

GRANDEX[®]



FABRICATION MANUAL

1. WHAT IS GRANDEX

Grandex is a solid, non-porous surface finishing material consisting entirely of $\pm 1/3$ acrylic resin (also known as polymethyl methacrylate (PMMA)), and $\pm 2/3$ aluminum trihydrate (ATN) – a natural mineral filler obtained from bauxite. GRANDEX is used as a decorative material in a variety of applications, both in residential and commercial premises. Its advantages include diverse designs, functionality and durability. It is supplied in the form of sheets and various sinks, which allows giving it almost any shape using conventional tools for woodworking. GRANDEX is an original solid surface finishing material produced only by Lion ChemTech. It is widely used for kitchen countertops and built-in bathroom sinks, bathroom and walk-in shower walls, kitchen sinks, built-in sinks, countertops for laboratory tables in residential premises, healthcare facilities, banks, boutiques, restaurants and so on.

2. ENVIRONMENT

Taking care of the environment is Lion ChemTech's rule, which applies to all its products. We have developed numerous ways to build a successful business, striving to reduce waste generation and emissions into the atmosphere to zero, saving energy and resources, implementing material recycling systems and thus preventing the creation of the threat to future generations. Moreover, GRANDEX can be considered an environmentally-friendly material, because:

- It is durable and can be restored: its service life is long and it can be easily repaired or restored. It is recyclable. Up to $1/3$ less waste is generated during the manufacture of GRANDEX than during stone working.
- It is chemically inert and safe for the environment: It does not enter into reaction with other chemicals or substances while causing low environmental damage. GRANDEX also meets the strictest standards used in the field of catering and food storage areas. All pigments used for material coloring are allowed to come into contact with food.
- It is non-toxic: At room temperature, GRANDEX is non-toxic and does not emit volatile organic compounds at all. In case of fire, it produces clear smoke in small amounts. What is more, the amount of volatile organic compounds that adhesives and sealants for GRANDEX form during fabrication is significantly less than stipulated in the US and EEC standards.

Safety rules:

1. For your own safety, read the manual carefully before working with various tools and follow safety recommendations.
2. Make sure you earth ground all tools.
3. Disconnect any additional keys and nozzles.
4. Keep your workplace clean.

5. Do not allow children and visitors at the workplace.
6. Do not overload the tools.
7. Use proper tools.
8. Wear specialized clothes for work.
9. Always use protective glasses or a specialized protective shield and ear protection (earplugs) when working with hand tools.
10. For safe operation, use clamping devices or a locking device when needed.
11. Keep the tools in a workable condition.
12. Use the recommended additional equipment.
13. Avoid accidentally turning on the tool.
14. Never step on the tool.
15. Check the tool for breakdowns and replace damaged parts as needed.
16. Never leave the tool turned on, especially when working with GRANDEx and its components.
17. Use two people for carrying GRANDEx, do not bend it, wear work gloves and belts, as needed.
18. Don't store the boxed material too high or in an unsafe place.
19. Do not use wet polishing when the tool is connected to the power supply. Specialized tools for wet polishing are available in the stores.
20. Store denatured alcohol (acetone, methanol and ethyl alcohol), adhesives and any other toxic or flammable substances in a safe, ventilated place.
21. Dust and fumes produced during polishing or other mechanical impacts on GRANDEx do not lead to any dangerous consequences. However, we recommend using tools that can be connected to a vacuum cleaner to minimize dust generation.
22. Ensure sufficient ventilation of the room when working with adhesives in cramped rooms (for example, bathroom, etc.); otherwise, use a respirator for organic fumes.

3. TOOLS AND AUXILIARY DEVICES

Most woodworking shops have the equipment required for operations with GRANDEX. There are no specific recommendations for selecting specific brands of tools to be used with GRANDEX. Nevertheless, to ensure the quality of fabrication and durability of equipment, cutting discs and milling cutter teeth must be made of tungsten carbide, and the electrical tool should be designed to work in the intensive mode.

Below is a list of woodworking equipment, which ensures efficient performance when used on GRANDEX sheets and molds:

3.1. SAWS AND DISCS

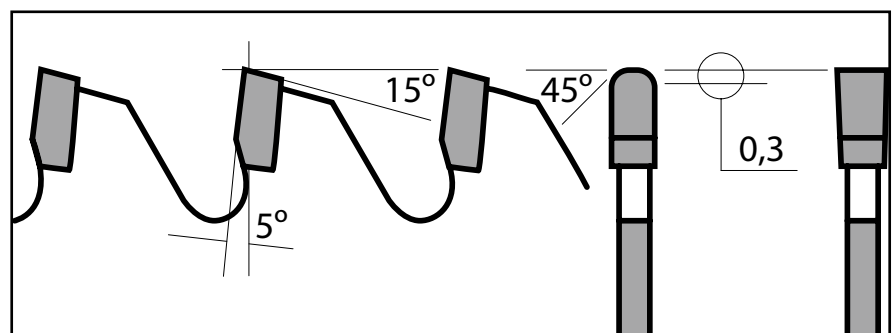
All types of circular saws can be used to cut and size GRANDEX.

The most acceptable types are:

- Horizontal cutting machines with a movable carriage
- Submersible saw where you can set a 45-degree angle
- Powerful portable circular saw
- Cutting center
- Vertical cutting machines
- Water-cooled diamond saw
- Radial saw machine

Regardless of the type, all saws must:

1. be powerful;
2. have discs with carbide metal teeth of different heights, which will be used for cutting GRANDEX only;
3. have blades with a straight/trapezoid tooth with a -5 to -10 degrees inclination angle, marked "for cutting hard plastic" or "light metals";
4. have a low-noise canvas, small grooves between the teeth, brass plugs and safety factor;
5. comply with local safety standards. The discs should be regularly sharpened on the abrasive mill with a 400 to 600 grain. Discs should have 6 to 8 teeth along the length of the 25 mm edge.



To select the most suitable type of dry discs for cutting GRANDEX, see the table below.

Disc diameter, mm	Sawcut width, mm	Base thickness, mm	Tool bore, mm	Tooth number, pcs	Tooth height, mm
200	2.8	2.2	30	64	9.8
250	3.2	2.6	30	80	9.8
300	3.2	2.6	30	96	9.8
350	3.6	3.0	30	112	10.2
400	4.4	3.6	30	128	10.5
450	4.4	3.6	30	144	9.8
500	4.4	3.6	30	160	9.8

3.2. MILLING EQUIPMENT AND MILLING CUTTER TEETH

Milling equipment is invaluable when working with GRANDEX.

Below is various milling equipment for efficient operation. There are no absolute recommendations on the choice of the brand or power of the milling equipment to be used when working with GRANDEX.

Use only hard alloy teeth. Keep them sharp. Diamond discs and milling cutter teeth are very well suited for working with GRANDEX. Consult a specialist in the company selling the equipment.

Below you can find the intended use and capacity of the recommended milling equipment.

INTENDED USE AND MINIMUM POWER OF THE TOOL/MILLING CUTTER

General works: For example: facing, seam and hole treatment	1600 W	10 mm milling cutter with 2 blades (double flute type), with carbide soldering with a 12 mm shank*
Working in an intensified mode: For example: numerous cutouts, perforation, rounding out.	2200 W	10 mm milling cutter with 1 blade (single flute type), with carbide soldering with a 12 mm shank*
Detailed works: For example: fabrication of the ends	900 W	A blade for decorative works with carbide soldering

3.3. POLISHING MACHINES AND SANDPAPER

Finishing works with GRANDEx is the most important part of the process, which affects the end user's impression of your ability to process GRANDEx.

Tools for the effective completion of finishing works include:

- Eccentric rotary polishing machines
- Pneumatic Eccentric polishers
- Sandpaper with grain P100, P120, P180, P240, P360, P400 (P600, P800, P1200, P1500 and P2000) (Fine grain paper should be used for wet and dry works)
- Scotch-Brite™7447, 7448 or Jost Superpad S/G 600 polishing discs
- IMFF™ – M100, M60, M30, (M15, m9) micron abrading discs

For more information about polishing, see the GRANDEx fabrication manual, Chapter No.19. Abrading and polishing.

3.4. CLAMPING DEVICE SYSTEMS

Several types of clamping equipment can be used in working with GRANDEx. Here's what we recommend:

- Spring clamp
- G-clamp
- Sash clamp

The table contains information on what clamping systems are recommended for various applications.

	TYPE OF CLAMP
Connection of tip edges, rear boards	Spring clamp or sash clamp
Fixing molds and rulers	G-clamp or sash clamp
Fixing sheets to fasten seams	Sash clamp

3.5. MOLDS

Molds produced by GRANDEx should be used to complete all inclined cutouts during the preparation for sink installation. You can use homemade molds for S-type sinks. Store all molds so that they are maintained in good condition, the leading edge is not damaged and its shape remains appropriate (for example, on a vertical rack). Make sure that the cutouts are clean and smooth, which will convert into fine seams when installing sinks.

4. CHECKING GRANDEX CONDITION

Before starting work, check the condition of the sheets and sinks.

Do not work with non-standard products, as this can increase the working time greatly.

An important part of product condition inspection is checking the color match. Grandex composition causes slight color differences that occur between different manufacturing stages. This is due to the complex process of mixing natural minerals and artificial acrylics. As a result, color variations are inevitable (on one sheet or different sheets of the same color).

