FABRICATION AND INSTALLATION MANUAL

for STARON
Cheil Industries Inc. (of Samsung)

This manual is intended to provide the most effective instruction for fabrication and installation of Staron.

The techniques listed in this manual are authoritative and Cheil provides our warranty program only in case of complying with this manual.

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1. Handling & Storage with Safety and Inspection

1.1 Handling

1.1.1 Sheet

Staron pallet should be unloaded with a fork truck or lifting device. If Staron sheet is unloaded manually because of lack of any unloading equipment, always carry one sheet at a time in the vertical position, wearing heavy-duty protective gloves and proper safety shoes.

Carrying sheets should be done by two people and on edge with one hand under to support, and one hand over to control the sheet.

1.1.2 Shape

Shape products should be handled carefully because they are fragile at all times even though they are packed to afford the maximum transport protection.
1.1.3 Handling adhesive

Staron adhesive requires care in handling. Always keep the instructions on the adhesive package.

1.2. Storing

1.2.1 Sheet

Sheets should always be stored flat and evenly supported in order to avoid warping and sagging. This requires full underlay support during storage. Sheet is most effectively stored between 15–23 °C (59–73 °F) and should be kept in a dry and well ventilated indoor area. Getting wet in storage is not allowed. Storage on the floor should be avoided.
1.2.2 Shape

Shape should be stored under the similar condition to avoid getting wet and should be avoided stacking more than six cartons high so that they prevent being broken when unloading.

1.2.3 Adhesive

Adhesive, whether it is tube-type or cartridge-type, should be stored in an dark and dry area of constant temperature in the range of 54 to 59°F (12 to 15°C). Staron tube-type adhesive has a guaranteed shelf life of two years and cartridge-type adhesive has one year when stored as mentioned above.

1.3. Inspection

Even though every sheet has been made with enough effort and total quality control, a final precutting inspection should to be conducted for free of defects prior to fabrication.

Refer to “Inspection Sheet”.
2. Tools and Accessories

2.1 Tool checklist

The following tools and accessories are needed or recommended for the fabrication and installation.

- Safety glass, shoes and gloves; dust mask and ear muffs
- Saw horses
- 50 mm X 100 mm X 2400 mm (3.2” X 4” X 96”) support rails
- 1000 mm and 2400 mm (3’ and 6’) straight edges
- G-clamps and spring clamps
- Extension cords
- Circular saw with carbide blade (40 teeth)
- Sabre saw with metal-cutting blade
- Router with a sharp 9.5 mm (3/8”) diameter carbide bit, minimum 2 hp and router templates
- Electric drill and bits
- Orbital sander, minimum 10,000 orbits/min
- Belt sander with 80–120 grit (120–180 micron) belt
Regular carpenter tools including square, level, hammer, nails, file, scribe or compass, tape measure, etc.

Sandpaper: as per final finish required (i.e. dull, semi gloss or high-gloss)

3M Scotch Brite pads (red, green and grey)

Caulking gun

Caulk remover tool

Hot melt glue gun and glue sticks

Staron adhesive

Abrasive scouring cleanser

Masking tape

Wooden bracing strips and shim material

Household aluminum foil

Aluminum conductive tape

Clean white cloth

Denatured alcohol

Block plane and chisel
2.2 Recommendation of tools and accessories

2.2.1 Routers

Advantages when using routers for fabrication and installation.
1) Easier to finish than when using saw
2) Possible to prevent corners being cracked because of a curved line of the cut corners.

The following guideline in the table below is recommended for common tasks.

<table>
<thead>
<tr>
<th>Task</th>
<th>Minimum Power</th>
<th>Tool/Bit</th>
</tr>
</thead>
<tbody>
<tr>
<td>General purpose work: e.g. edge and seem trimming, cutouts</td>
<td>2 Hp (1.5 kW)</td>
<td>10mm(3/8&quot;) carbide tripped single flute with 12mm(1/2&quot;) shank</td>
</tr>
<tr>
<td>Heavy duty work: e.g. bulk cutouts, banjo cuts, coving</td>
<td>3 Hp (2.3 kW)</td>
<td>10mm(3/8&quot;) carbide tripped double flute with 12mm(1/2&quot;) shank</td>
</tr>
<tr>
<td>Detail work: e.g. edge treatment</td>
<td>1.5 Hp (1.1 kW)</td>
<td>Carbide tripped decorative bits 12mm (1/2&quot;) shank with roller bearing</td>
</tr>
</tbody>
</table>

Revolution per minute (rpm) : 20,000 – 25,000

The recommendation above are based on maximizing maintenance on routers and quality tungsten tipped bits in day-to-day operations

Please stick Staron to flange base of router to protect Staron from damage.
2.2.2 Saws and blades

The following saws are acceptable:

- Stationary saw bed with sliding tray
- Vertical panel saw
- Drop cut saw with 45 degree angle option
- Water cooled diamond tipped saw
- Heavy duty portable circular saw
- Beam saw
- Radial arm saw

Regardless of the type of saw, all saws must:
1) be heavy duty
2) have triple-chip blades of tungsten carbide
3) have hook angle blades with pitch of -5 to 10 degrees and be described as "for cutting hard plastics"
4) have 4,000 – 6,000 rpm
5) have a quiet blade, small gullets, brass plugs and heavier blade stock
6) be used for cutting in a straight line

