Aeterna™ Sintered Slab
Technical Manual: Fabrication

AETERNA
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Index

General Fabrication Recommendations

For optimum results when fabricating Aeterna™ Sintered Slabs, ensure all necessary installation conditions are in line with National applicable standards and that local building codes are met and procedures followed.

- Use professionals with demonstrated experience in fabricating large-format slabs.
- Ensure installation is in accordance with all local building codes.
- Ensure the installer is familiar with and following all Installation Specifications outlined in ISO / ANSI referenced sections therein.
- Follow the manufacturer's recommendations for all products used when installing slabs.
- Read the information in the technical guides before using any Aeterna™ Sintered Slabs.
- Always use the recommended tools – DRY CUTTING IS NOT RECOMMENDED.
- Make sure that the work area is safe, clean, and well lit in order to properly complete the installation and inspection required when installing large slabs.

1. Cutting

The Aeterna™ Sintered Slabs can be cut and machined on traditional cutting machines for natural stone, marble and quartz agglomerations such as bridge milling and CNC machines, CNC contouring machines and waterjet machines.

In the case of machining using a tool, it must be suitable for cutting 6-12 mm sintered slabs. Information and parameters are provided in this manual for cutting on: Waterjet Machine-Bridge and CNC milling machines CNC Contouring machines.

In order to achieve optimum machining, it is good standard practice to verify the perfect flatness of the work table/grid plate on which the slab will be placed, as well as the absence of scraps and debris from previous operations. The flatness of the work table/grid plate, combined with that of the slab, is important for the good quality of the cut because it reduces vibrations.

Aeterna™ Sintered Slabs do NOT require a trimming cut when recommended parameters listed below are followed. Ensure recommendations regarding cutting speeds, minimum distances, and all other recommendations are strictly followed when fabricating.

Aeterna™ Sintered Slabs are the reflection of the mineralogical formations that already exist in nature as a result of the processing of natural mineral components such as clay, quartz, feldspar, and kaolin under high pressure shaping, high temperature sintering with advanced technological equipment. Therefore, it can be cut easily.

1.1 Cutting and Machine Work Area

- Ensure that the work surface for cutting slabs is clean and flat with a firm and completely leveled base.
- **SILICA DUST IS HARMFUL IF INHALED.** Exposure to silica dust from cutting, grinding, or polishing can cause acute lung injury, silicosis, or cancer. Wear a respirator when cutting, grinding, or polishing. Use wet cutting methods and do not dry cut. Children should not be present during cutting, grinding, or polishing. If you have to dry cut (not recommended), you must use the recommended personal safety equipment per the Safety Data Sheet and mechanical dust extraction methods.
- Use cutting tools and disc blades for large format sintered slab materials as described in the opening section.
- Before performing any cut or fabrication, ensure that the various tools (water jet cutters, CNC tools, bridge saws) are working properly, are suitable for the operation to be carried out, and are not worn out in a way that may affect cutting quality and slab integrity.
- Operating parameters (feed rate, pressure, etc.) must be provided by the machine's supplier to ensure perfect cuts. If you're using a bridge saw or a CNC tool, it's important to use high-quality diamond blades with a suitable number of diamonds for the product to process. Worn out blades will affect the cutting quality and may lead to breakage. Whatever machine you're using, make sure that the surface on which the slab is placed is perfectly flat and stable with no worn-out parts, sharp edges, or hollows. Invasive fabrication and supporting surfaces far from optimal may lead to excessive stress on the slab. Ensure that the slab is secured to the workbench to prevent it from moving, thereby compromising the quality of the cut. A 12 to 15 mm backer board (made, for example, of high-density foam) may be useful for reducing vibrations caused by the machinery in slabs (even with matting) that require more drilling/fabrication.

1.2 Linear Cut

For score and snap linear cuts, use professional wet cutters for higher cutting quality.
Dry, score and snap cutters: there are various tools available, depending on the type of cut and the size of the slab, including:

- Guide rails for straight cuts and for trimming off marked sections.
- Cutting off pliers.
- Cutting guides on a rigid and stable workbench that can absorb the tools' vibrations (for large and medium formats).

• Professional cuts using a cutting guide warning:
  - Place (using a lifting frame) the slabs on rigid and stable workbench that can absorb vibrations produced by the cutting tools.
  - Anchor the cutting guide to the slab (the guide is normally equipped with a diamond blade).
  - Score the slab, maintaining constant speed and pressure along the entire scoring line. Do not stop at any point while scoring the slab. It must be a continuous score application.
  - Place cutting pliers at the ends of the scoring line, starting from the part where the tool's blade finishes.
  - For slabs of considerable length and/or thickness, you may have to snap both sides simultaneously by pressing down the centre of the slab.
  - Some tools and scoring processes can result in a sharp or jagged edge. This can be fixed with a diamond buffer or a pass with a sanding block.
  - Caution:
    - If the diamond wheel is new and its first use, check the diamond blade / wheel to be sure it scores properly and is in proper alignment.
    - Do not use deformed diamonds.
    - Do not rub the diamonds on a metal surface.
    - Replace the diamonds that are worn or chipped.

1.3 Fabrication Cut-Outs with Grinder on Workbench

Some floor and wall slabs may have to be shaped to accommodate other elements (doors, windows, etc.). For cut-outs, use a regular angle grinder or one integrated into the cutting guide for linear cuts. Adjust the feed rate of the diamond disc based on the shape of the cut. The disc shall not move faster than 0.5 m/min (Diamond supplier's recommendation should be check). Excessive speed could damage the machine, deform the diamond disc, and break the slab. In the event of 90-degree cut-outs or cut-outs with different angles, the corners must be rounded, using a diamond drill bit (more information in section 1.4) before the angle grinder. The drill bit's diameter must be appropriate for the complexity of the shape you want to create. Indicatively, it must be twice the thickness of the slab. Based on the complexity of the cut (e.g. U-shape) and the intended use of the machined slab, you may have to divide the shape into smaller parts to better adapt to the element. This measure is particularly recommended for low-thickness slabs. Be sure to use the appropriate dust collection system for the grinder as well as personal protection equipment (PPE) to avoid any dust inhalation.