Therefore, to ensure the best possible match of GRANDEX color, follow these instructions:

Step 1: Use sheets from the same series

Step 2: Check the code printed on each sheet

Step 3: Conduct a color matching test.

If there is no number on one of the sheets in the full pallet, most likely, it is from the same batch as the rest of the sheets in this pallet. You can take step 3 before you start working with this sheet.

If you find a clear color mismatch after you have completed all three steps for material condition inspection, contact the GRANDEX supplier.

5. WAREHOUSING AND CARRYING

Do not attempt to unload or carry GRANDEX sheets by yourself alone.

Do not carry the sheets horizontally or without fasteners and do not take the sheets with bare hands when unloading.

The product is fragile, heavy and requires care in handling for the first-class material to get to the workbench intact.

The sheets should be stored so that the horizontal level is observed, i.e., without sagging and deformation.

GRANDEX sheets and sinks are most effectively stored at a temperature between +15 and +23°C. They should be stored in a dry, well-ventilated room.

Sinks should be stored in easily accessible places, and information about the contents of boxes should be clearly visible. Do not put anything heavy on the boxes with sinks. Under no circumstances should boxes with GRANDEX sinks be stored outdoors.

If GRANDEX has been exposed to very cold temperatures, it should warm up to room temperature (approximately +18 to +20°C) before you can start working with it. Store the adhesive in the dark, in a room with a constant temperature between +12 and +15°C. The shelf life of all GRANDEX adhesives is 2 years. Please check the expiration date before using the adhesive.

6. FABRICATION

The following section describes the main technological techniques that will ensure the effective fabrication of GRANDEx sheets and sinks.

This manual describes basic operations. If you need to use more sophisticated technologies, please contact your GRANDEx technical representative for more information.

6.1. GRANDEx CUTTING

Before you start cutting, study your drawing carefully and make a cutting plan. You must plan a gap of at least 3 mm to ensure GRANDEx expansion in volume and good contact.

For any works with GRANDEx, leave a gap of at least 3mm for the final fit of the GRANDEx between the walls.

Note: The 6 mm GRANDEx is intended for vertical use only.

6.2. SEAM LOCATION

When studying any GRANDEx installation plan, consider two aspects:

1. The seams should be positioned so as to minimize the quantity of GRANDEx sheets and related materials used.
2. Position the seams so that to make the most out of all product benefits.

6.2.1. SELECT SEAM LOCATION

All seams must be made end-to-end, i.e., they must be perpendicular or parallel to the sheet length. All the seams along the countertop length should be reinforced on the bottom with a strip of material 50-100 mm wide.

To select the best seam position, strictly follow these instructions:

1. Select the location for the cooktop and/or heat-generating devices.

If possible, place the seams parallel to the front edge of the cooktop or installed equipment while considering the design and economy of materials. A minimum gap between the seams of the countertop and the cooktop is 250mm.

2. Location of the dishwasher

If possible, the seams should not be located over the dishwasher (but consider also the design and economy of materials).

Note: Always use insulating material and add it on top of the dishwasher, between the GRANDEx countertop and the dishwasher.

3. Inner corner arrangements

If possible, reinforced seams should be located at a distance of 35 mm from the inner corner, while considering the design and economy of materials. All inner corners should be rounded to a 5mm radius.

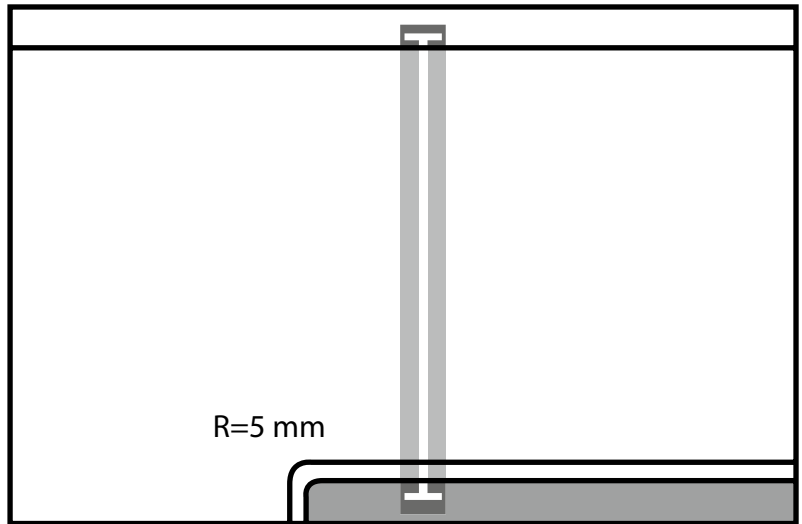


Fig.12c. Joining sheets together

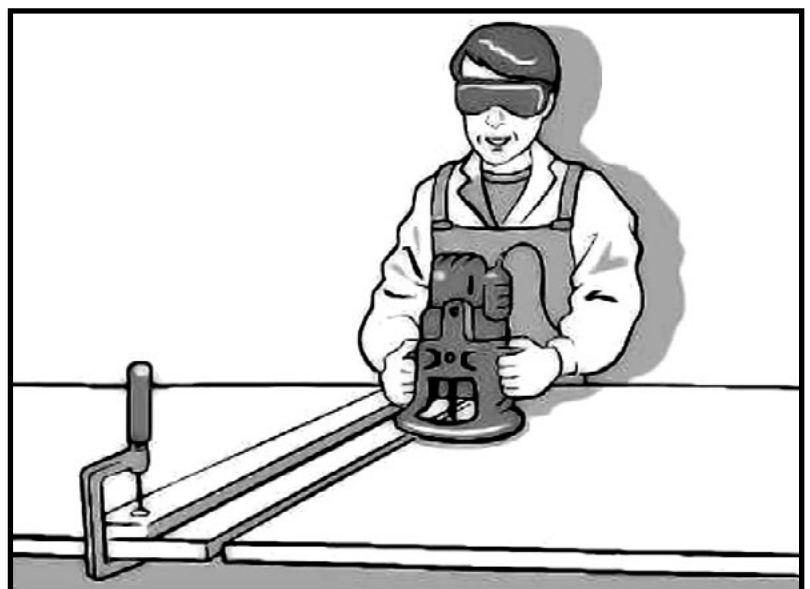
4. Seam location at the installation site and the dimensions of transportable sections.

Consider the dimensions, the weight of the transported sections and their impact on the non-recommended location of seams at the installation place. Use detailed information about the installation location to ensure the correct balance of these two conflicting characteristics.

6.3. MAKING GRANDEx SEAMS

When connecting two pieces of GRANDEx, it is essential that they fully match each other.

The ideal preparation of two edges for connection is fitting the ends by milling them (mirror cutting). This technique involves the use of a standard cutter with two blades (double flute type), which synchronously processes the working ends of two pieces of GRANDEx to create the best seam. See the illustration below:



MIRRORCUTTING TECHNIQUE.

Once you process the surface of the future seam with a milling cutter, carefully polish both ends

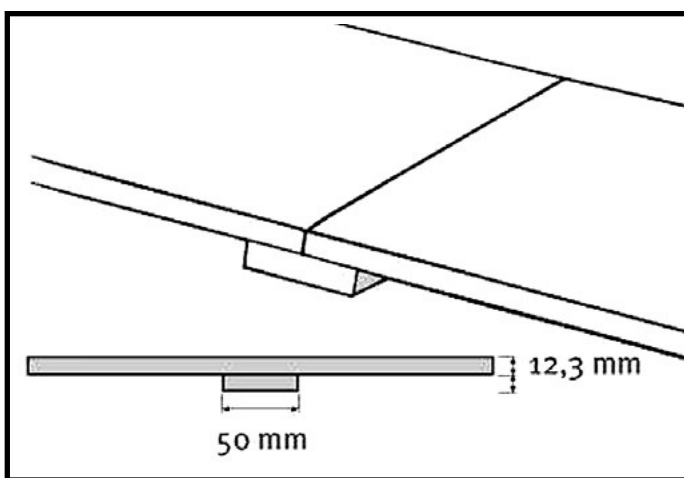
(apply the cutter 6-7 times on the end while not touching the front face) using sandpaper with 150/180 grain for better attachment with the adhesive.

Clean both ends of anything that may affect the seam color. Use pure denatured alcohol on a clean white cloth or paper towel.

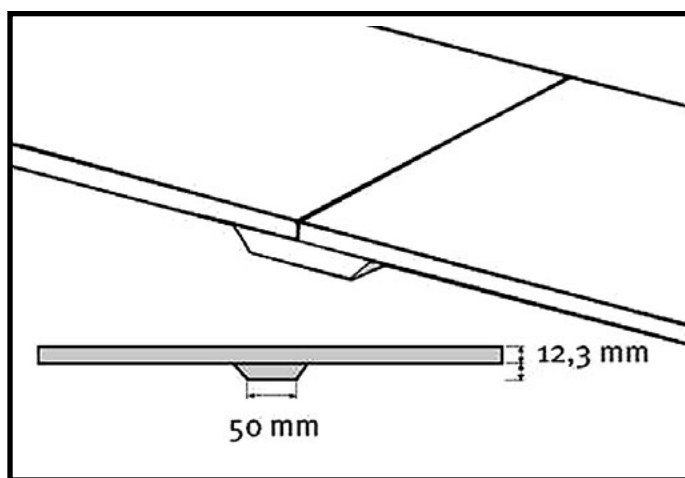
Note: We recommend sanding the marking on the back of the sheet with sandpaper in the places where the parts are glued together. Try connecting both ends to make sure they are fully aligned.

