can permanently damage the top. This bulletin is intended to provide guidance for fabricating and installing Zodiaq® food service counters.

Note: DuPont does not provide a warranty for installation of Zodiaq® in commercial applications.

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A. SAFETY

DuPont™ Zodiaq® quartz surfaces is made from quartz and resin. Operations such as sawing, routing, drilling, and sanding can generate respirable silica dust. Wet cutting, coring, and polishing minimize the generation of dust. For more information see Tech Bulletin "Minimizing Respirable Crystalline Silica Dust During Fabrication and Installation," Z-2001-011. Contact your local Distributor for more information.

B. GENERAL OVERVIEW

Zodiaq® is intended to be used as a decorative surface and should not be used as a structural material in food service or other applications. Structural support is required to support the weight of the Zodiaq® and any external loads.

- All external loads must be limited to compressive loads.
- Compressive loads must not exceed material limits (Zodiaq® Compressive Strength = 24,000 psi).
- Provide adequate support directly underneath any load. Do not use Zodiaq® to transfer bending and/or shear loads from external equipment to supporting structures.
- Minimum inside corner radius for cutouts is 1/4" (6-mm).

Zodiaq® can be used in many different food service applications including those with heating equipment.

- Steps should be taken to insulate Zodiaq® from heated food service equipment. A minimum of two layers of Nomex® insulation is recommended. (DuPont™ Nomex® insulation with a minimum thickness of 0.11"/layer and a minimum weight of 9.5 oz/yd²/layer).
- Design must accommodate expansion and contraction to minimize the build-up of mechanical and thermal stresses. Zodiaq® coefficient of thermal expansion is 8.06×10^{-6} in/in-°F (1.45×10^{-5} mm/mm-°C).
- Provide clearance between Zodiaq® and adjacent walls and/or cabinets or at any potential constraint. For example, provide 1/8" (3-mm) minimum radial clearance between the Zodiaq® top and columns or brackets penetrating through the top.

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C. FOOD SERVICE DESIGN RECOMMENDATIONS

This bulletin provides recommendations for designing food service counters. DuPont is the manufacturer of slabs of material and is not in the business of designing, fabricating or performing installations; nor do we employ architects skilled in the art of design. DuPont does not approve or disapprove any designs nor assume any liability for the design selected. DuPont provides a product only warranty, but does not provide a warranty for installation of DuPont™ Zodiaq® quartz surfaces in commercial applications.

D. AMBIENT TEMPERATURE CUTOUTS

- Minimum ¼" (6-mm) radius.
- Smooth or hone around the interior of the cutout to remove cut lines and chipping. Minimum 120 grit diamond is recommended.
- Ease top and bottom edges.
- Cutouts must be at least 2" (50-mm) apart.
- Install support for the cutout within 2" (50-mm) of the edge of the cutout.
- Provide a minimum gap of 1/8" (3-mm) between appliance and edge of cutout to allow for the expansion/contraction of the tray or appliance.

E. HOT OR COLD CUTOUTS

Hot or cold cutouts require special treatment including insulation, equipment support, etc. Reference section K item number 4 for guidance on adjacent hot and cold cutouts.

- Minimum ¼" (6-mm) radius.
- Smooth or hone around the interior of the cutout to remove cut lines and chipping. Minimum 120 grit diamond is recommended.
- Ease top and bottom edges.
- Cutouts must be at least 2" (50-mm) apart.
- The design of a hot and cold cutout must include space for insulation and additional equipment support.
- **Use supports to isolate the weight of a drop-in food well from the Zodiaq®.**