Blades must be sharpened regularly with a 400–600 grit (20–40 micron)–grinding wheel. Blades must have 6 teeth per diameter inch (25mm diameter) and are recommended the table below.
<table>
<thead>
<tr>
<th>Blade diameter (mm/inch)</th>
<th>No. of teeth</th>
<th>Plate (mm/inch)</th>
<th>Kerf (mm/inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>200/8</td>
<td>64</td>
<td>2.2/0.09</td>
<td>2.80/0.11</td>
</tr>
<tr>
<td>250/10</td>
<td>80</td>
<td>2.6/0.10</td>
<td>3.2/0.13</td>
</tr>
<tr>
<td>300/12</td>
<td>96</td>
<td>2.6/0.10</td>
<td>3.2/0.13</td>
</tr>
<tr>
<td>350/14</td>
<td>108</td>
<td>3.0/0.12</td>
<td>3.6/0.14</td>
</tr>
<tr>
<td>400/16</td>
<td>120</td>
<td>3.6/0.14</td>
<td>4.4/0.17</td>
</tr>
<tr>
<td>450/18</td>
<td>144</td>
<td>3.6/0.14</td>
<td>4.4/0.17</td>
</tr>
<tr>
<td>500/20</td>
<td>160</td>
<td>3.6/0.14</td>
<td>4.4/0.17</td>
</tr>
</tbody>
</table>

※ The following tools must not be used, in any circumstance, for cutting Staron to ensure that no chipping occurs and that all cuts are neat and clean:
1) Jig saws
2) Ripping or combination blades
3) Auger bits
4) Blades for wood-working

※ When Staron is subject to stress, all small cuts, fractures and invisible cracks in the Staron may lead to cracking. Therefore, the elimination of this weakness is highly recommended. The best way to do it is to rout all sawn edge with a router with a sharp straight cutting tool.
2.2.3 Sander and Sandpaper

The following sanders are acceptable and needed:
· Orbital sander, minimum 10,000 orbits/min
· Small hand sander
· Random orbital sander
· Stationery belt sander
· Portable belt sander (for 60–120 grit (120–230 micron) sandpaper)

The following requirements are needed for sandpaper:
· Open coat silicone carbide sandpaper is more efficient than aluminum oxide sandpaper.
· Refer to ‘Chapter 9. Finishing’ for the best selection or combination of sandpaper to get the required surface.
2.2.4 Clamps

Several types of clamps are suitable and the following clamps are general:
· Spring clamps, for making an edge by attaching strips.
· G-clamps, for holding templates and/or Staron when cutting and/or routing.

2.2.5 Dust collection

Although Staron dust is non-toxic, all dust must be removed at the point of generation wherever possible. All cutting and sanding areas of the workshop have to equip the ducted extraction. Portable sanders must be fitted with suitable dust extractors.
3. Templates

The use of an accurate template is needed or highly recommended for successful completion of a cutout and less sanding when finishing Staron. Templates should be used for accurate work when using a router to make all cutouts for sinks, appliances, faucet and similar parts.

Materials for making templates are:
- 2mm (1/8") hardboard
- heavy cardboard sheets
- M.D.F. board
- Plywood

The following procedure is a method to make a template for installation of undermount sinks and bowls.

A. Step One:
Make a Paper Pattern
1. Prepare the paper template guide of a sink to be installed or draw a line as per its inner dimension.
2. Choose a router bit and the paper template guide to be used for making the final sink cutouts. Keep in mind that this bit and template guide must be used.
3. Using a compass, scribe a line inside the line above equal to the cutting diameter of the bit to be used for making the final wooden template.
4. Cut out the paper pattern following your scribed line.
B. Step Two:
Make a Wooden Plug
1. Use the paper pattern above to trace the shape onto a piece of 1/2" plywood.
2. With a saber saw, carefully cut just outside the traced line, so that the line remains on the plug.
3. Carefully sand back to the traced line using a belt sander so that the plug should be extremely smooth.
4. Identify the sink model, router bit diameter, and template guide.

C. Step Three:
Make the Template
1. Place the plug on a piece of material for template which are recommended above and screw or nail through the plug and into supports underneath.
2. Securely clamp the material to the supports underneath.
3. Using the router with the bit size that is selected in step one, cut around the plug.
4. Inspect and finish the template.
4. Cutting and Cutouts

4.1 Caution for Cutting

All cutouts and cutting except straight cutting should be made by template and router with 9mm(3/8”) to prevent edges and corners being cracked. Round off top and bottom edge of the cutout to a 2mm(1/16”) minimum radius. All nicks, tool marks, etc should be removed with 150 grit (100micron) or finer sandpaper. Support within 76mm(3”), but no closer than 25mm(1”), from the edge of the cutout. All cutouts should have at least 3mm(1/8”) clearance on all sides for expansion. Temperature in the shop is recommended over 15℃ (59°F) to get the best effect. When cutting, frequently check the bit and blade to prevent chip being occurred or to get the smooth cutting edge of Staron. If required, change or sharpen them.

4.2 Straight line cutting

In case of a large quantity of cutting, running saw and panel saw with carbide blade must be used. When cutting, the blade must be positioned 20~30 mm (1”) higher than Staron sheet. Cutting speed depends on the sheet thickness. When using the saw with 350 mm (14”) blade and 7.5 Hp, the recommended cutting speed as per thickness is as follows,

<table>
<thead>
<tr>
<th>Thickness of Staron</th>
<th>Cutting speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 mm (1/2”)</td>
<td>ca. 3 m/min (10ft/min)</td>
</tr>
<tr>
<td>6 mm (1/4”)</td>
<td>ca. 5 m/min(16ft/min)</td>
</tr>
</tbody>
</table>
In case of on-site cutting and a small quantity of cutting, hand saw and router can be used with straight guide.

### 4.3 Round cutting and cutouts

1) Use only a router with a sharp, 9mm (3/8") or larger diameter bit, guided by templates clamped to the top to complete the cutout. Provide enough space, a minimum 6mm (1/4") on all sides, to allow expansion.

2) Remove all nicks, tool marks and so on with 150-grit (100 micron) or finer sandpaper in order to get smooth top and bottom edges.

3) Add support within 76mm (3"), but closer than 25mm (1"), from the edge of the cutout.

4) For cook top cutouts, apply aluminum conductive tape around the cutout so that it folds over on the top surface. All corners must be covered with the tape. Trim the excess tape after the cook top is installed.

※ In case of gas and solid disk electric cook tops, reinforcement with Staron on the corner of the backside is highly recommended.
4.4 Cooktop Cutouts

Cooktop cutouts are absolutely required on all cutouts made for heat-generating appliances.