Secure the plastic parting tape (packing tape) directly under the seam to enable GRANDE movement. Adjust the sheets so that the outer side looks the best. Install two sheets for gluing at a distance of approximately 3 mm. Use the matching GRANDEX adhesive to fill the seam and use the clamps without tightening them too much.

Note: All GRANDEX seams must be reinforced. Reinforced seams will have the strength of the ordinary sheet. The seam reinforcer - GRANDEX strip - should be the same thickness as the sheet (width - 50 to 100 mm). The strip must be attached to the entire length of the seam and the GRANDEX adhesive must be applied to the entire surface of the seam reinforcer.

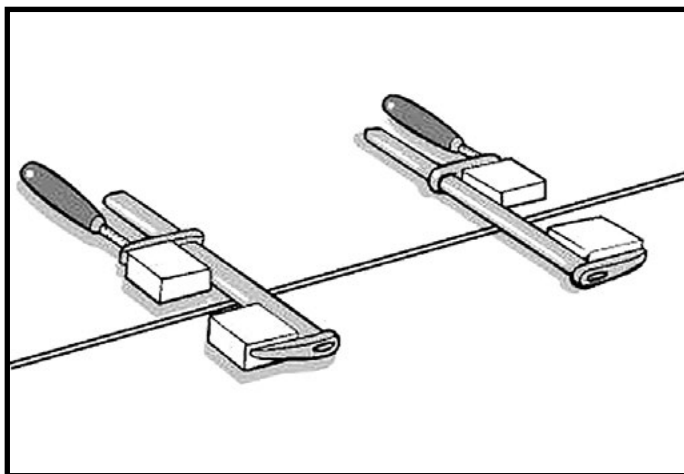


STANDARD SEAM REINFORCER



BEVELED SEAM REINFORCER

All GRANDEX seam reinforcers located near heating sources or, if we are talking about a kitchen countertop of any type, must be beveled at 45.



**BARS ON THE MATERIAL +
CLAMPING DEVICES**

Attach small square-shaped bars to each piece of GRANDEX with hot-melted adhesive and press them together using clamps to ensure compression of workpieces. Do not tighten them too much.

Make sure that the adhesive evenly comes out from the seam along the entire length, after you pressed the parts together with a clamping device.

When the adhesive dries and hardens, remove its excess with a small block plane. To finish the seam, take an eccentric rotary polishing machine or belt sander

with the abrasiveness of sanding material P100 (m100). Remove excess adhesive and visible differences between the sheets. When the first stage of polishing is completed, take the sandpaper with grain P120 (m60), polish and remove the differences in the seam area.

For matting, polish with a polishing machine with grain P180 (m60) and finally finish the surface using a burgundy Scotch-Brite™ 7447 abrasive disc.

6.4. END PARTS AND SIDE EDGES

There are several types of fabrication in the production of edge parts.

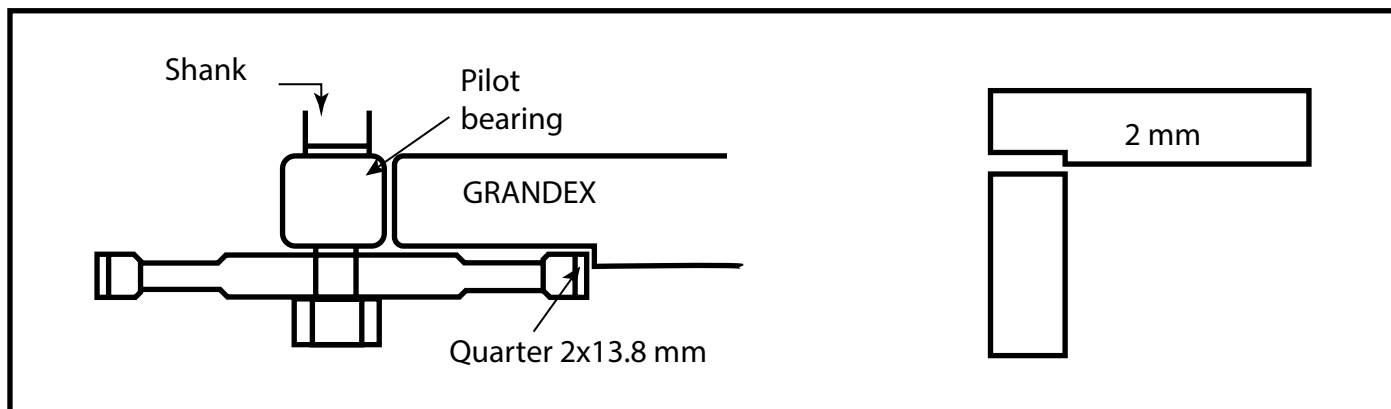
1. End face details with gaps or grooves

Details of the end face with gaps or grooves presuppose additional reinforcement of the seam, accurate installation of side edges and excellent seam quality.

Since the underside of the sheets is not the same in color and sometimes contains air bubbles, which may affect the seam quality, we recommend taking the following steps to avoid the aforementioned issues.

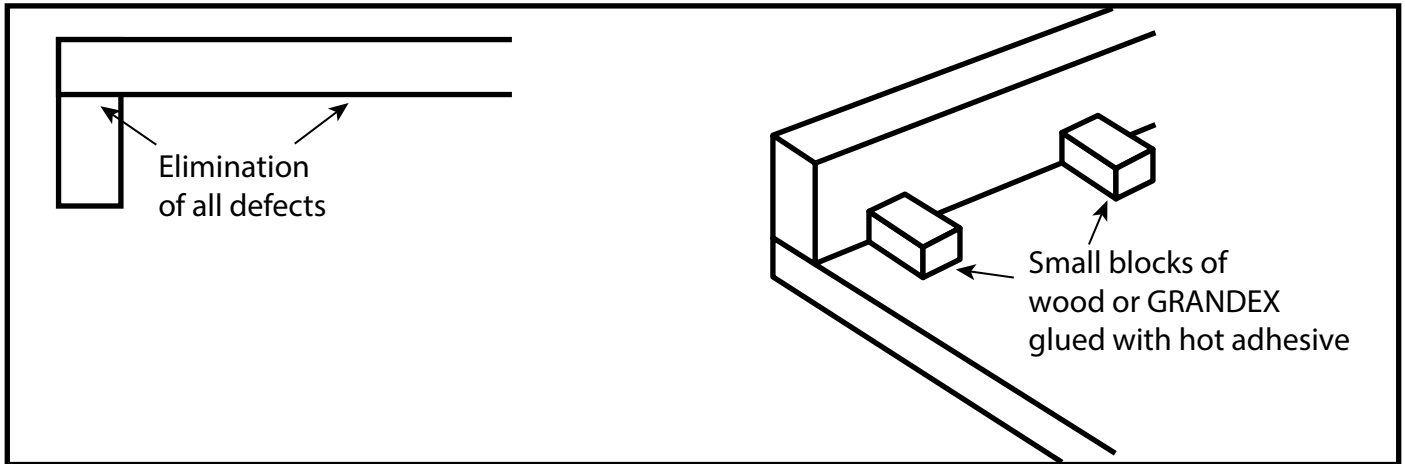
Tools you need:

- 1600 W milling machine
- A milling cutter for cutting grooves in the surfaces (as shown in the Figure below).



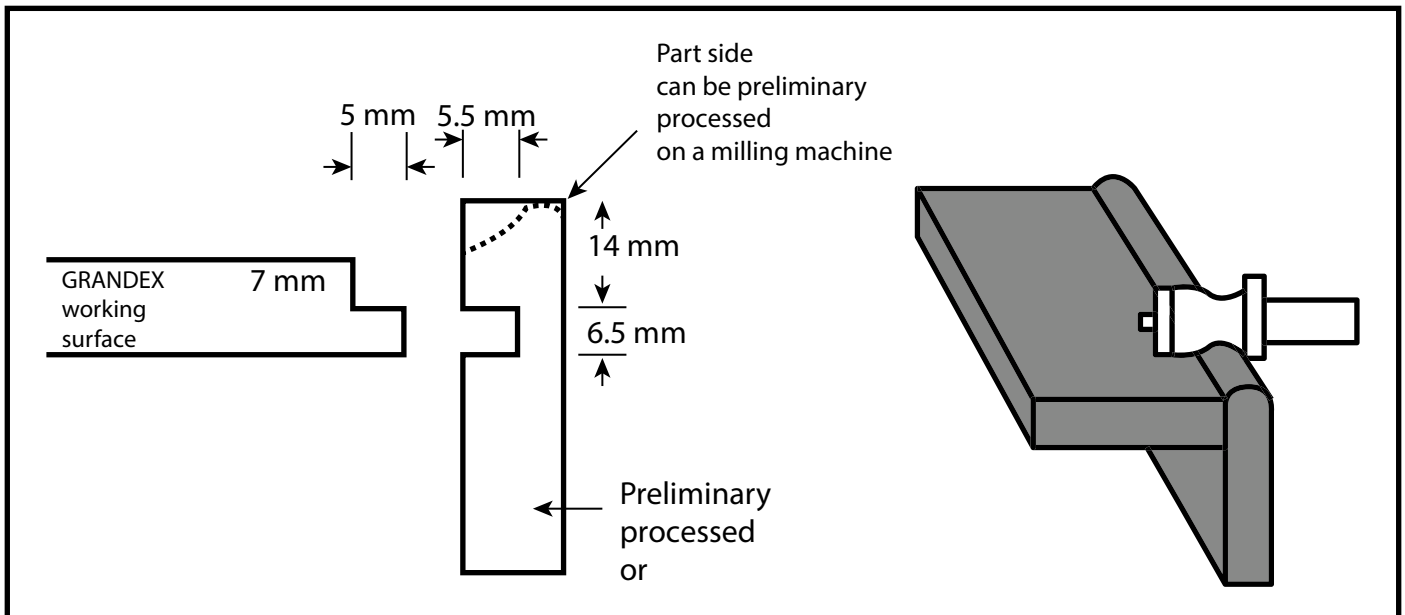
2. Details of the end face without grooves.