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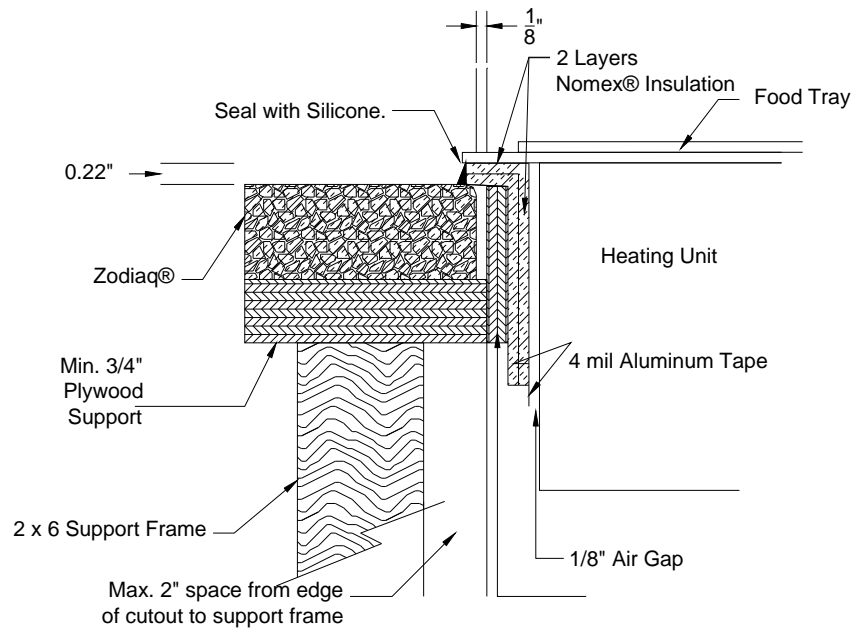
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- Install support for the cutout within 2" (50-mm) of the edge of the cutout.
- Minimize heat transfer (hot or cold) by installing insulation. A minimum of two layers of Nomex[®] insulation is recommended. (Nomex[®] insulation with a minimum thickness of 0.11"/layer and a minimum weight of 9.5 oz/yd²/layer)
- Provide a minimum gap of 1/8" (3-mm) between appliance and edge of cutout to allow for the expansion/contraction of the tray or appliance.

FIGURE 1
Hot/Cold Cutout Example



Notes:

1. Longest run of frame support to be tied into casework. Shorter pieces of frame support should be tied into longer runs. See Appendix I for additional support information.
2. Caution: Do not allow foil tape to create a heat transfer path directly to the Zodiaq[®]. This is to minimize the heat transfer to the Zodiaq[®].
3. DuPont[™] Nomex[®] insulation with a minimum thickness of 0.11"/layer and a minimum weight of 9.5 oz/yd²/layer.
4. In some instances, the thickness of the vertical support requires it to be face applied to the plywood underlayment.

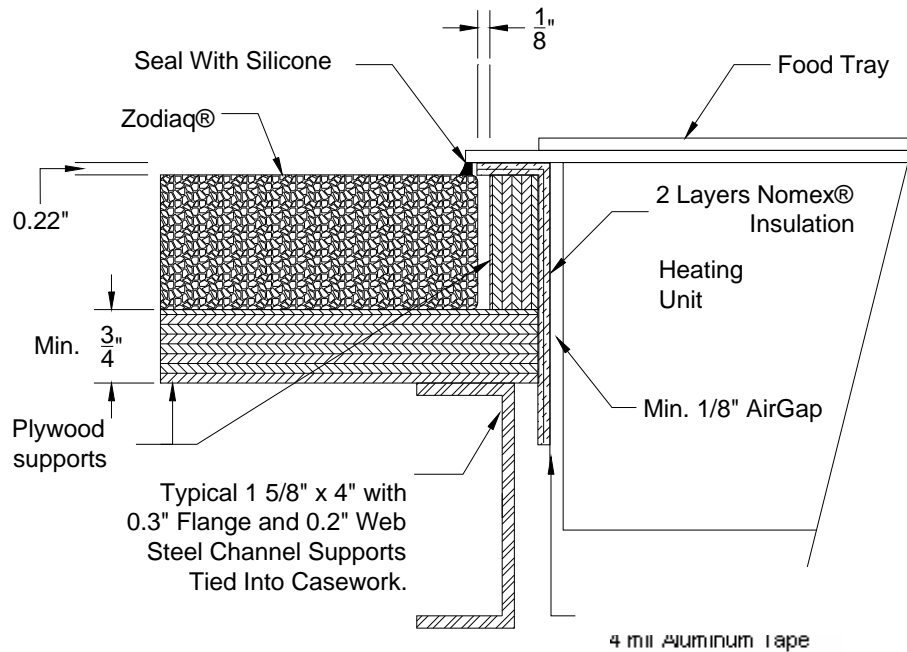
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FIGURE 2
Hot/Cold Cutout Alternative Example



Notes:

1. Longest run of channel to be tied into casework. Shorter pieces welded to longer runs. See Appendix I for additional support information.
2. Underlayment support materials should be moisture resistant. See Appendix I for additional support information.
3. Caution: Do not allow foil tape to create a heat transfer path directly to the Zodiaq®. This is to minimize the heat transfer to the Zodiaq®.
4. DuPont™ Nomex® insulation with a minimum thickness of 0.11"/layer and a minimum weight of 9.5 oz/yd²/layer.
5. Wherever possible, apply the vertical support to the top of the plywood underlayment.