1) Measure the appliance decorative flange.
2) Determine cutout size including a minimum 6mm(1/4") gap between cutout and the appliance.
3) Make a template for corner cutting below.

<table>
<thead>
<tr>
<th>Flange size in mm(inch)</th>
<th>R in mm(inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9–13(3/8–1)</td>
<td>3(1/8)</td>
</tr>
<tr>
<td>13–19(1/2–3/4)</td>
<td>9(3/8)</td>
</tr>
<tr>
<td>19–37(3/4–11/2)</td>
<td>19(3/4)</td>
</tr>
<tr>
<td>37–(11/2)</td>
<td>41(15/8)</td>
</tr>
</tbody>
</table>

4) On the bottom of a Staron sheet, draw the appliance flange length and width lines. And draw another cutout line, allowing the gap between cutout and the appliance(above).
5) Make four(4) 150mm x150mm(6" x6") corner blocks from Staron with four(4) 45 degree beveled edge. Pointing one of the edge corners to the cutout center and positioning 100mm x100mm(4" x4") part of the blocks inside the cutout line, apply Staron Joint Adhesive to the entire surface of each block and adhere the blocks to the bottom of the sheet.
6) Line up the template on the supported sheet. Rout the four (4) cutout corners with 9mm (3/8") bit and straight edges.

7) Round off the edges of the cutout smooth with sander.
5. Frame and Support

5.1 Frame

Supporting Staron worktop with a strong perimeter frame must be done so that the worktop will be kept to level for its useful life.

1) Common technique
   Create a perimeter frame in the workshop. Glue the worktop onto the perimeter with silicone or neoprene panel adhesive. Adjust the worktop to a perfect level when installing.

2) Special technique
   Position a perimeter frame on-site and place the worktop over the frame for exact adjustment and leveling with the minimum of adhesion to allow for maximum movement.

The following materials are recommended for a perimeter frame.
- 25mm (1") moisture resistant M.D.F. board
- 25mm (1") moisture resistant particle board
- 25mm (1") moisture resistant plywood

Do not use full underlayment because it can cause heat accumulation and thermal expansion difference between Staron worktop and frame may make them warped or cracked.

**Constructed ladder system**
5.2 Support

Support must be installed for overhangs of worktop containing seams or for 13mm (1/2") overhangs extending more than 150mm(6") to make the overhangs stronger. For overhangs extending less than 150mm(6"), no additional support is required.

5.2.1 Overhangs supports

For overhangs extending more than 150 mm(6") and up to 300(1’) mm, plywood underlayment or brackets are required. For overhangs extending more than 300 mm(1’) and up to 460 mm(1’4'’), plywood underlayment and brackets are required. For overhangs extending more than 460 mm(1’4'’), legs or columns are required. For seamed overhangs, plywood underlayment and reinforcing strips and/or edge build-ups are required, and all seams must be supported and put in the overhang, not over the cabinet.

5.2.2 Making and installing the supports

Plywood underlayment

- Position 19 mm(3/4") plywood or M.D.F. over the cabinet.
- Cut out the plywood or M.D.F. in the cabinet area, leaving 75 mm(3") to 100 mm(4") wide webs over the cabinet walls.
- Leave a minimum 6 mm(1/4") clearance between the plywood or M.D.F. and built-up edge.
- Fasten the support to the cabinet with wood screws every 100 mm(4") to 150 mm(6").
not use nails.

Brackets (made with hard material like metal, plastic, etc)

- Brackets must be installed every 600 mm (2') or less. Determine the number of brackets to fabricate by measuring the cabinet. Brackets must be long enough to reach within 127 mm (5") of the countertop edge.
- Fabricate the backer plates that will be used to mount the brackets to the cabinet.
- Drill screw holes into the backer plate every 600 mm (2') or less determined earlier to match up with the brass inserts in the brackets.
- Fasten the brackets to the backer plates using screws.
- Fasten the backer plates to the cabinet frame with wood screws before attaching the plywood underlayment.
- Use one dab of silicone adhesive every 300 mm (1') to 457 mm (1' 5") to secure Staron worktop to the plywood underlayment.
- Use one dab of silicone adhesive 25 mm from the tip of each bracket. Apply dabs of silicone every 300 mm (1') to 457 mm (1' 5") to the upper edges of the cabinets.
**Seamed overhangs**

- Put the seamed parts of Staron worktop in the overhangs as far from the cabinet edge as possible.
- Position reinforcing strips or edge build-ups of Staron under each end of the seam.
- Glue with Staron Joint adhesive, making sure that all seams in the edge are completely filled.
6. Thermoforming

6.1 Oven for thermoforming

An oven that is essential for thermoforming is quite simple but the homogeneous heating is very important to get a good thermoforming.
- The oven has to be designed for Staron sheet to be heated to the same temperature at the same time.
- Therefore the oven has to be able to fully enclose the sheet and heat it in a consistent and constant fashion with accurate and predictable control. Convection oven gives a good result.

6.2 Material Preparation

Material preparation is very important for successful thermoforming of Staron.

1) Cut all pieces to their required dimension which should be considered an excess dimension of edge cutting to be probably required.
2) Sand all material to a matte finish to remove any chips and scratches from edge that may cause tearing during bending.

When designing, the minimum inside radius thermoformed as per Staron thickness is as follows.

<table>
<thead>
<tr>
<th>Staron Thickness</th>
<th>Minimum inside radius</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 mm (1/4&quot;)</td>
<td>25 mm (1&quot;)</td>
<td>Solid, Sanded</td>
</tr>
<tr>
<td>13 mm (1/2&quot;)</td>
<td>76 mm (3&quot;)</td>
<td>Solid, Sanded</td>
</tr>
<tr>
<td>13 mm (1/2&quot;)</td>
<td>100 mm (5&quot;)</td>
<td>Aspen, Pebble</td>
</tr>
</tbody>
</table>

If the sheet is bended to a radius smaller than the above values, the sheet may crack, craze or whiten externally and/or internally.