RECOMMENDATIONS

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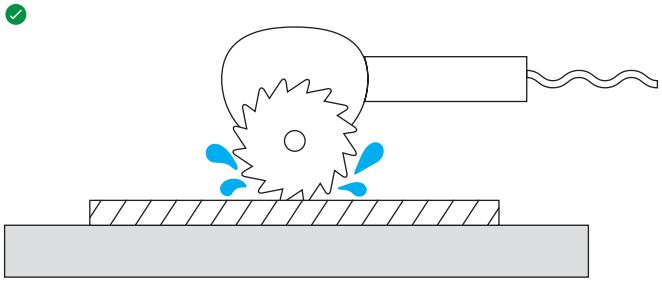
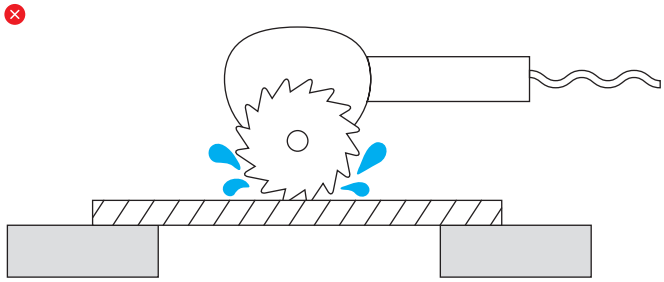
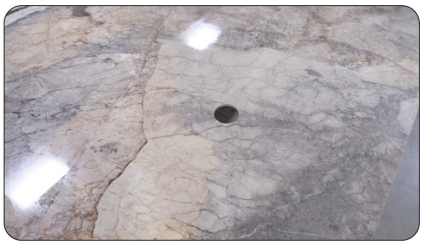
	

1.4 Circular Holes

- To drill through holes, use water-cooled drill bits with a diameter of up to 8 mm (3/8”).
- For larger diameters, dry-cut drill bits should be used*. Machine the sheets with a radial arm saw and cutting disc for sintered slabs*.
- Polish the cut edges with an abrasive sponge*.
- To make round holes (e.g. wall or floor drains) proceed as follows:
    - Place the slab on a solid, rigid and stable surface that can absorb the cutting tools’ vibrations. If the slab is particularly flexible (e.g. large-format, low-thickness slabs), we recommend performing these operations on solid and stable workbenches specifically designed for this purpose.
    - Use only professional round diamond drill bits (that can be mounted on angle grinders or screwdrivers). Diameters usually range from 6 to 75 mm.
    - Make the hole with a circular movement without applying too much pressure. Make sure to dampen the drilling point with water and drill the hole several times, always damping it. This operation will extend the lifespan of the drill bits and reduce friction between the drill bit and the slab, thus ensuring a high-quality cut.

**See warning information in section 1.2.*





1.5 Rectangular Cut-Outs

Making square or rectangular cut-outs with a diamond disc installed on an angle grinder is difficult, and the outcome is uncertain. The stress caused by the cut and the vibrations on the material, in the precarious work conditions often found in construction sites, can cause cracks and breakage, even after glueing the piece. In most cases, these problems can be solved as follows:

- Drill a small hole on the 4 corners of the rectangle with a 7-8 mm (5/16”-3/8”) diameter drill*. If necessary, drill additional holes along the perimeter of the cut-out. The number of these holes depends on the length of the cut-out’s sides
- After drilling every corner, cut a rectangle with a circular saw joining previously drilled corners*.

**See warning information in section 1.2.*

RECOMMENDATIONS		
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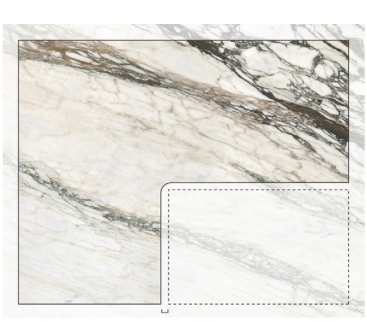
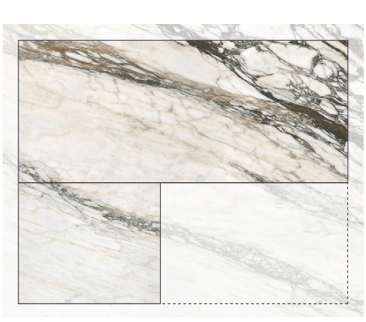
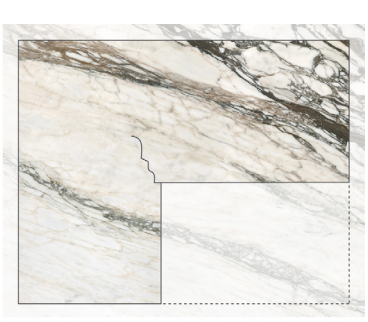
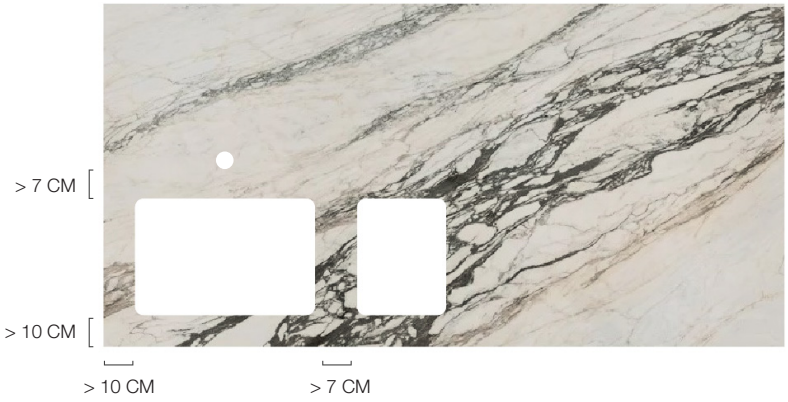
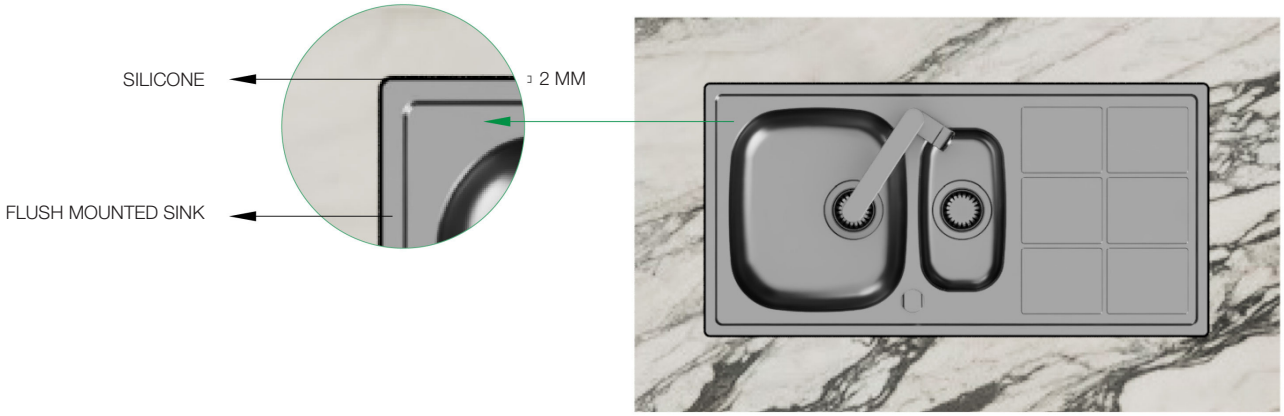
 8 MM		