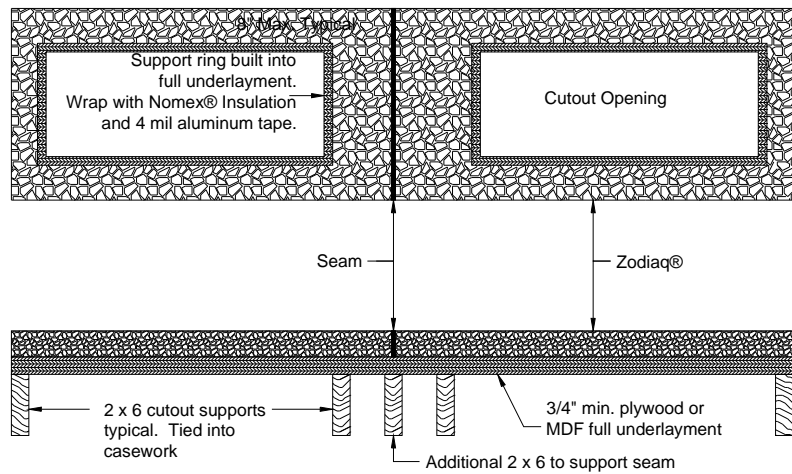
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F. SUPPORTING SEAMS

DuPont™ Zodiaq® quartz surfaces seams require structural support. The structural support needs to be flush with the supporting substructure. **Local codes may dictate which support material may be used.** Typical support materials include cabinetry, wood, plywood, and steel.



Notes:

1. Underlayment support materials should be moisture resistant. See Appendix I for additional support information.
2. DuPont™ Nomex® insulation with a minimum thickness of 0.11"/layer and a minimum weight of 9.5 oz/yd²/layer.

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G. MOUNTING SNEEZE GUARDS, HEAT LAMPS, ETC.

Mount sneeze guard and/or heat lamp support structures directly to the sub frame. Do not attach sneeze guards, overhead heat fixtures, dividers, etc., directly to Zodiaq[®]. Drill through the Zodiaq[®] top using appropriate diamond tooling and secure the sneeze guard and/or heat lamps to the framework below. Provide adequate radial clearance (1/8" (3-mm) minimum) between the Zodiaq[®] top and columns or brackets penetrating through the top. (See Safety Section)

H. POSITIONING HEAT LAMPS

Heat lamps can generate extremely high surface temperatures. Most health authorities require food to be kept at a temperature of at least 140°F (60°C). The distance between the lamp(s) and the Zodiaq[®] will depend on lamp characteristics (e.g. wattage). The distance should be determined to achieve food temperature requirements and minimize hot spot creation on the Zodiaq[®]. As an example, for a kitchen-to-server pass through it is better to flood the entire pass through with uniform heat than to generate focused hot spots or to heat one side of the pass through and not the other. **NEVER use heat lamps to solely heat the Zodiaq[®] surface.**

I. HOT PADS

Since hot trays of food are sometimes placed on surfaces near food wells, some form of semi-permanent hot pad should be installed to isolate the Zodiaq[®] surface from the heated tray. One approach is to precut grooves in the surface of the Zodiaq[®] and insert stainless steel rods. It is best to use silicone to attach the rods to the grooves. This helps the rods stay in place but they can be removed, if necessary, for periodic maintenance.