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6.3 Mold Preparation

Accurate molds must be prepared before commencing thermoforming. Make molds from plywood or M.D.F. board in male/female sections to hold the hot sheet in the desired shape. If required, clamps should be prepared for thicker and/or large pieces. Molds must be matched final part shape requirements.

1) Cut the male and female shape in good quality plywood or M.D.F. board with a jig saw or router. The mold surface must have a smooth good quality without any defects like scratches, cracks, etc to prevent them from transferring into the face of the Staron to be thermoformed.

2) Be sure that the internal part of the male and female molds must be supported so that the molds endure the pressure.

3) Do not use metal or solid wood because these absorb heat and slow the thermoforming and cooling process.

6.4 Calibration of Oven

Oven must be correctly prepared and calibrated.

1) Sample preparation for calibration
- Drill a 1 mm (1/16") diameter hole halfway into a test piece of Staron.
- Insert a thermocouple wire in the hole and the other thermocouple on the surface. The thermocouples should be covered with aluminum tape.
- Check two different temperatures.
- Check when the temperature in the hole reaches 145–150°C (293–302°F) and on the surface below 160°C (320°F) simultaneously. This will be the most effective time/temperature for your oven.
- Keep this profile during thermoforming.
- When the temperature in the hole reaches 145–150°C (293–302°F), if the temperature on the surface is higher than 160°C (320°F), the heating power is too strong. Reduce the heating power.
- Remove the piece from the oven and allow it to cool until the thermometer reaches 82°C (180°F).
- Check this cooldown time.

### 6.5 Thermoforming the Staron

Staron must be heated to Between 145°C (293°F) and 165°C (330°F) during bending. Lower temperatures may crack and whiten the Staron and higher temperatures blister, whiten or crack because colder or hotter material will be more brittle. Heatup time will depend on oven design and the size of the piece to be thermoformed. Uniformly heat the entire piece to prevent problems. A guide to heating time as per oven temperature below is recommended. But running a test on a scrap piece is highly recommended to find the best time/temperature for the oven.

<table>
<thead>
<tr>
<th>Sheet thickness</th>
<th>Oven temperature</th>
<th>Heatup time</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 mm (1/4&quot;)</td>
<td>150°C (302°F)</td>
<td>30 – 60 min</td>
</tr>
<tr>
<td></td>
<td>175°C (347°F)</td>
<td>15 – 30 min</td>
</tr>
<tr>
<td>13 mm (1/2&quot;)</td>
<td>150°C (302°F)</td>
<td>45 – 80 min</td>
</tr>
<tr>
<td></td>
<td>175°C (347°F)</td>
<td>25 – 60 min</td>
</tr>
</tbody>
</table>

Oven temperature exceeding 175°C (347°F) may overheat the surface of the sheet before its inside reaches the thermoforming temperature. Absolutely do not exceed this temperature.
1) Before thermoforming Staron sheet, calibrate the oven with a sample piece, as per instructions in Section 6.4.
2) Pre-heat the oven to the desired temperature.
3) Place the piece of Staron in the oven and start the timer.
4) At the expiration of the calibrated time, remove the piece from the oven.
5) Place the piece in the mold and clamp it securely.
6) Reset the timer.
7) At the expiration of the calibrated cooldown time, remove the piece from the mold and keep it under the atmosphere to cool to room temperature.
7. Adhesive Systems

7.1 Adhesive systems

Staron provides two (2) types of adhesive to joint Staron sheet and shape. Tube adhesive comes in two parts, labeled Component A, and Component B, and is packaged in 60 grams aluminum Tube and 3 grams polyethylene tube. Cartridge adhesive is packaged in 250 ml cartridge. Tube adhesive has a guaranteed shelf life of two years from the date of manufacture and cartridge adhesive has one year, providing they have been stored as per instruction in section 1.

The seaming performance, not appearance, is guaranteed when using only the adhesive. These adhesives are produced in a range of specific colors to match with sheet and shape product. Refer to the table below.
Subject to how to use the adhesive, follow all instructions on each pack.

<table>
<thead>
<tr>
<th>Sheet Color</th>
<th>Adhesive Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bright White</td>
<td>BW010</td>
</tr>
<tr>
<td>Fog</td>
<td>SF020</td>
</tr>
<tr>
<td>Peach</td>
<td>SP051</td>
</tr>
<tr>
<td>Ivory</td>
<td>SI040</td>
</tr>
<tr>
<td>Rose</td>
<td>SR050</td>
</tr>
<tr>
<td>Pearl</td>
<td>SP011</td>
</tr>
</tbody>
</table>