You can also connect rectangular edges directly to the underside of the GRANDEx sheet. When using this technology, make sure there are no defects on the underside of the sheet and always polish the attachment spot of the swing panel and the underside of the sheet before connecting them.



3. Cascade edge

Cascading edges are applied to the front side when the upper edge protrudes over the countertop by 2-3 mm. This will allow a specialized cascade cutting tool to round the surface and create a water-retaining barrier.



4. Other options for end face fabrication

Other approaches to the decorative fabrication of end faces of swing panels can create unique design elements.

The main popular options for end face fabrication include:

- Rounded "Bullnose" shape

- Pencil round
- S-shaped curve (Ogee)
- Chamfered 15-degree edge

The technology used for all end face processing options is the same. Milling cutters of various shapes are used to achieve the appropriate result.

Gluing end face parts:

Often during fabrication, seams or joints at the ends are not completely filled due to oversight. When gluing a piece of GRANDTEX with another piece of GRANDTEX or other materials, the seam must be completely filled with the appropriate adhesive. In addition, all seams at the ends must be filled with an adhesive with the same elasticity to prevent excessive pressure on the joined sections.

6.5. WALL PANEL

6.5.1. End-mounted wall panels:

By wall panels installed end-to-end, we mean vertical walls located on the backside of the countertop and attached to the countertop with a simple end-to-end seam.

This method is simple and does not require much time. An additional part is attached to the GRANDTEX countertop, for which GRANDTEX adhesive or silicone sealant can be used.

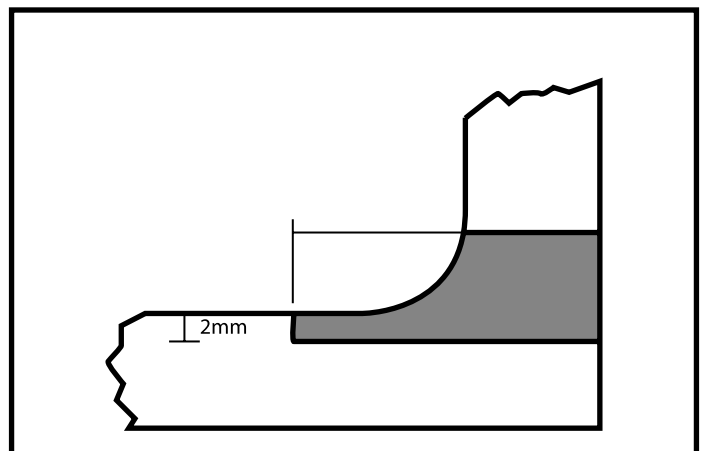
6.5.2. Vaulted wall panel

The vaulted back wall is created by attaching an additional part into the seam between the countertop and the wall panel, which is pre-rounded to ensure a radius transition from the countertop to the wall panel.

There are three ways to achieve this result:

1. Insertion into the countertop.

For this technique of insertion into the countertop, a bar measuring 12.3 mm x 25 mm should be inserted into the countertop at a depth of 2 mm, which will form a certain foundation to mount the back wall. This requires additional material to be used for making an arch between the countertop and the back wall.

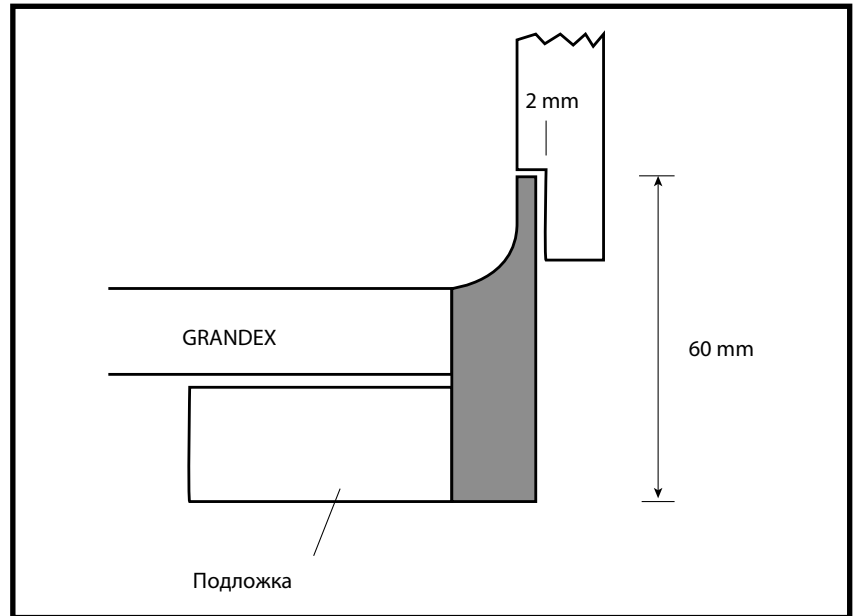


INSERTION INTO THE COUNTERTOP TECHNIQUE

2. Vaulted method (alternative)

The vaulted method requires an additional block of 12.3 mm x 60 mm, which was processed on a milling machine with a milling cutter with a 10 mm radius. Then, this block is glued to the back of the sheet.

The back wall with a quarter of 2mm is installed vertically on the block and glued.

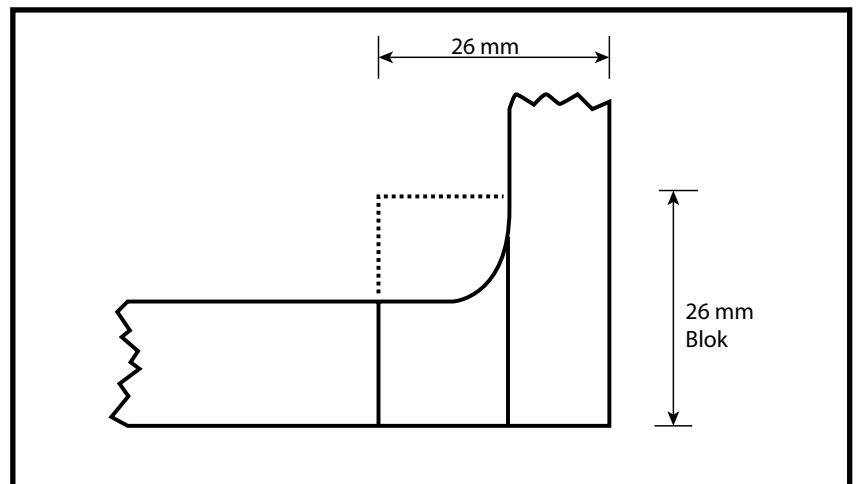


3. Block method.

The block method requires gluing a rectangular block of 24 mm behind the countertop.

This creates the basis for the installation of the back wall and ensures a radial transition of the countertop into the back wall.

Note: The wallboard (skirting board) is installed using similar methods.



6.6 INSERTION OF SINKS

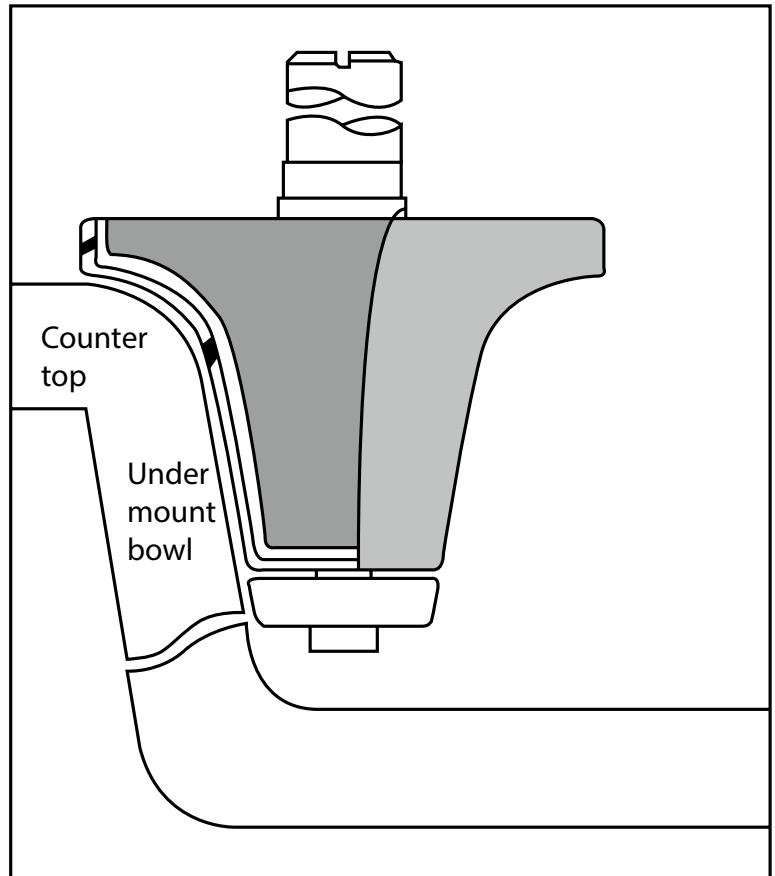
GRANDEX sinks must be installed carefully and precisely to ensure a clear fit.