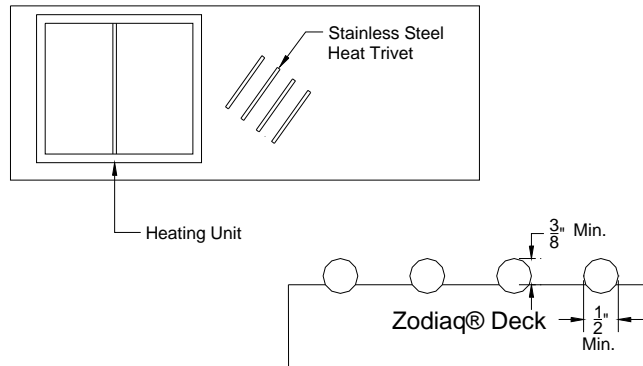
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FIGURE 4
Stainless Steel Trivet Rods



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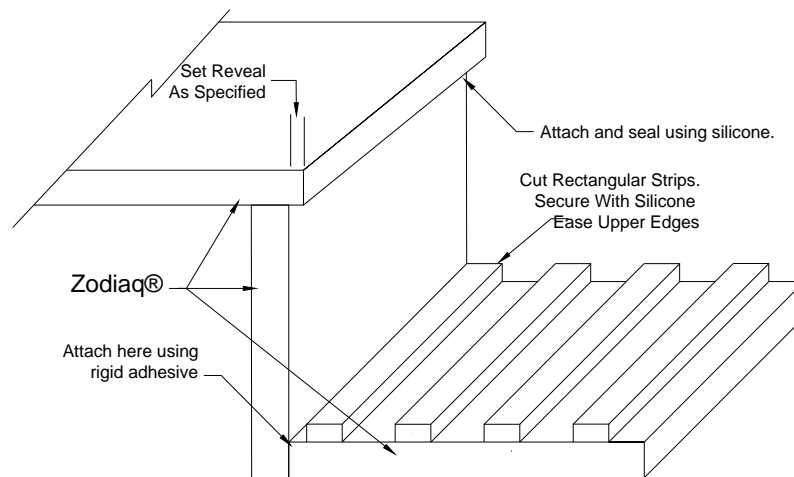
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J. TRAY SLIDES

Tray slides are typically located at a different elevation than the primary food counter. Do not hard seam the tray slide to the primary counter. Use acrylic or polyester adhesive to seam a backsplash to the back of the tray slide. Attach the backsplash to the underside of the counter in a “reveal” style. Use silicone to seal the backsplash to the underside of the counter. The tray slide glides in the slide area can be made of Zodiaq®, stainless steel rods, brass strips, etc., and should be attached using a silicone sealant.

FIGURE 5
Zodiaq® Tray Slide



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K. DEALING WITH THE UNUSUAL

To provide assistance in the design and installation of DuPont™ Zodiaq® quartz surfaces food service installations, DuPont recommends the following:

1. Avoid **stress risers** such as square inside corners, chipped edges and abrupt changes in the width of the Zodiaq®.
2. Avoid direct Zodiaq® to hot water/**steam contact**. NEVER under mount hot wells in a way which would cause Zodiaq® to become part of the steam tray.
3. For a drop edge leave at least 1/8" (3-mm) behind the dropped edge and casework to allow for expansion and contraction from temperature changes.
4. Ideally, hot wells and cold wells should be separated by at least 12" (305-mm), with a **flexible expansion joint** between wells. Typical design: 1/8" (3-mm) gap between sheet edges, filled with silicone sealant. There may be situations when the client will not accept exposed expansion joints. In these cases, joints can be covered with PVC "T" molding, flat strips, custom made Zodiaq® strips, etc. Attach the cover strips with silicone. While the use of flexible expansion joints is highly recommended, it is acceptable to omit this feature if Zodiaq® is insulated from both the hot and cold temperature equipment. Three or more layers of Nomex® insulation are recommended if flexible expansion joints are not used. (DuPont™ Nomex® insulation with a minimum thickness of 0.11"/layer and a minimum weight of 9.5 oz/yd²/layer)

Note: Hold Nomex® insulation in place using 4 mil aluminum conductive tape. Do not fold tape onto surface of Zodiaq®. Do not allow foil tape to create a heat transfer path directly to the Zodiaq®. Wrap tape onto support for tray or appliance.

L. JOB PLANNING AND COMPLETION REVIEW CHECKLIST

There are several items to consider before starting installation at the job site that may require adjustment:

- Have you checked the site for 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.

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- 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 Zodiaq®?
- Have you considered where the workers will put new trays of hot food when they refill the installed food trays? If there is a smooth flat area near the installed food tray, that's where the workers may put the new hot tray. You'll need to plan for a way to keep this extreme heat from damaging the Zodiaq® surface by providing hot pads, trivets, and/or steel rods (see Figure 4).
- Are there places where someone is likely to stand on the Zodiaq® top to change light bulbs or advertising signage, to reach overhead cabinets, to take a "short cut" to the kitchen, etc.? Have you provided adequate support for the Zodiaq®?