Adhesive color with Sheet

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<table>
<thead>
<tr>
<th>Sheet Color</th>
<th>Adhesive Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sanded White Pepper</td>
<td>WP410 Pearl</td>
</tr>
<tr>
<td>Sanded Midnight</td>
<td>SM422 Ivory</td>
</tr>
<tr>
<td>Sanded Sahara</td>
<td>SS440 Ivory</td>
</tr>
<tr>
<td>Sanded Seafoam</td>
<td>SS471 L.Blue</td>
</tr>
<tr>
<td>Sanded Kiwi</td>
<td>SK432 L.Green</td>
</tr>
<tr>
<td>Sanded Blush</td>
<td>SB452 Pink</td>
</tr>
<tr>
<td>Sanded Gold Dust</td>
<td>SG441 Ivory</td>
</tr>
<tr>
<td>Sanded Grey</td>
<td>SG420 Grey</td>
</tr>
<tr>
<td>Sanded Nebula</td>
<td>SN431 Grey</td>
</tr>
<tr>
<td>Sanded Vermillion</td>
<td>SV430 Ivory</td>
</tr>
<tr>
<td>Sanded Cinnabar</td>
<td>SC450 Pink</td>
</tr>
<tr>
<td>Sanded Sunset</td>
<td>SS451 Pink</td>
</tr>
<tr>
<td>Sanded Pine</td>
<td>SP462 Green</td>
</tr>
<tr>
<td>Sanded Moss</td>
<td>SM461 Green</td>
</tr>
<tr>
<td>Sanded Leaf</td>
<td>SL463 Green</td>
</tr>
<tr>
<td>Sanded Marine</td>
<td>SM470 Blue</td>
</tr>
<tr>
<td>Sanded Dark Nebula</td>
<td>DN421 Black</td>
</tr>
<tr>
<td>Sanded Onyx</td>
<td>SO423 Onyx</td>
</tr>
<tr>
<td>Sheet Color</td>
<td>Adhesive Color</td>
</tr>
<tr>
<td>-----------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Aspen Snow</td>
<td>AS610</td>
</tr>
<tr>
<td>Aspen Green</td>
<td>AG661</td>
</tr>
<tr>
<td>Aspen Amber</td>
<td>AA631</td>
</tr>
<tr>
<td>Aspen Grey</td>
<td>AG620</td>
</tr>
<tr>
<td>Aspen Pepper</td>
<td>AP640</td>
</tr>
<tr>
<td>Aspen Brown</td>
<td>AB632</td>
</tr>
<tr>
<td>Aspen Twinkle</td>
<td>AT630</td>
</tr>
<tr>
<td>Aspen Slate</td>
<td>AS661</td>
</tr>
<tr>
<td>Aspen Spruce</td>
<td>AS660</td>
</tr>
<tr>
<td>Aspen Sky</td>
<td>AS670</td>
</tr>
<tr>
<td>Aspen Lava</td>
<td>AL650</td>
</tr>
<tr>
<td>Aspen Dark</td>
<td>AD621</td>
</tr>
<tr>
<td>Pebble Ice</td>
<td>PI811</td>
</tr>
<tr>
<td>Pebble Saratoga</td>
<td>PS820</td>
</tr>
<tr>
<td>Pebble Gold</td>
<td>PG840</td>
</tr>
<tr>
<td>Pebble Aqua</td>
<td>PA860</td>
</tr>
<tr>
<td>Pebble Rose</td>
<td>PR850</td>
</tr>
<tr>
<td>Pebble Grey</td>
<td>PG810</td>
</tr>
<tr>
<td>Pebble Copper</td>
<td>PC851</td>
</tr>
<tr>
<td>Pebble Blue</td>
<td>PB870</td>
</tr>
</tbody>
</table>
Listed below are the proper adhesives to use when Staron is jointed to a variety of materials other than Staron.

<table>
<thead>
<tr>
<th>Material to be jointed to Staron</th>
<th>Recommended adhesive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrylic or polyester solid surface other than Staron</td>
<td>Silicone Sealant</td>
</tr>
<tr>
<td>Metal, porcelain</td>
<td>Silicone Sealant</td>
</tr>
<tr>
<td>Wood, wood veneer</td>
<td>Silicone Sealant and double-sided adhesive tape(※)</td>
</tr>
<tr>
<td>Glass</td>
<td>Clear Silicone Sealant</td>
</tr>
</tbody>
</table>

※ It is mainly used for auxiliary adhesive of silicone sealant.

### 7.2 Positioning seams

When planning any fabrication and installation of Staron, seams must be planned in a manner which minimizes the use of Staron sheet and accessory material and which maximizes product performance.

All seams should be butt seamed, i.e. seams should be placed either perpendicular or parallel to the length of the sheet.

To satisfy the above, follow the conditions listed below.

1) Seams should not be positioned over hot and/or heat emitting appliances and dishwasher.
2) Seams should be positioned at least 76mm (3") apart from any cutouts.
3) Seams should be positioned at a minimum of 35 mm(13/8") from the internal corner.
4) Carefully consider the size and weight of transportable parts and their impact on non-preferred on-site seams.

Even though Staron joint adhesive creates an inconspicuous bond between two sheets, the seam has marginally less strength than the body of the sheet. Because of this, seams should be avoided on areas of high stress such as internal corners and areas of intense heat.
There are two different kinds of seams.

7.3 Seaming Staron

7.3.1 Caution for Seaming

Reinforced seam is absolutely required on all shop and field seams. Use only approved adhesives.

7.3.2 Edge preparation

When seaming two pieces of Staron in all application, it is very important that the two pieces are a perfect fit without any contamination, which can discolor the seam. Clean the edges with clear denatured alcohol on a clean white cloth or paper towel. If necessary, remove the contaminants with 150 grit (100 micron) sand paper before cleaning with denatured alcohol.
7.3.3 Standard Seam

Follow the step listed below for seaming Staron.

1) Transport pieces to be seamed to the worktop
2) Place a strip of aluminum foil or release paper under the seam to stop surplus adhesive spilling onto worktop.

3) Lightly sand both edges with 150 grit (100micron) sandpaper.
4) Wipe both edges with clear denatured alcohol on a clean white cloth.
5) Adjust the sheet face alignment to be perfect.
6) After check the face alignment and good edge fit, mix the Joint Adhesive
7) Set the two pieces to be seamed about 3 mm (1/8") apart.
8) Squeeze the Joint Adhesive into the gap between two sheets.

9) Lightly clamp the piece together. Alternate to the above, you can choose to glue small blocks onto each piece of Staron with hot melt glue, and clamp on to these with sash clamp to provide seam pressure.

10) Make sure that a perfectly even bead of glue is emitted from the full length of the seam when clamp pressure is applied.
11) When the glue is dry and hard, remove surplus glue with a block plane set, a belt sander or a disc grinder on a low angle.

7.3.4 Reinforced Seam

Follow the same step to the standard seam.
After seaming two pieces, glue the strips to the underside of the standard seaming part with the similar preparation as explained in Section 7.3.1.
8. Downturns and Backsplashes

8.1 Straight edge downturns construction methods

There are two kinds of straight edge downturns construction methods.