Be sure to use the right tools. At the same time, all tools must be of high quality, the cutters must be sharp, and the rulers and angle pieces must be accurate. For all sinks, you need the following:

S-shaped mold (bottom mount):

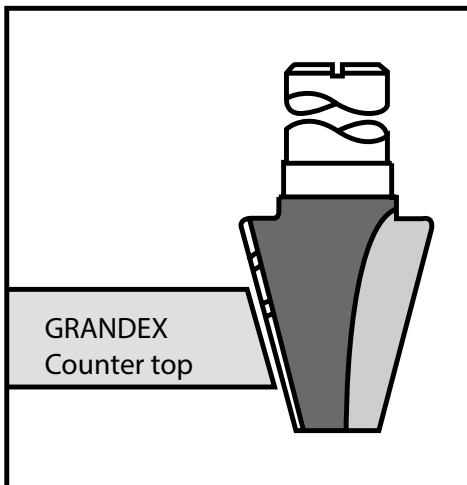
1. Reinforced workbench allowing to attach the sink to the sheet.
2. At least 1600 W milling machine with 30mm guide bushing and 12 mm collet.

3. The exact mold for the sink being installed.
4. 2 milling cutters recommended for S-shaped models:
 - Milling cutter with one blade, 10 mm (e.g., Titman XC001-10*12)
 - Form milling cutter for edge fabrication (e.g., Titman ROU-127-15)

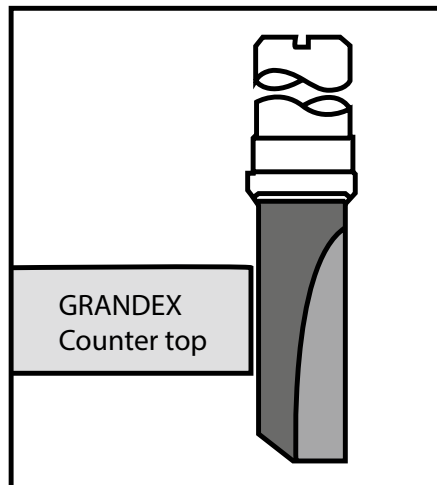


A-shaped mold (Beveled edge):

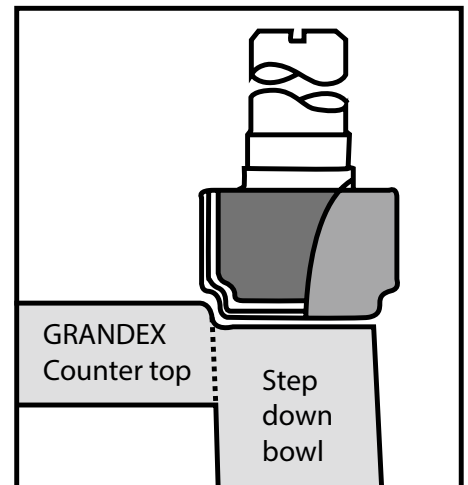
1. Reinforced workbench allowing to attach the sink to the sheet.
2. At least 1600 W milling machine with 30mm guide bushing and 12 mm collet.
3. The exact mold for the sink being installed.
4. 3 milling cutters recommended for A-shaped models:
 - Milling cutter with one 10 mm blade (e.g., Titman XC001-10*12)
 - 15-degree coned milling cutter (e.g., Titman XC101*12)
 - Contour milling cutter, if the gradual lowering method is used (e.g., Titman XC206/12)



TITMAN XC001-10*12



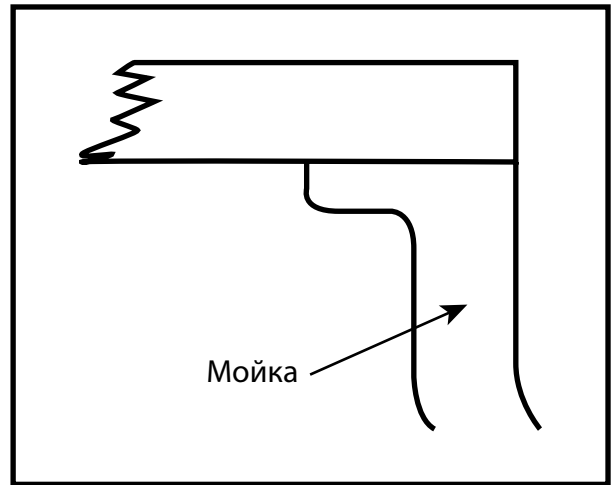
TITMAN XC101*12



TITMAN XC206/12

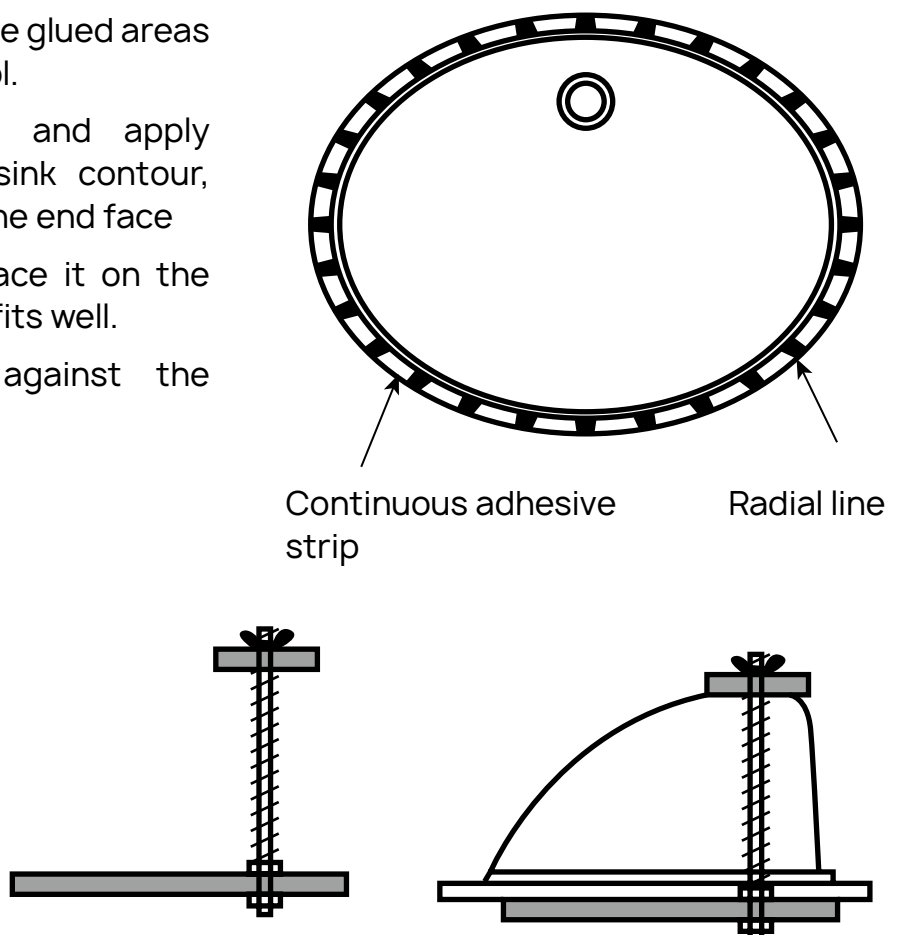
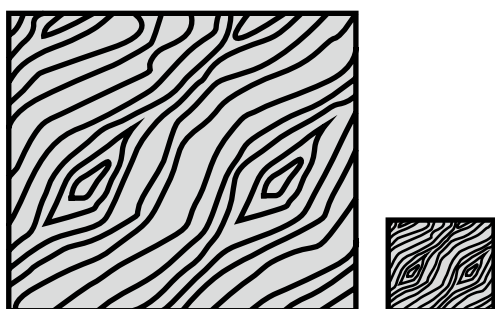
6.6.1 S-shaped mold (Cutting):

The S-shaped sink is glued to the underside of the countertop. The seam is located on the vertical plane of the sink, as shown in the figure below:

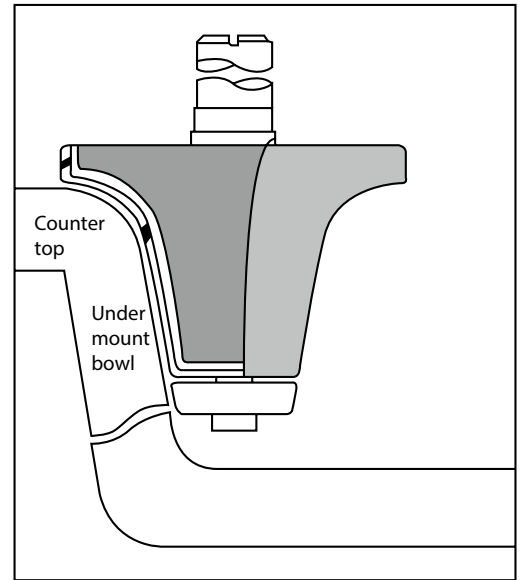


Instructions:

1. Turn the sheet over and polish the area where the sink will be attached to an even state.
2. Use the clamping device to press the homemade mold to the installation site (the sheet should still be turned over).
3. Using at least a 1600 W milling machine equipped with a guide bushing and a cutter with one blade, make a cutout for the sink.
4. Remove the mold and try to fit the sink in the installation place. Center the sink inside the cutout using small bars on the hot-melt adhesive. Glue the bars fixing the sink along its edges, if a grooved connection is not used.
5. Recessed GRANDEX sinks can be glued directly to the GRANDEX sheet without any mechanical supports if the sheet and the sink have been polished and cleaned before gluing.
6. Check the rim of the sink for any defective gluing. (Fit the sink in the installation location).
7. Clean the front edge and the glued areas with pure denatured alcohol.
8. Take GRANDEX adhesive and apply a thick layer along the sink contour, approximately 5 mm from the end face
9. Turn the sink over and place it on the buffer blocks. Make sure it fits well.
10. Firmly press the sink against the installation site.