After installation, review the following and make sure that all guidelines have been followed:

- Are all of the cutouts made with the appropriate gaps? Is insulation needed? Provided?
- Are all of the food wells properly supported so the weight is not carried by the Zodiaq® countertop?
- Are all seams supported as needed and completely filled?
- Are the feet of the casework properly adjusted in elevation to provide level support to the countertop structure?
- Are the Zodiaq® decorative surfaces sitting flat on the underlying support structure? Are shims required under the support structure to provide the needed support? (Do not put shims between the Zodiaq® and the support structure.)
- Is there a minimum 1/8" (3-mm) gap between Zodiaq® and other parts so the metal trays and appliances can expand and contract unrestricted?
- Did you install the sneeze guards, overhead lamps, brackets, etc.? If not, have you provided adequate instruction for the trade craftsmen that will follow so that their work does not damage or compromise the Zodiaq® top?

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- Do all of the heating pan temperature control knobs have positive stops to prevent setting the temperatures too high? If not, install them before you leave. Food temperatures should be at least 140°F (60°C) to meet most health department requirements. Heating foods to a boil will dry out the food, waste electricity, and can cause overheating of the Zodiaq® countertop.

M. FOOD SERVICE REVIEW

1. What is the minimum spacing between cutouts of the same temperature?
Answer: 2" (50-mm)
2. What is the minimum spacing between cutouts of different temperatures?
Answer: 2" (50-mm) with three or more layers of Nomex®.
3. What is the minimum spacing between cutouts and front and rear edges?
Answer: 2" (50-mm)
4. What is the minimum spacing between Zodiaq® and hot/cold trays or appliances?
Answer: 1/8" (3-mm)
5. What clearance between casework and back of the drop edge is needed?
Answer: 1/8" (3-mm) min
6. What special modifications are required for cutouts 14" (355-mm) apart?
Answer: None
7. For hot and cold cutouts how much insulation is required?
Answer: Use 2 layers of Nomex® minimum. (DuPont™ Nomex® insulation with a minimum thickness of 0.11"/layer and a minimum weight of 9.5 oz/yd²/layer).
8. What insulation materials are approved for cutouts?
Answer: Only Nomex® insulation.
9. What should the food temperature be?
Answer: At least 140°F (60°C) or per local health department regulations.
10. When using heat lamps to warm the Zodiaq® serving surface, what should the maximum temperature be?
Answer: Do not use lamps to heat the Zodiaq®.
11. Where should seams be located?
Answer: Best if not through cutout or inside corner.
12. What should you do if hot trays or pots will be placed on the Zodiaq® surface?
Answer: Install permanent hot pads, rods, or trivets
13. When is it OK not to support a deck seam?
Answer: Never. Always support all seams.

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N. APPENDIX I – STRUCTURAL PERIMETER SUPPORT, GUIDANCE ON ALTERNATIVES

Analysis cases based on beam simply supported on both ends.

Uniform load (w) on entire span.

Guidance based on maximum deflection (Max y) at center of beam.

Max y = -5w^4/384EI @ l/2
Roark&Young case 2e, page 100
Zodiaq® density = 2431 kg/m3 = 0.088 lb/in3 = 151.8 lb/ft3.

Table with columns: Support Properties (width, depth, nominal size, thickness, weight per foot, Inertia, Modulus), beam length, Zodiaq® 3-cm weight, uniform beam load (w), Max y. Rows include MDF medium density and MDF high density.

The above cases are not recommended as they provide insufficient support.