1) Rebated edge
   - Fit the router with the rebate bit.
   - Rout a 13 mm(1/2” sheet thickness) × 2 mm(1/16”) rebate along all edge of the
countertop that require downturn.
   - Finish off the router cut with a scraper of fine sandpaper.
   - Cut the required number of strips with the minimum 50 mm(2”) separation between
downturn seams and countertop seams.
   - Finish to a smooth edge of the strips to be glued to the rebated edge.
   - Turn the sheet over and trial fit all downturn strips.
   - Apply an enough quantity of Joint adhesive to the rebated area.
   - Place the downturns in position and clamp in position every 100 mm(4”).
   - After drying the Joint adhesive, the edge can be routed the shape as required.
2) Non-rebated edge
- Eliminate all defects on the surface to be seamed.
- Construct straight edge downturns butted directly against the underside of the Staron without using the rebate.
8.2 Corners construction methods

All internal corners have as large a radius as possible.

8.2.1 Thermoforming method

1) Prepare a strip of the Staron required depth of the downturn by a length that provides 100 mm (4”) returns from each end of the corner radius.
2) Thermoform the strip to the required radius as per Chapter 6.
3) Prepare the edge to be glued against the underside of the countertop.
4) Turn the sheet over and trial fit all downturn strips.
5) Apply an enough quantity of Joint adhesive to the rebated area.
6) Place the downturns in position and clamp in position every 100 mm (4”).
7) After drying the Joint adhesive, the edge can be routed the shape as required by using a profile router.
8.2.2 Laminating method

Laminating method is not popular, but mainly used for small radius corners.

1) Create blocks 200 mm(8") × 200 mm(8"), sufficient to make up the required downturn depth.
2) Finish to a smooth edge of the blocks to be glued.
3) Apply a perfectly even layer of Joint adhesive to all the block faces.
4) Clamp the layers together and allow to dry.
5) After drying, sand two adjoining sides of the block to a smooth finish in order to be glued to the countertop.
6) Transcribe onto the block the internal radius and return arms of the finished piece.
7) Clamp template to laminate block in a position that ensures that the internal corner piece is exactly 13 mm(1/2").
8) Rout along the template to complete the piece.
9) Closely examine the now formed corner piece for any visible seams. If seams are visible, do not use the piece and repeat the previous procedure to fabricate the piece again.
10) Check all edges and ends to be glued to ensure that they are well finished and perfectly squared.
11) Construct straight edge downturns as per instruction in Section 8.1.
12) Trial fit all parts for size, alignment and color match.
13) Apply a generous quantity of Joint adhesive and clamp all pieces in position.
14) After drying the adhesive, using a profile router, complete the edge by removing the overhang.
LAMINATED EXTERNAL CORNERS

150mm (6"

13mm (1/2"

11/08/99
8.3 Edge treatment

8.3.1 General Edge

General decorative edge treatments to downturns can create unique design elements to fabrication techniques.

**Popular edge treatments**

Cove Edge  Full Bull Nose  Double Round Over  Flush Edge

No Drop Edge  Bevel 45 degree Edge  Inlaid Flush Edge

1) After completion of attachment of all downturns, including internal and external corners,
   use a profile router to finish downturns flush and square with countertop.
2) Sand any edge imperfections smooth.
3) Select the preferred router bit and placing this in a router.
4) Rout all edges on the face side of the countertop. Make sure that the router is kept level and square on the countertop.
8.3.2 Waterfall Edge

Unlike other edge details, a waterfall edge must be applied to construct a waterfall edge. Refer to the figures below.
8.4 Backsplashes

8.4.1 Butted backsplashes

1) Follow the same procedure as instructed for non-rebated downturns.
2) Apply a small daub of silicone to the internal corner of backsplash and the wall as illustrated above.

8.4.2 Coved backsplashes
1) Type A

- Place the countertop on a level workbench.
- Cut the exact size strips 13 mm (1/2") × 25 mm (1") of Staron to match length sections of coving and to form the insert piece. (If required, create required pieces for the vertical insert)
- Cut exact size strips of Staron to form the backsplashes.
- Make a rebate of 2 mm (1/16") by 25 mm (1") around the edge for the countertop where the coving is to be glued.
- Finish all edges to be seamed clean and smooth.
- Apply a generous quantity of the Joint adhesive to the rebate well and clamp the piece into place.
- After drying the adhesive, apply a generous quantity of the Joint adhesive to the top surface of the insert piece and clamp the backsplash into place.
- After drying the adhesive, using a cove router, shape the internal cove by cutting away the proud part of the block.
- Using a ball sander and then scraper, finish the cove between the backsplash and the countertop to a uniform finish and level.
2) Type B

- Place the countertop on a level workbench.
- Cut the exact size strips 60 mm(2") × 13 mm(1/2") of Staron to match length sections of coving and to form the insert piece. (If required, create required pieces for the vertical insert)
- Cut exact size strips of Staron to form the backsplashes.
- Make a rebate of 2 mm(1/16") by 25 mm(1") along the bottom face edge of the backsplash strips.
- Finish all edges to be seamed clean and smooth.
- Apply a generous quantity of the Joint adhesive to the rebate well and clamp the piece into place
- After drying the adhesive, using a pilot drill, drill a hole into the insert piece every 200 mm(8"), making sure that the holes are drilled 20 mm(13/16") below the lower edge of the coving.
- Apply a generous quantity of the Joint adhesive to the rear edge of the countertop, and place the backsplash into place ensuring that the coving meets the face of the countertop in perfect alignment. Place screws into place and tighten up the backsplash to the countertop by screwing into the subframe.
- After drying the adhesive, using a cove router, shape the internal cove by cutting away the proud part of the block.
- Using a ball sander and then scraper, finish the cove between the backsplash and the countertop to a uniform finish and level.