2. Additional Countertop Fabrication Details

Holes, openings, and cut-outs must be made at an appropriate distance from the edge (distance minimum), where there shouldn't be any additional machining. This minimum distance depends on the stress on the slabs and the overall machined surface. Indicatively, it should be > 7 cm. Should the shape of the slabs not allow for such a distance, it's advisable to divide it into square or rectangular parts. The minimum distance permitted between cut-outs and/or the edge of the slab is > 10 cm.



Flush-mount housing and cut-outs for the elements to be flush-mounted (sinks, cook tops, etc.) must provide an additional perimeter space of about 1.5mm that functions as an expansion joint.



As a general rule, 90-degree angles are not recommended, whether you're using water jet cutters or angle grinders. The corners of rectangular internal shapes, which usually accommodate steel accessories (e.g. washbasins, hobs), need to be rounded. The radius is usually 10 mm* and, in any case, must not be less than the slab's thickness. The same approach can also be used in corners with different angles (obtuse or acute angles). In the event of cut-outs, round holes must be made at the corners performed before performing the linear cut.

RECOMMENDATIONS			
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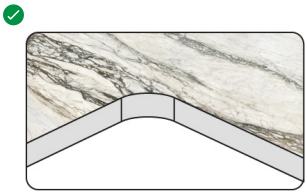	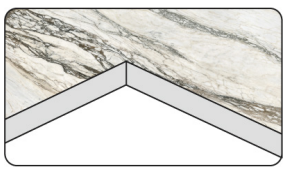	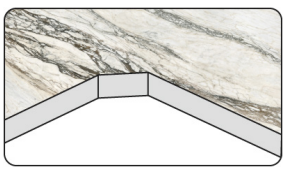	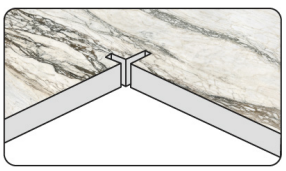

Joints between slabs and other materials whenever these slabs are combined with other surfaces (e.g. furnishings, walls, metal accessories, window fixtures) require elastic grouting, it's important to define the distance between them, taking the following into account:

- Expansion coefficient of the adjacent elements (for sintered slab it's 5.8x10-6).
- Any movement and/or deformation the elements may be subject to grouting elasticity.

When designing and fabricating a countertop with sintered slabs, the following must be taken into account:

- Type and shape of the furnishing.
- Colour and aesthetic effect of the slab.
- Type of structure available. In any case, slabs are to be used solely as coverings. They do not have any structural function. Any criticality resulting from improper use of the sintered slab countertop must be considered during the design stage. Here are a few recommendations to follow:
  - Geometry: diagonal cuts are not recommended for joining different portions. It's always better to make straight cuts for square and rectangular portions of slabs that don't have particular imbalances in their unmachined areas. Particularly complex shapes should be broken down into rectangular portions to be reassembled during installation.
  - If multiple slabs must be processed in order to obtain graphic continuity (e.g. bookmatch), take care in cutting the portions to be paired. This type of process, even when carried out at the highest trade standards, can imply slight graphic shifts. Anatolia® will not be held liable for this.