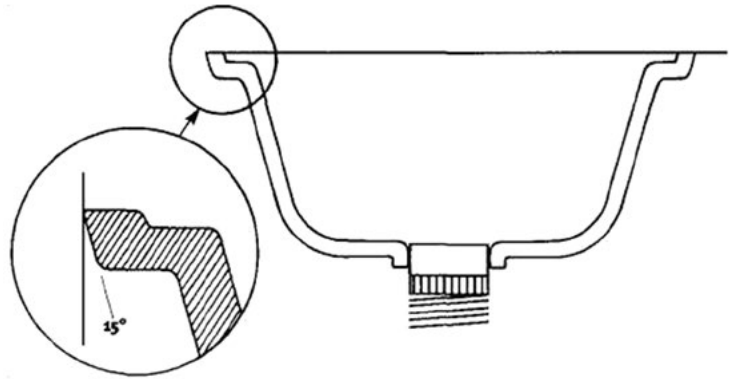


11. Use a sink clamp (or similar equipment) to support the sink until the adhesive hardens
12. After the adhesive has hardened, remove clamps and turn the sink over.
13. Using a milling machine with a round milling cutter (e.g., Titman ROU-127-15), cut off the protruding sections of the sheet to the sink level.
14. Polish and abrade the sink and sheet in the usual way.



6.6.2. A-shaped mold (Beveled edge):

For A-shaped sinks, a 15-degree beveled edge on the sink is required. This allows lowering it inside the sheet so that it is installed on its surface precisely.



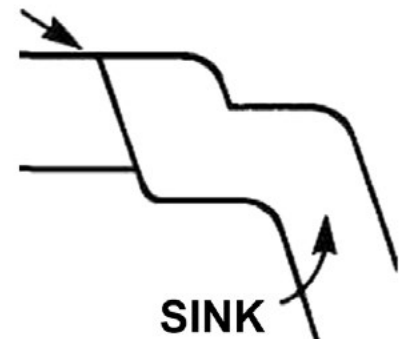
Note: Not all GRANDEx sinks have a 15-degree beveled end face. First, check the sink. If it does not have a 15-degree bevel, refer to section G.6.3., which explains how to convert an S-shaped sink into an A-shaped one.

There are two methods used to install A-shaped sinks:

1. Aflush mounting:

An A-shaped sink can be mounted aflush to the countertop. Accordingly, this method involves installing the sink aflush with the countertop surface, as shown in the figure below.

Sink, beveled by 15°, attached using adhesive



Instructions:

1. Carefully place the sheet on the device supporting its level so that when you pass through it, there is room for the milling cutter, and the sink is protected to the full depth. Provide supports under the cutout area or use the bars on the hot-melted adhesive as described below.

2. Fix the appropriate mold into place, remembering that the mixer center or the sink center are not necessarily located in the center of the cutout.
3. Using a 30 mm guide bushing installed in a 1600 W milling machine and milling cutters, work in a clockwise direction along the contour of the inner part of the mold.
4. Provide the support for the cutout using blocks glued with hot-melted adhesive or supports made of long bars so that the central part does not fail.
5. Replace the 10 mm milling cutter equipped with a milling cutter with an angle of 15 degrees.
6. Set the milling depth in such a way as to almost completely cut through the material, i.e., approximately 12 mm.
7. Mill the beveled angle towards the notch clockwise.
8. Install the sink into place. Perhaps, it will not be aflush with the countertop.
9. Continue lowering the cutter while cutting off a little each time. You may need two or three tries to finally fit the sink. This is the most important stage for an accurate fit and alignment.
10. Remove the mold, carefully inspect the position of the sink in the cutout, and check the level and the presence of any gaps.
11. Using masking tape or foil-based tape, make a gasket around the inside of the cutout to prevent the adhesive from leaking out of the seam.
12. Before using the adhesive, clean the rim of the sink and the end face of the sheet with a white cloth and pure denatured alcohol.
13. Take GRANDEx adhesive and get an assistant.
14. Apply the adhesive to the sink and the sheet and attach it to the installation place while pressing on it.
15. When the adhesive hardens, remove the excess and polish until the sink is aflush with the countertop.

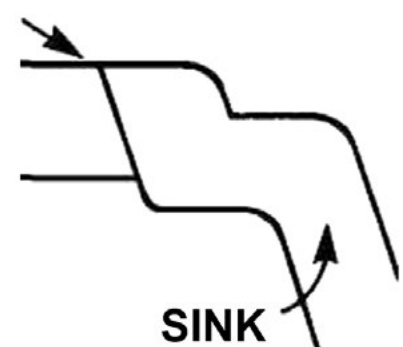
2. Gradual lowering method:

The gradual lowering technique requires a maximum of 1.5 mm protrusion in the sheet along the edge of the sink.

This technology should be used when installing a sink of the same color as the countertop.

With this technology, any small color differences between the sheet and the profiled insert are hidden, since a protrusion is created in the seam surface, as can be seen in the figure below.

Gradual lowering method



Instructions:

1. Carefully place the sheet on the device that supports its level, allow some room for

the cutter at the time of sink insertion, and make sure the sink is protected to the full depth. Provide supports under the cutout area or use the bars on the hot-melted adhesive as described below.

2. Fix the appropriate mold into place, remembering that the mixer center or the sink center are not necessarily located in the center of the cutout.
3. Using a 30 mm guide bushing installed in a 1600 W milling machine and milling cutters, work in a clockwise direction along the contour of the inner part of the mold.
4. Provide the support for the cutout using bars on the hot-melted adhesive so that the central part does not drop through.
5. Replace the 10 mm milling cutter equipped with a milling cutter with an angle of 15 degrees.
6. Set the milling depth in such a way as to almost completely cut through the material, i.e., approximately 12 mm.
7. Mill the beveled angle towards the notch clockwise.
8. Install the sink into place. Perhaps, it will not be aflush with the countertop.
9. Continue lowering the cutter while cutting off a little each time. You may need two or three takes so that the sink is installed at a maximum of 1.5 mm depth relative to the countertop. This is the most important stage for an accurate fit and alignment.
10. Do not remove the mold, carefully inspect the position of the sink in the cutout, and check the level and the presence of any gaps.
11. Using masking tape or foil-based tape, make a gasket around the inside of the cutout to prevent the adhesive from leaking out of the seam.
12. Before using the adhesive, clean the rim of the sink and the end face of the sheet with a white cloth and pure denatured alcohol.
13. Take GRANDEx adhesive and get an assistant.
14. Apply the adhesive to the sink and the sheet, and attach it to the installation place while pressing on it.
15. When the adhesive hardens, install the contour milling cutter into the 1600 W milling machine.
16. Using a contour milling cutter, work on the sink again. You may need more than one try.
17. Remove the mold carefully.
18. Carefully polish all the defects left by the milling cutter and attach the sink to the GRANDEx countertop.

Useful tips:

Do not attempt to install an A-shaped sink without the appropriate equipment.

Milling cutters must be sharp and in good condition.

We highly recommend using molds produced by GRANDEx.

Do not damage the exact beveled edge of the A-shaped product, as this may be critical for the final fit.

Inspect the box contents carefully to make sure that the product is in proper condition.

When transporting a countertop with a sink already attached, do not allow sagging or pressure on the area with the sink.

Provide sufficient assistance to deliver and install this fragile and critical part of the structure.

6.6.3. Converting an S-shaped sink into an A-shaped one:

To cut a 15° angle along the edge of the sink, which will ensure installation using the A system, use the following methods:

- Use a manual milling machine
- Use a stationary milling machine
- Use a CNC milling machine

Using a manual milling machine

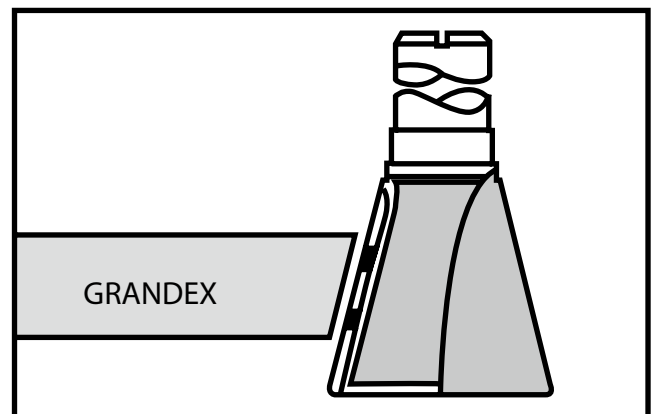
Tools you need:

- Min. 1600 W manual milling machine
- Guide bushing: $\varnothing 30$ mm
- Threaded rod: $\geq \varnothing M10$
- Nut retainer
- Nuts $\geq M10$
- Wooden support block
- Wrench $\geq M10$
- Mounting box for installing the sink on permanently fixed supports.