3) Type C

- Place the countertop on a level workbench.
- Cut the exact size strips 13 mm(1/2") × 26 mm(1") of Staron to match length sections of coving and to form the insert piece. (If required, create required pieces for the vertical insert)
- Adhere these strips together to form block insert strips 26 mm(1") × 26 mm(1").
- Cut to exact size strips of Staron to form the backsplashes.
- Finish all edges to be seamed clean and smooth.
- Apply a generous quantity of the Joint adhesive to the rebate well and clamp the piece into place
- After drying the adhesive, apply a generous quantity of the Joint adhesive to the top surface of the insert piece. and clamp the backsplash into place.
- After drying the adhesive, using a cove router, shape the internal cove by cutting away the proud part of the block.
– Using a ball sander and then scraper, finish the cove between the backsplash and the countertop to a uniform finish and level.
9. Finishing

9.1 Classification of Finish

There are three kinds of finishing methods.

9.1.1 Dull Finish

1) Load an orbital sander with 120 grit (120 micron) silicone carbide paper.
2) Sand the entire top for a uniform finish. (Do not concentrate too heavily over seam area)
3) When finishing this, wipe the top with a dust collecting cloth.
4) Re-sand the top with 220 grit (60micron) silicone carbide paper or red Scotch Brite, and repeat the clean-up procedure.
5) Wash the top down with a damp cloth to remove all dust and grit.
6) Re-sand the top with 360 grit paper (30micron) or gray Scotch Brite until a low luster is obtained.
9.1.2 Semi-gloss Finish

1) Complete the dull finish as above
2) Re-sand the top with 600-grit paper (20micron). This finish is normally taken with the particle colors.

9.1.3 High gloss Finish

This finish is more sensitive to keep its gloss and look than the others.

1) Complete the dull finish as described in Section 9.1.1.
2) Re-sand the top with 600 grit (20micron) wet paper and repeat the clean-up procedure.
3) Re-sand the top with 800 grit (10micron) wet paper and repeat the clean-up procedure.
4) Re-sand the top with 1200 grit (5micron) wet paper and repeat the clean-up procedure.
10. Transportation and Installation

10.1 Transportation

- Each part must be wrapped in bubble sheets and corrugated cardboard.
- Cushion the floor of transportation vehicle and brace the entire top and all holes for hob and sink.

10.2 Installation

10.2.1 Caution for installation

- Provide only perimeter support (top edges of cabinets with or without buildup strips).
  Use only dabs of flexible adhesives no less than 300mm(12") apart to fasten tops of Staron to the perimeter support.
- Never install mechanical fasteners such as screws and nails into Staron.
- In wet wall installations, leave a 13mm(1/2") air gap at the bottom of the substrate wall to prevent water leaks from wicking up between the Staron and the substrate.
- All inside corners should have at least 13mm(1/2") radius to prevent corner stress.
  Corner seam should be offset at least 25mm(1") form inside corners.
- Do not install Staron overlayment or over old countertops.
- Leave a piece of color matched material from each counter on the job for future repairs.

10.2.2 General procedure

1) When arriving at the site, check site access and power availability.
2) Make sure that cabinets are complete and satisfactorily installed.
   The tops of the cabinets must be flat and true to within 3mm (1/8") of a flat surface.
3) After checking as above, unload all parts.
4) Unwrap all parts and check for transportation damage.
5) Lay the countertop on the cabinets and trial fit all parts.
6) Check that expansion gaps of 1.5 mm(1/16") are left against all walls.
7) After cleaning surroundings, make sure all seaming faces are cleaned with clear denatured alcohol.
8) Complete the on–site seams one by one.
9) When drying the Joint adhesive, remove excess glue and polish seams as done in the factory.
10) Ensure the hob is correct size for the cutout as prepared on the factory.
11) Explain and give 'Care and Maintenance' booklets to a owner, issuing the Warranty Card.
12) Place an off-cut of color-matched material hidden in an appropriate place to use for repair that may be required in the future.

※ During cutting and sanding of Staron, all the machines must have a facility to allow extraction into a vacuum cleaner to minimize dusts.

10.2.3 Detailed procedure

1) Inspection of Staron
- Inspect all the pieces to be installed are the right color and dimension as per drawing
- Inspect edge crack, excessive warp and any other defects.
- If there are any defects, contact the fabricator before installing.

2) Preparing base units/cabinets

2.1) When replacing old base units/cabinets
- When replacing old countertops, add special attention to removing them.
- All screws, nails and any sharp edges should be removed from the countertops
- Check the existing base units have enough strength and stability.

2.2) When fitting new base units/cabinets
- They should be leveled and plumbed, and secured to each other and the back wall.
- Check for dishwasher position and fit insulation between the dishwasher and the countertop.

10.2.4 Clearance

- 1.5 mm(1/16”) clearance between each wall are needed for countertops to allow the expansion as per temperature change. This must be caulked with silicone sealant later.

- In case of both hot and cold food wells in a Staron countertop, a 3mm(1/8”) flexible silicone should be applied between them, at least 76mm(3”) apart from both wells.

10.2.5 Preparing seams

- Use a router with a sharp double fluted tungsten carbide straight cutter.
- Clamp a true straight edge to both sides of the countertop to be adjusted.
- Firmly press the base plate of the router against the straight edge and proceed to remove the excess material.
- Sand the router edge lightly with 150 grit (100 micron) sandpaper ensuring the top edge
is not rounded in the process.

10.2.6 Wall cladding

1) Wall cladding should be done prior to seaming.

2) A minimum expansion space of 3 mm (1/8") should be considered.

3) All wall and wall tiles as well as the reverse side of the Staron should be clean and well secured, cleaning them with denatured alcohol and a clean cloth.

4) All cutouts for electric sockets etc. should be made with a router and a double fluted straight cutter.

5) Apply Silicone or Neoprene Panel Adhesive to the reverse side of the Staron as follows.
   - Apply a continuous bead of adhesive around the sheet of Staron approximately 40 mm from the outside edge. Then apply dabs approximately 30 mm (1") in size, equally spaced, at approximately 100 mm (4") centers, within the inside area. Any cutouts requires a continuous bead of silicone or neoprene 20 to 30 mm (1") in from the cutout.
   - Hot melt glue can be applied to the reverse side of the sheet shortly before adhering it to the wall.
   - Press the Staron wall cladding firmly against the wall.