RECOMMENDATIONS

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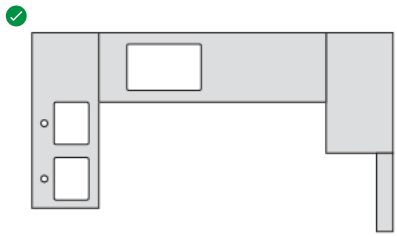
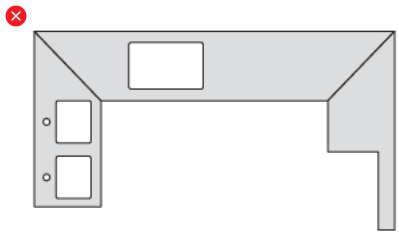
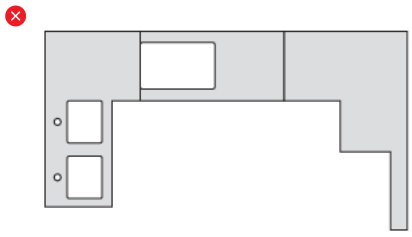
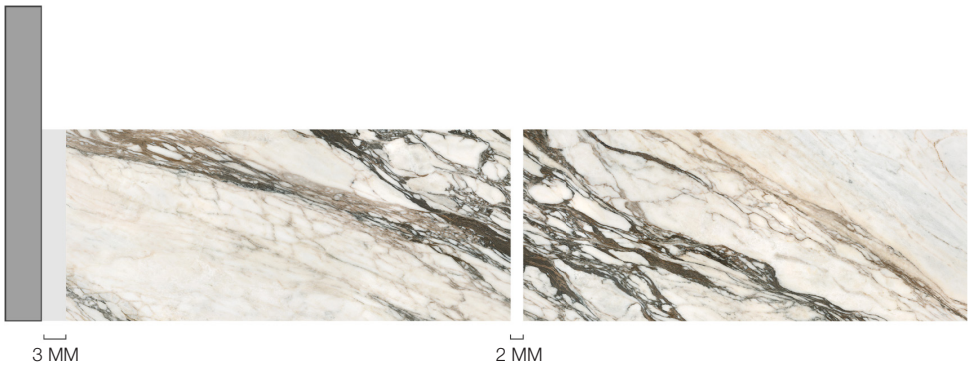
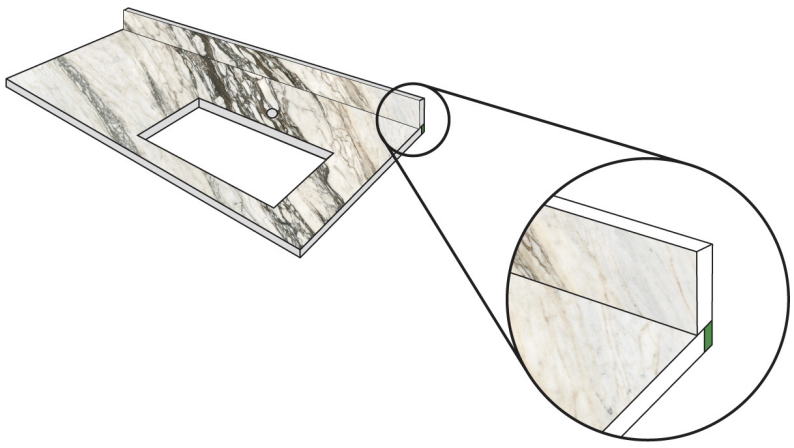
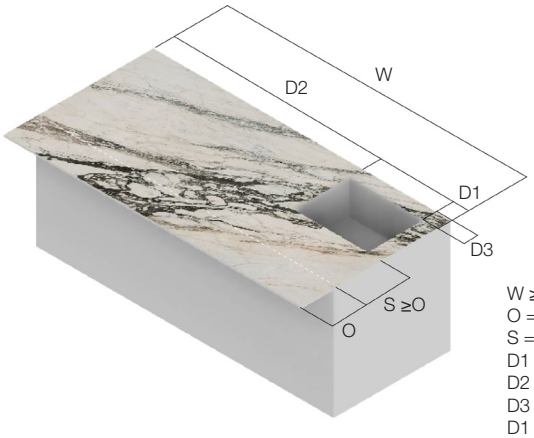
		

An empty space of at least 3 mm that functions as an expansion joint must be provided between the product and the wall against which it is rested, for seaming 2 mm between the pieces is recommended.

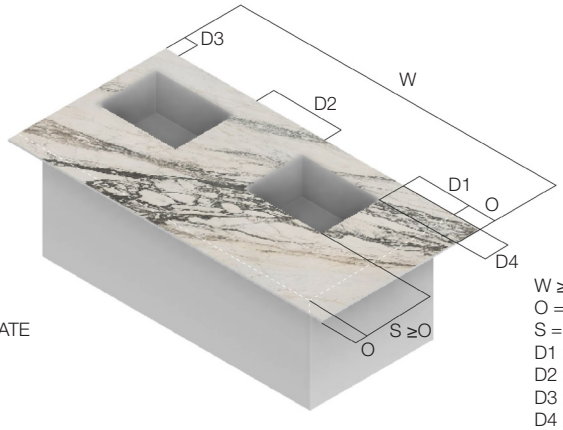




The 6 mm thick sintered slabs, even if supported, are not suitable for the creation of overhang. At least 12 mm thick sintered slabs must be used for overhang design. The maximum overhang the surface can sustain without having to provide an adequate support is 15 cm. The entity of static capacity (sustainable weight) is subordinate to whether or not there are holes in the immediate vicinity. We always recommend a specific assessment in that excessive weight near the holes can cause the surface to break. For overhangs greater than 15 cm, up to a maximum of 30 cm, an adequate support must be provided. The creation of overhang is not recommended in the case of holes or openings on the slab positioned at less than 6" from the edge of the cabinet. In case of holes or openings at a distance between 6" and 24" from the edge, the depth of the overhang should be reduced 50% with respect to the indications in the points below.