Cutting the edges of the profiled insert

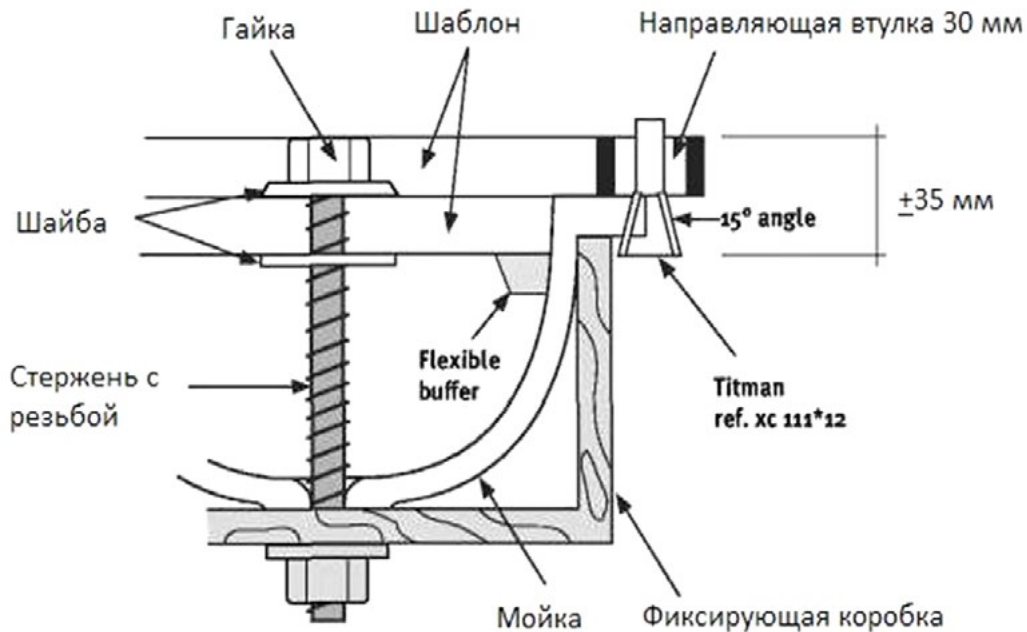
Steps:

1. Equip a manual milling machine
 - Install the guide bushing $\varnothing 30$ mm
 - Install the milling cutter with two blades (Titman ref. HS 111 * 12)
 - Set the height (+/- 35 mm).



2. Prepare the sink

- Install the sink on the milling mold
- Fix it with a threaded rod
- Install the nut retainer on top
- Install the nut and tighten with a wrench
- Press the sink in the mounting box against the work surface.



3. Milling of the A-shaped corner

Turn on a manual milling machine. Wait until it starts working at full speed. Set it on the work surface. Slowly move the milling cutter along the cut line. Your movements should be smooth.

4. Check for the following:

- Does the edge you are working on have any irregularities or potholes?
- Repeat the milling process using the same method, as needed.

5. Turn off the manual milling machine.

6. Disconnect the sink and the mold

- Remove the sink from the mounting box
- Loosen the nut
- Remove the nut, retainer and the support block
- Disconnect the sink from the mold

Note: Be sure to use protective gloves to prevent injury.

15° edges are sharp and brittle. Don't damage them!

6.7. Making cutouts for cooktops at the installation site

It is strongly recommended that the cutouts for cooktops be made by the manufacturer at the factory since the complex technique of their production does not allow for such works at the installation site.

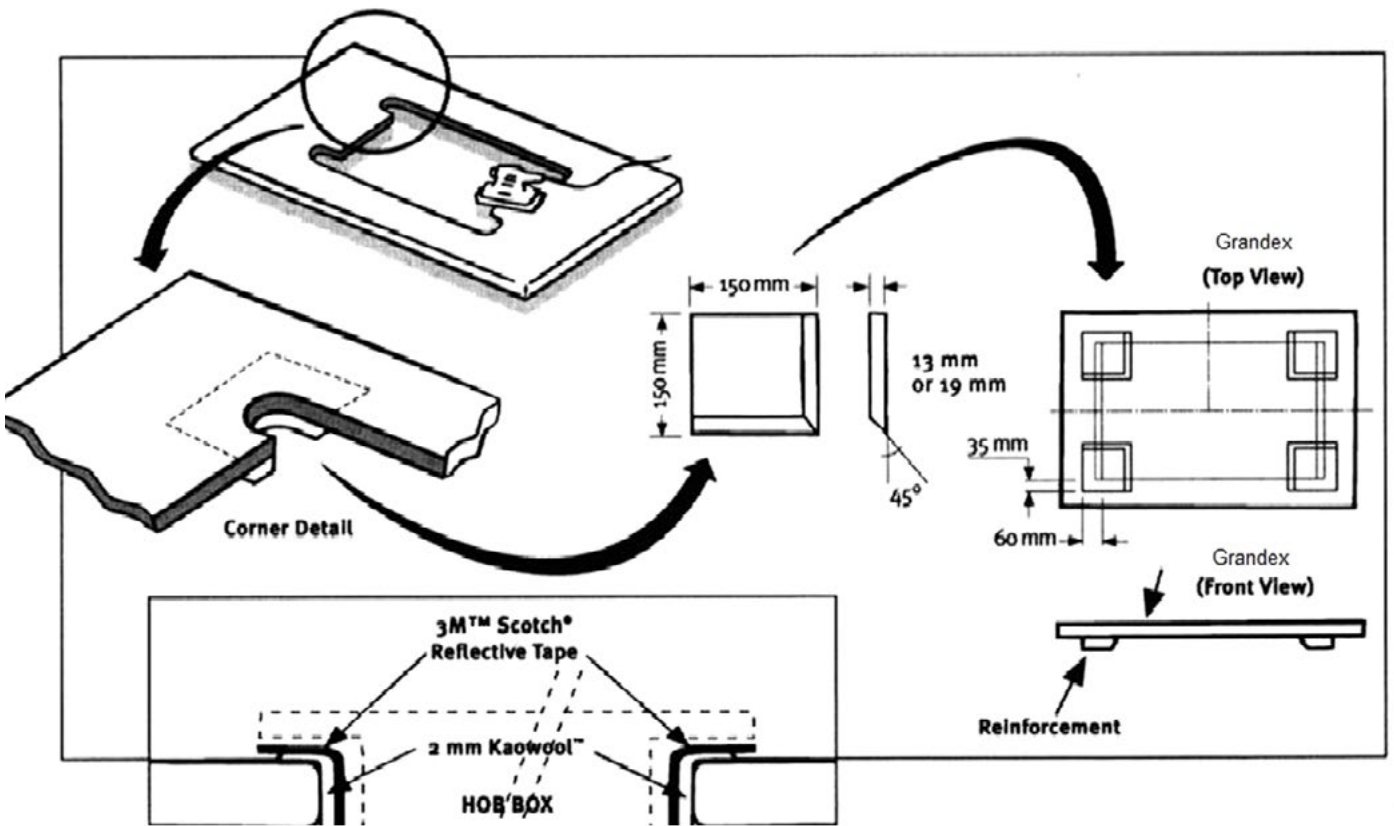
A. Standard cut-out method: (for cooktops with a corner radius of 60 mm and more)

1. Using a mold of the required size, make a cutout in GRANDEx, including in the front and rear guidelines of the support surface. To make a cutout in GRANDEx, use a guide ruler and a 12x50 mm straight-toothed milling cutter with a power of at least 1600 W. Cutouts should be at least 3 mm larger than the line of the planned cooktop. It would be more expedient to first cut through the entire thickness of GRANDEx and then cut through the inner supporting frame.
2. Change the cutter to a special circular cutter (upper and lower radius of 1.5 mm) Using hot-melted adhesive, glue a profile strip or plywood to each side of the cutout and fit it aflush to the edges of the cutout milled by the cutter.
3. Polish the cut-out ends smoothly and make sure there are no defects and notches left after polishing.
4. Glue 3M™Scotch aluminum reflective tape. Leave a gap of 3 mm around the entire circumference. We also recommend using Kaowool™ insulation tape
5. Cut off the excess Scotch aluminum reflective tape around the entire circumference of the flange or cooktop.

B. Intensive cutting method: (mandatory when installing rectangular cooktops)

1. The cutout should be made using a milling machine and a sharp 10-12 mm straight carbide milling cutter. This is the only recommended method for this work. Always use the correct mold for differently sized flanges.
2. Polish all inner ends very carefully so that no irregularities remain. The upper and lower edges should be polished with a radius of at least 1.5 mm until they are smooth and rounded.
3. Be extra careful when polishing corners, as this is a challenging spot. However, each corner must be reinforced with an additional piece of GRANDEx, which is attached using GRANDEx adhesive. Leave a gap of 3 mm between the cutout and electrical communications and appliances. If you can leave more space, do it. See the detailed drawing below.
4. Attach the aluminum reflective tape around the cutout perimeter. The tape should run along the upper edge of the cutout and should be located where the cooktop sides are located, while the rest of the tape must be pushed inside the cutout. We recommend using Kaowool™ insulation tape.