10.2.7 Seaming

- Trial fit all the seams by clamping it together.
- Mix the Joint adhesive as per instructions on the tube. (If required, cartridge can be also used.)
- Seam the sheets as per Chapter 7.
- Typical drying time as per ambient temperature is referred below.

<table>
<thead>
<tr>
<th>Ambient temperature</th>
<th>Drying time(min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°C (32°F)</td>
<td>180</td>
</tr>
<tr>
<td>10°C (50°F)</td>
<td>75</td>
</tr>
<tr>
<td>23°C (73°F)</td>
<td>40</td>
</tr>
<tr>
<td>37°C (99°F)</td>
<td>15</td>
</tr>
</tbody>
</table>

(Although the ambient temperature is as above, if the sheet temperature is different from the above, drying time can be varied.)
To check if the adhesive has dried, press against the seam with a fingernail. If any indentation is not appeared, drying is finished.

**10.2.8 Finishing Seam**

- Remove hot melt glue block and all kinds of cramps used for tightening the seam.
- Remove the hot melt deposits with a wide sharp chisel and clean off the surface.
- Remove the excess joint adhesive with a sharp low angle block plane making sure not to damage the surface of the Staron.
- Sand seams by using a belt sander with a 100 mm (4") wide base and silicone carbide belt making sure not to leave the Staron surface with heavy sanding marks.
  (Alternatively, use a random orbital sander or standard orbital sander with 80 grit (180micron) silicone carbide paper.)
- Clean the surface with a damp clean cloth to remove any sanding residue.
- Finish the seam to keep the same degree of finish as done in the factory.

**10.2.9 Fixing the countertop to base units/cabinets**

- Drill holes to the back and front rail using a high speed drill 2 to 3 mm (1/8") larger than the screw to be used to fix the countertop down to the base units/cabinets. (Screwing directly into Staron is not allowed.)
- Screw not to pass through the underlayment and not to overtightening the screw.

**10.2.10 Fixing the appliance to the countertop**

- Apply 3M Aluminum tape and Nomex tape around the appliance cutouts.

**10.2.11 Inspection**

- Finish sand to remove minor scratches.
- Leave the cutout hidden in an appropriate place.
10.2.11 Care and maintenance

- Explain and give 'Care and Maintenance' booklets to an owner, issuing the Warranty Card.

10-4

10-4
11. Vertical Application

11.1 Wall preparation

- Check that the supporting surface is dry and sound.
- Ensure that water or moisture can not seep behind vertical face paneling, by leaving a 25 mm (1") gap between backing board and horizontal surface.
- Removing from the surface any dust, grease, loose grit, loose tiles or any other materials that can prevent Staron evenly adhering to it.
- Perfectly clean the wall with clear denatured alcohol.

11.2 Adhering Staron to Surface

- Lay the Staron face down and remove any dust, grease, pencil marks and labels
- Using silicone or neoprene panel adhesive, make a large “S” pattern on the face of the sheet and a perimeter bead about 100 mm (4") from the edges of the sheet.

- Push the Staron onto the wall and bump into position with shoulder or heel of hand.
- Point out all seams with color-matched silicone using clear denatured alcohol and a clean white cloth to remove the surplus silicone.
12. Repairing

12.1 Minor repairs

If minor damages such as scratches, chemical stains, and minor impact marks are found on the surface, they are repaired with a light abrasive cleaner or, for heavier damage, light sanding.
- Identify the extent of the damage.
- Repair by attempting to remove damage using an abrasive cleaner.
- If not satisfactory, use 400 grit (40 micron) wet and dry paper.
- If still not satisfactory, it is not minor and others repair options should be considered.

12.2 Small chips and impact marks

Small chip or impact marks can be repaired below.
- Drill out them using a new bit which is slightly larger than the damage area.
- Remove dust and clean the edges with clear denatured alcohol and a clean white cloth.
- Make a 3 mm (1/8") diameter square cut in the tip of a color-matched tube of Joint adhesive.
- Position the tip of the tube on the edge of the hole.
- Squeeze the adhesive down the side of the hole.

Overfill to allow for shrinkage.

- Break bubbles with a toothpick.
- Let the adhesive set and finish in the usual way.
12.3 Medium sized problems

- Clamp a pre-made template into position in the area to be repaired.
- Using a small trim router fitted with a plunge bit adjusted to a depth of 4 mm (1/8"), follow the template and create a circular rebate in the countertop.
- Using a piece of color-matched material, make a plug with a 15 degree tapered edge to the exact size of the rebate.
- Fill the rebate with a generous quantity of the Joint adhesive, clamp the plug in position and allow to dry.
- Using a router, remove plug material and adhesive.
- Sand and finish repaired area to the required finish level.
12.4 Large sized problems

12.4.1 Triangle insert

1) Make the template shaped triangle.
2) Remove the damaged cutout area with a router, making sure the cuts are at least 100 mm (4") away from the cutout corner.

3) Make the insert 2 mm to 3 mm (1/8") wider than the repair cut in the countertop with a router.
4) Trial fit the insert until there are no visible gaps

5) Reinforce the insert and the seams as below.
- Cut the reinforcement block with 45 degree bevel edge except glued surface, making it at least 50 mm (2") wider than the required insert
- Trial fit the reinforcement block and the insert using clamps.
- Clean all the seam area with clear denatured alcohol and a clean white cloth.
- Glue all the pieces

6) After drying, trim the repair section along the cutout edge with a router, using a template as a guide.

7) Finish the repaired surface.
12.4.2 Section replacement

Section replacement can be done like the figure above. After replacing the section, carefully finish the new section and the old section to have the same look.

12.5 Cracked seam

1) Router the seam area using a router with a "V" groove bit

2) Cut a color-matching strip of Staron and sand it to fit the "V" groove.
3) Clean all surfaces with clear denatured alcohol and a clean white cloth and allow to be dried.
4) Applying Joint adhesive onto the "V" groove and install the repair strip.
5) Install a reinforcing strip under the seam to prevent re-cracking.

6) After drying the adhesive, sand smooth.