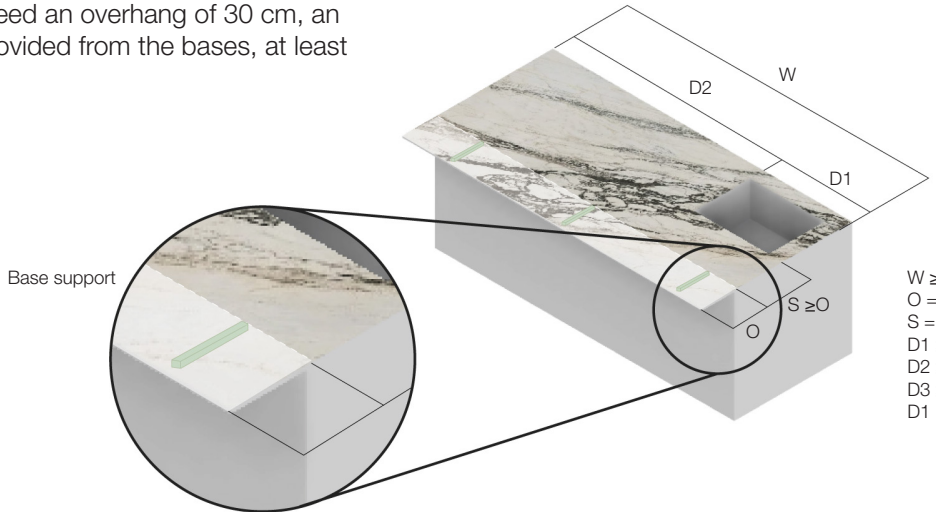


W ≥ 600 MM
O = PROTRUDING WALL
S = AREA WITH SUBSTRATE
D1 ≥ 100 MM
D2 ≥ 100 MM
D3 ≥ 100 MM
D1 + D2 ≥ O



W ≥ 600 MM
O = PROTRUDING WALL
S = AREA WITH SUBSTRATE
D1 ≥ 600 MM
D2 ≥ 600 MM
D3 ≥ 100 MM
D4 ≥ 100 MM

For standard lengths that exceed an overhang of 30 cm, an adequate support must be provided from the bases, at least every 60 - 62 cm.

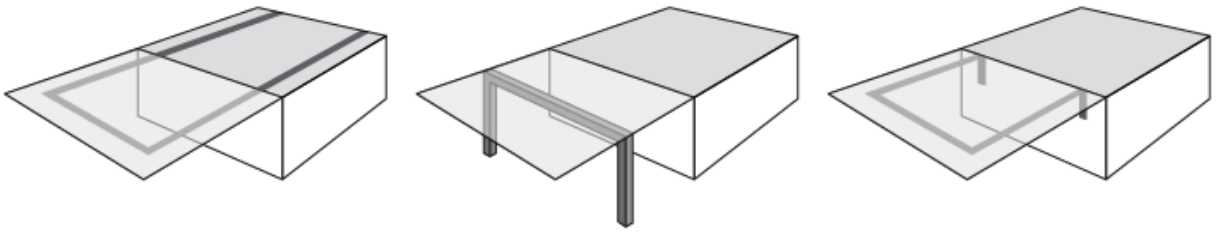


W ≥ 600 MM
O = PROTRUDING WALL
S = AREA WITH SUBSTRATE
D1 ≥ 100 MM
D2 ≥ 100 MM
D3 ≥ 50 MM
D1 + D2 ≥ O

Bear in mind in the design phase:

- Possible overloads due to dynamic loads
- Possibility of impact
- Safety: the creation of overhang for tables or countertops is usually associated with the total or partial removal of the mat backing from the 12 mm thick material, with consequent lower capacity to withstand impact by the slab

Aeterna™ Sintered Slabs do not require sealing after installation before use.



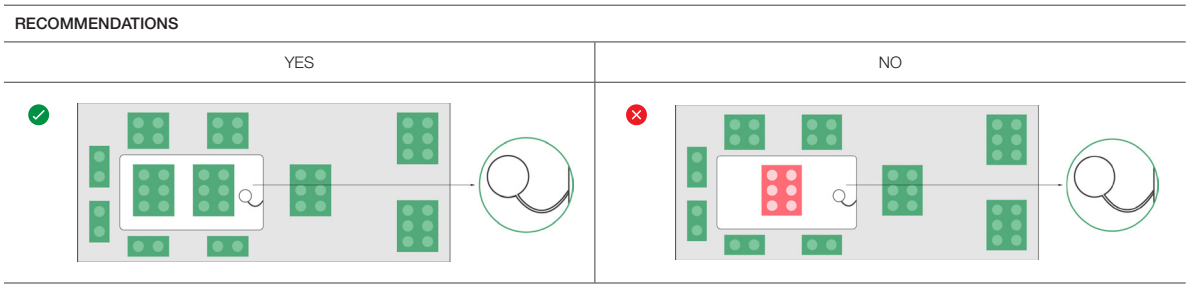
Product for Gluing:

To join ceramic elements (e.g. straight edge) use two-component epoxy or polyurethane resins of the same colour as the material, taking care to avoid the formation of gaps. After the pairing and before the resin sets, eliminate any trace of excess resin. Grind the edge to obtain a chamfer at least 1/16” wide. To glue the countertop to the structure and/or to seam 2 pieces, we recommend using an elastic and transparent adhesive (e.g. silicone). To fill the coupling joints between the flush-mount element and the slab (when applicable) use an elastic and transparent adhesive (e.g. silicone) or plastic gaskets supplied by the manufacturer of the appliance/sink.

3. Digital Control Bit

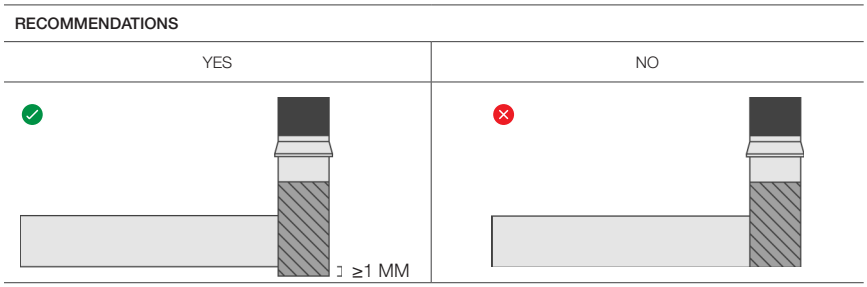
In the case of carrying out machining, cuts and holes using CNC contouring machines, arranging suction cups on the bottom part of the slab is indispensable. The suction cups must be distributed evenly under the slab in such a way so as to reduce vibration and bending during the cutting operations. In the case of carrying out holes and cuts of portions of material, the suction cup(s) must be positioned in the area of the cut material so that it is supported and it does not fall at the end of the cut. Ensure that the suction cups have a perfect grip on the back of the slab.