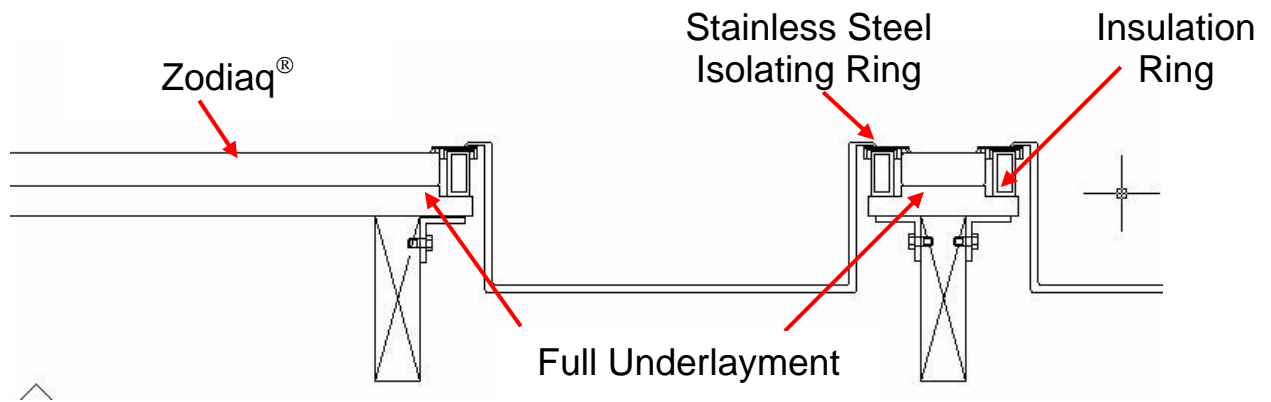
In addition to full underlayment support in commercial food service, full perimeter structural beam support of large hot/cold well cutouts is recommended. Plywood greater than or equal to 3/4-inch is recommended for full underlayment support. Structural perimeter support (see alternatives outlined below) should be provided around the full perimeter of large hot/cold well cutouts within 2-inches of the cutout edge. Two sides of any cutout should be structurally supported regardless of dimension, e.g., tangential supports for soup wells. Cutout leg lengths greater than 18-inches should have structural perimeter support. The structural perimeter support must be rigidly tied back into rigid vertical cabinet members and must be level to fully support the Zodiaq® decorative surface. The guidance appearing below is based on a maximum 48-inch perimeter support span. If longer spans exist in the application, larger support beams should be used.

Table listing various support materials and their properties: wood 2 X 6, steel channel, steel angle (equal and unequal legs), steel I beam. Columns include dimensions, weight, inertia, modulus, beam length, Zodiaq weight, uniform load, and Max y.

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O. APPENDIX II - INSTALLATION EXAMPLE**APPENDIX II - 1 Completed installation overview.****APPENDIX II - 2 Cross-sectional drawing of installed hot wells.**

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APPENDIX II - 3 Full underlayment support.



APPENDIX II - 4 Support beams between cut-outs.



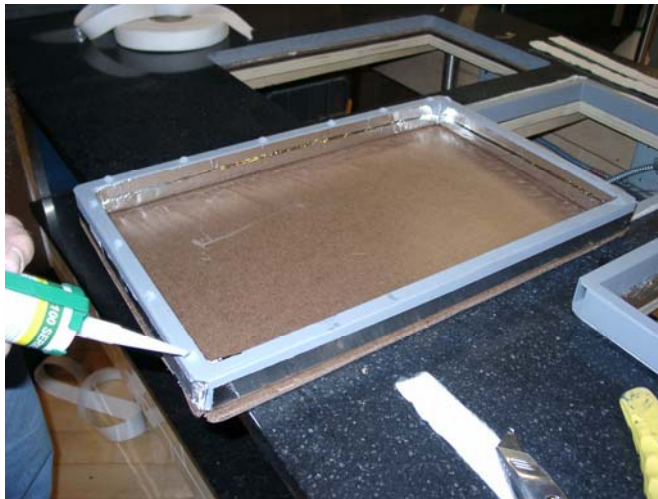
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Z-2007-001**APPENDIX II - 5 Support structure should be level to fully support to the Zodiaq®.****APPENDIX II - 6 Hollow metal insulation rings support equipment from underlayment. Rings provide some insulation due to hollow air-filled chamber. Nomex® insulation is used for additional insulation.**

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Z-2007-001**APPENDIX II - 7 Nomex® insulation used to fill space around perimeter of metal insulation rings.****APPENDIX II - 8 Dabs of silicone on bottom of insulation frames.**

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APPENDIX II - 9 Equipment dry fit on installed frame. There should be a vertical gap of approximately 0.22-inch between equipment isolating ring and Zodiaq® surface.



APPENDIX II - 10 Food service pans used to properly position Stainless Steel isolating rings.



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APPENDIX II – 11 Pan loaded with weight to compress assembly into silicone.



Weight

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