First drill a hole inside the cutout, using the crown bit. Afterwards, use the router bit to get closer to the cutting line. As you get closer to the cutting line, curve a bit; do not use a perpendicular approach as this could create a notch. At the end of the cut, reduce the speed to 50% as you complete the cutout.



Tips for digital control bits:

- Crown bit:
  - Drill the slab with the lowest downward speed possible, especially at the end of drilling.
  - Before completing the drilling, raise the crown a bit to remove the pressure from the inside of the crown.
- Router bit:
  - Always begin from a hole previously made with a crown bit. Never lower the router bit directly onto the surface. The first two times, eliminate only 0.5 mm; then 2 mm per pass. Removing more than 6 mm on a 12 mm slab is not recommended.
- Cutting bit:
  - Do not use the oscillation option during cutting; this could cause splintering.



PARAMETER OF CNC TOOLS

THICKNESS (MM)	TOOLS	RPM	SPEED (M/MIN)
12	CROWN BIT	3500-5500	0.2
12	ROUTER BIT	8000-10000	3.0

4. Waterjet Cutting

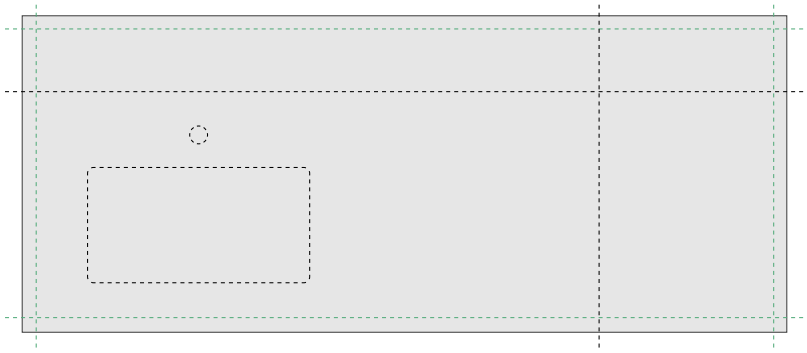
Water jet machines ensure high-quality precision cutting. Cutting parameters (feed rate, pressure, maximum inclination angle, etc.) must be provided by the supplier of the machinery. Here are a few indicative guidelines:

THICKNESS (MM)	SPEED (M/MIN)	PRESSURE (BAR)	ABRASIVE FLAW RATE (KG/MIN)
6	0.3 -1.5	3500-3800	0.4
12	0.3 -1.5	3500-4000	0.4

Before producing:

- Check that the bench is straight, level and free of any debris.
- Check that there is enough support for the slab.

If using waterjet to remove 3/4” perimeter from 6 mm and 12 mm slabs, the cut should begin and continue beyond / off the slab following the sequence as indicated.



Preparing cut-outs:

- All inner corners require a minimum radius of 3 mm.
- We recommend radiuses of more than 3 mm when the kitchen design allows as it will make the countertop firmer.
- Lower pressure is recommended for drilling holes.
- To do the cutouts, beginning the cut at an internal point in the cutout and then getting closer to the cut perimeter is recommended.

RECOMMENDATIONS	
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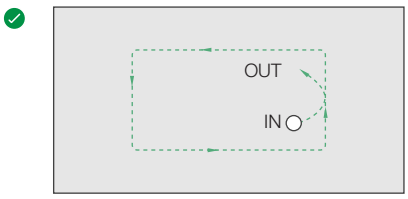
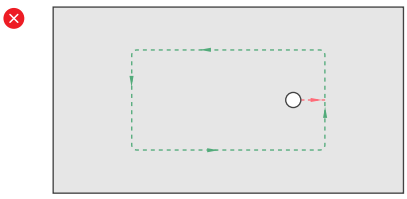
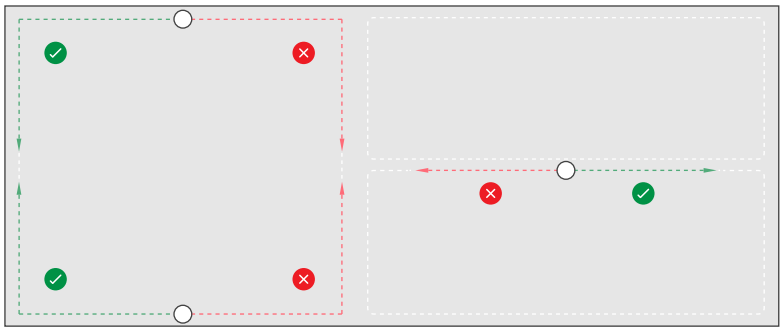
	

To do large cutouts or large parts, you must remember the following cutting sequence.

First cutting towards the edge of the slab from the hole or in parallel to the edge of the slab and following this direction to finish the part is recommended. Making the first cut towards the center of the slab is not recommended.

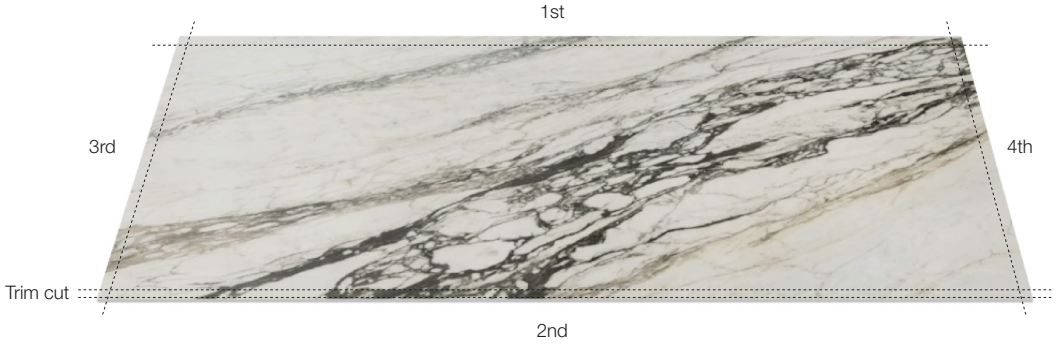


5. Bridge Cutting

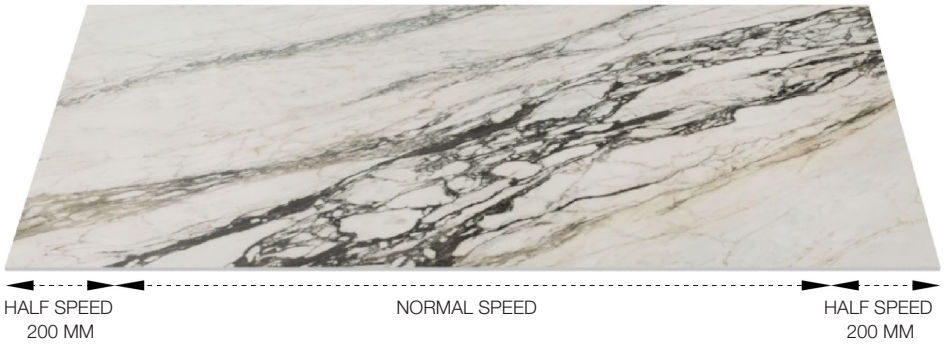
- The machine must have an appropriate number of diamonds for the hardness of the material. That's why cutting discs for stone, quartz and any material other than sintered slab cannot be used. They would risk overheating the slab (thus breaking it) and result in poor cutting quality. Self-sharpening cutting discs are available on the market; however, we recommend sharpening them periodically and always after cutting other materials. The diameter of the disc must be appropriate for the hardness of the material (in this case, sintered slab), the slab's thickness, and the technical/mechanical features of the machine. Once the diameter is known, the tool's supplier must provide the cutting parameters (feed rate, descent speed, RPM, etc.). Diamond discs for sintered slab usually have a diameter ranging from 300 to 500 mm and different feed rates (vf) based on their technical features.
- Vibration caused by the machine can affect the fabrication and even break the slab. That's why it's important to choose low-vibration machines and discs.
- Make sure the disc rotation coincides with the cutting direction.
- When using a new disc, do a few cuts so the disc segments can adapt and the diamonds open.
- In the exceptional case that the disc is lowered directly onto the slab, do it in automatic mode at the slowest possible speed.
- Use something made of limestone at the head and tail of the cut to enhance the segments if the segments become blunt faster than normal during straight cuts.
- Always secure the slab to the workbench (especially smaller workpieces) to prevent it from moving while cutting it.
- The workbench must be as flat as possible with no signs of wear. Its condition can severely affect the quality of the fabrication. A foam backer board can help make the workbench flatter without damaging the discs and the slab.
- While cutting, it's important to use the maximum water flow to cool the disc. Be sure the water flow is aimed at the cutting area.
- Avoid 90-degree angles in cut-outs.
- CNC machining requires special considerations and setup parameters for slabs less than 12 mm.

6. Cutting Sequence

1st Recommendation:
Before producing a 12 mm slab, if there are any chips or damages to the slab edges from material handling or shipping, trimming can be done as noted below.



2nd Recommendation:
When cutting 12 mm slabs with a disc, recommended to reduce the speed to half at the beginning and end of cutting process.



In general, the feed rate must be reduced depending on the cut's complexity, the slab's thickness, and the disc's technical features. That's why we recommend machines that allow for adjusting their RPMs as well as their feed rate.

Indicatively, the diamond discs for sintered slab should have the following features:

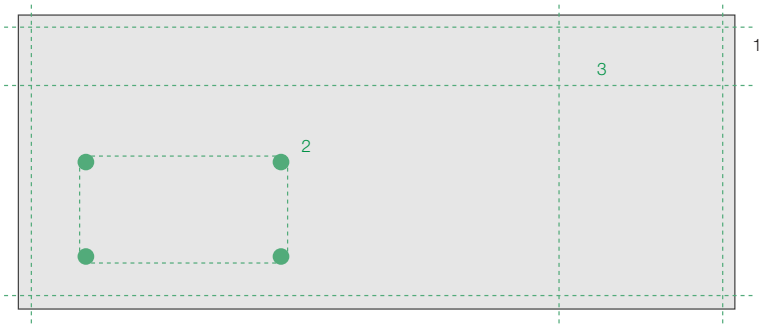
THICKNESS (MM)	STRAIGHT CUT SPEED (M/MIN)*	45º ANGLE SPEED (M/MIN)	Ø DISC (MM)	DISC RPM (AVERAGE VALUE)
6	1.0 - 1.5	0.7	300	2100-2800
6	1.0 - 1.5	0.7	350	1900-2500
6	1.0 - 1.5	0.7	400	1500-2300
12	1.0 - 1.5	0.7	300	2100-2800
12	1.0 - 1.5	0.7	350	1900-2500
12	1.0 - 1.5	0.7	400	1500-2300

**White color products recommended to lowering cutting speeds 25% to prevent the disc from overheating.*
** Refer to the tool's supplier for sizes and parameters.*

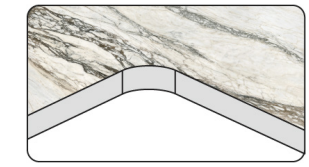
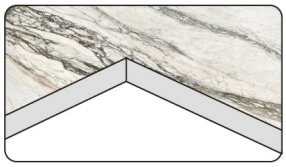
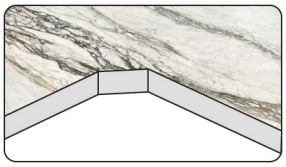
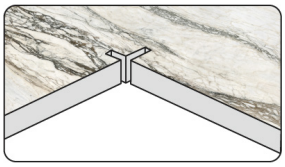
3rd Recommendation:

Prepare the holes on all inner corners, minimum 3mm bit diameter. We recommend bits larger than 3mm when the kitchen design allows, as it will make the countertop firmer. Never lower the disc directly on the slab before drilling the corners.

- No “L”-shaped countertop with 45º angled edges.
- No squared cutout for a sink.
- No inner 45º angled edge for the sink.
- Absolutely NO 90º CORNER



RECOMMENDATIONS

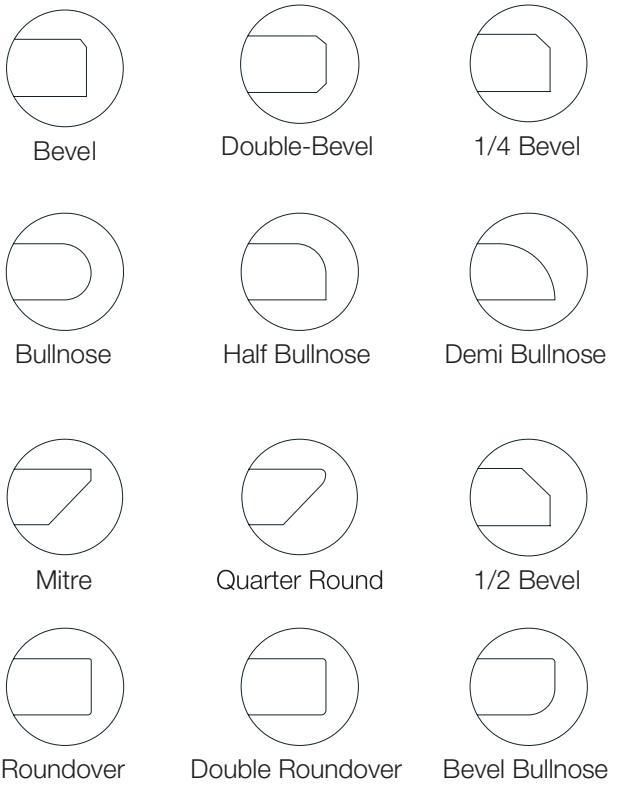
YES	NO	NO	NO
			

**See section 2 for more details.*

7. Countertop Edge Finishes

The edges of the Aeterna™ Sintered Slabs can be machined in a CNC contouring machine in such a way so as to obtain various profiles. Edge finishes help make a furnishing tiled with slabs even more elegant. The choice is purely aesthetic but requires the use of suitable machines and drill bits. Anatolia® recommends against leaving the slabs with a sharp edge and recommends carrying out a 1 mm minimum chamfer or a rounded profile with a 1 mm minimum radius of curvature. The edge of the slab can subsequently be subjected to grinding, including by polishing grinders. Below are a few examples that can be obtained using a CNC contouring machine.

The perimeter profile of the slabs, but not that of the inside of the holes, can also be contoured using a straight-line contouring machine like the ones used in the glass industry. When choosing the edges’ finish, it’s important to consider that the colour effect of the slab’s surface is not the same in its thickness. In any case, edges can have a rough, satin, or polished finish. There are several diamond buffers or abrasive pads for this purpose. They are mounted on angle grinders or screwdrivers and have different grits, depending on the desired finish. Some tools and invasive processes can result in a jagged edge. However, these buffers and pads can be used to fix this blemish. In any case, always refer to the tool’s supplier for operating parameters (RMP, grits, optimal grit sequence). For furnishings exposed to chipping risks, we recommend finishes with rounded edges.



Recommended parameter and tools for edge machining:

Speed: 25- 30 Inc / min.
Brush Sequence: 36-4680-120-220-400
Abrasive Matte- Satin Finished:120-220-500
Abrasive Polished Finished: 50-100-200-500- 1000-2000

Resources

For additional information, please refer to the available resources.

TOOLS + RESOURCES
Safety Data Sheet – North America
Safety Data Sheet – Europe
Safety Data Sheet – Europe (Arabic)
Care + Maintenance
Technical Manual: Material Handling
Technical Manual: Installation
Warranty

The World of Anatolia

We are a constellation of people and places. Get in touch.

CANADA
TORONTO HEAD OFFICE,
SHOWROOM AND DISTRIBUTION
CENTER
8300 Huntington Road
Vaughan, ON, L4H 4Z6
Canada

TORONTO SLABS DISTRIBUTION
CENTER
8555 Huntington Road
Vaughan, ON, L4H 5G7
Canada

info@aeternasurfaces.com

Tel: +1 905 771 3800
Toll free tel: 1 877 311 3434
Fax: +1 905 771 6300
Fax: +1 866 324 1838

USA
SAVANNAH OFFICE, SHOWROOM
AND DISTRIBUTION CENTERS
Anatolia (USA) Inc.
Tel: +1 877 311 3434

SAVANNAH WAREHOUSE #1
202 International Trade Pkwy
Port Wentworth, GA, 31407
USA
Tel: +1 912 438 5167

SAVANNAH WAREHOUSE #2
250 International Trade Pkwy
Port Wentworth, GA, 31407
USA
Tel: +1 912 438 5167

TURKIYE
IZMIR OFFICE, SHOWROOM
AND DISTRIBUTION CENTER
Aliağa Organize Sanayi Bölgesi
Çoraklar Mah. 5000 Sk. No: 34
35800 Aliağa, İzmir,
Türkiye
Tel: +90 232 520 7300

IZMIR MANUFACTURING FACILITY
Aliağa Organize Sanayi Bölgesi
Çoraklar Mah. 5000 Sk. No: 25
35800 Aliağa, İzmir,
Türkiye
Tel: +90 232 520 7300

REGIONAL OFFICES
CHINA
Room 517 Yi Shu Da Lou Ji Hua 4 Road
Chan Cheng District, Foshan City
Guang Dong Province, 528000
China

INDIA
206 - Pacific Business Park
Mahendra Nagar (Part)
8/A - National High Way
Morbi, Gujarat, 363642
India

USA
Anatolia (USA) Inc.
131 Crosslake Park Dr., Suite 203
Mooresville, NC, 28117
USA
Tel: +1 877 311 3434

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aeternasurfaces.com

info@aeternasurfaces.com