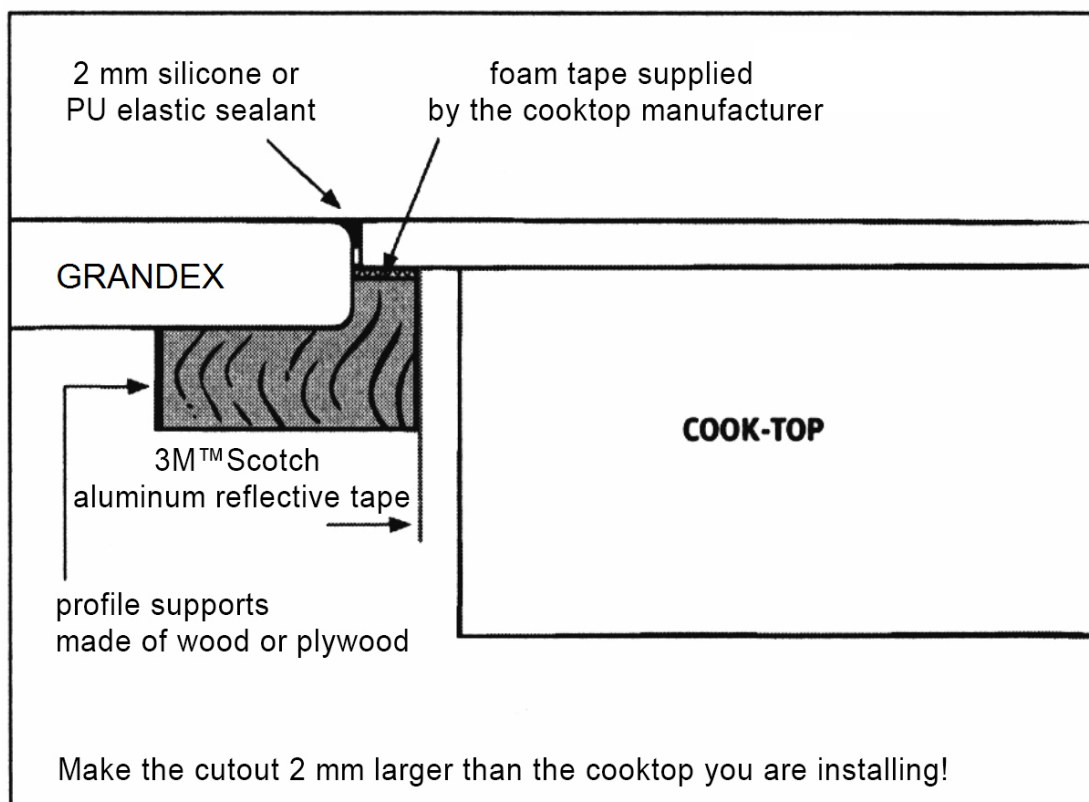
- All four corners must be re-taped. Make sure that the tape at the corners is overlapping.



Note: Leave a space of at least 50 mm behind the cooktop.

If there is a high wall cladding panel behind the gas stove, it is recommended to leave a space of 100 mm. This may require some changes in cabinet design.

We recommend using Kaowool™ when installing the sink in public catering places or ovens.



Note: The cutout should be made using a milling machine and a sharp 10-12 mm straight carbide cutter. This is the only recommended tool for this task. Always use the appropriate mold to make the cutout 2 mm larger than the cooktop you are installing.

1. Polish all inner ends very carefully so that no irregularities remain. The upper and lower end faces should be polished with a radius of at least 1.5 mm until they are smooth and rounded.
2. Be extra careful when polishing corners, as this is a challenging spot. Leave a gap of 3-6 mm between the cutout and electrical utilities and appliances. If you can leave more space, do it.
4. Attach profile supports made of wood or plywood to the inside of cabinets and each other. Insulate the supports using 3M™Scotch aluminum reflective tape.
5. Use the foam tape supplied by the cooktop manufacturer and fix the appliance in the center of the cutout. Fill the 2 mm gap with silicone or PU (polyurethane) elastic sealant.

Cooktop installation:

- Fix the cooktop in the center of the cutout
- Check that the cooktop is insulated with all the necessary insulation materials.
- Install the cooktop in the way described in the manufacturer's instructions. If possible, fix the cooktop to the GRANDEx countertop with a continuous layer of silicone sealant. If this is not possible, fix the panel on the support surface, do not tighten mounting points too much, and make sure that no screws are screwed directly into GRANDEx.

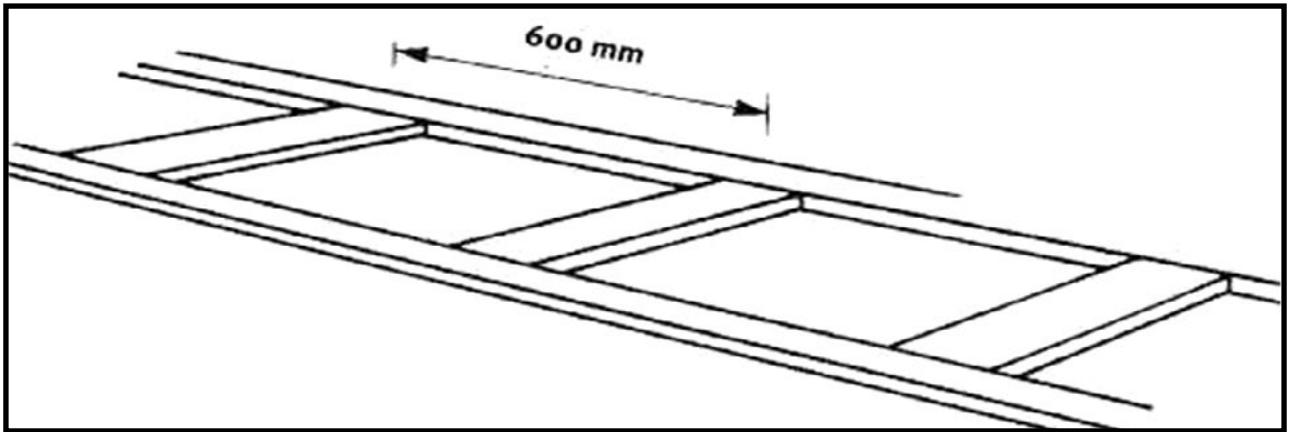
Note: Any works to change the cutout contour for the cooktop made by an unlicensed specialist after installation may lead to the invalidation of your warranty.

6.8. Frames and support structures

GRANDEX must be placed on a supporting, sturdy, circular frame. Such frame will add strength and allow moving GRANDEx and attaching it to kitchen cabinets. The entire frame must be glued to the GRANDEx panel using elastic adhesive, for example, silicone or polyurethane adhesive. Before gluing, make sure kitchen cabinets or the frame of the underlying surface are aligned to the level. Various types of material can be used as the underlying surface:

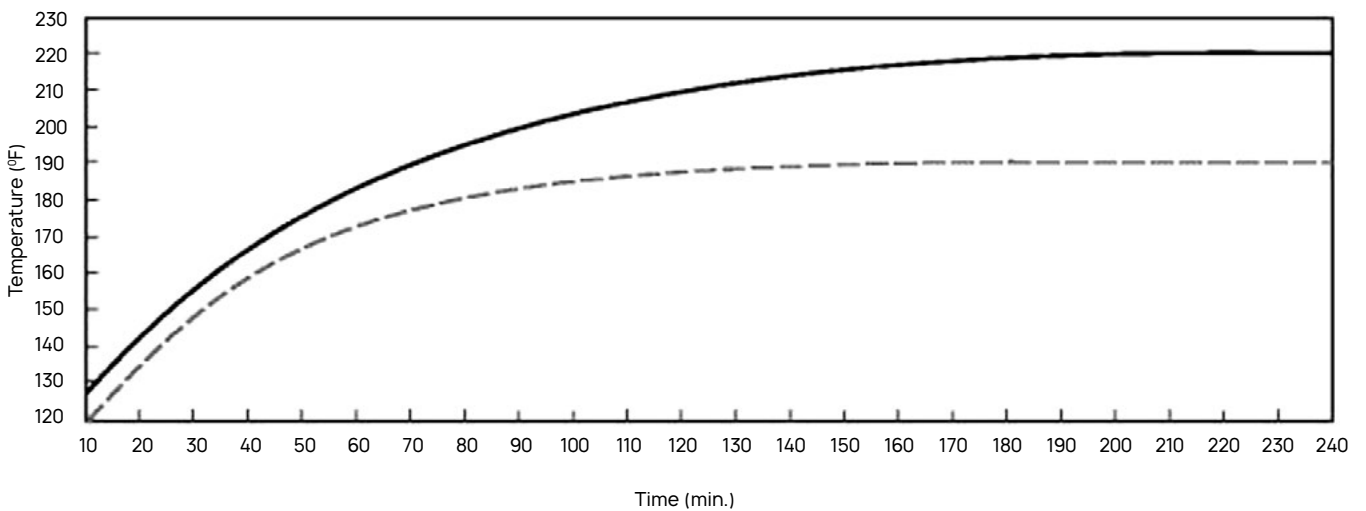
- moisture-proof multilayer plywood
- moisture-proof MDF
- moisture-proof chipboard

The frame must be mounted in the front, in the rear and on the sides.

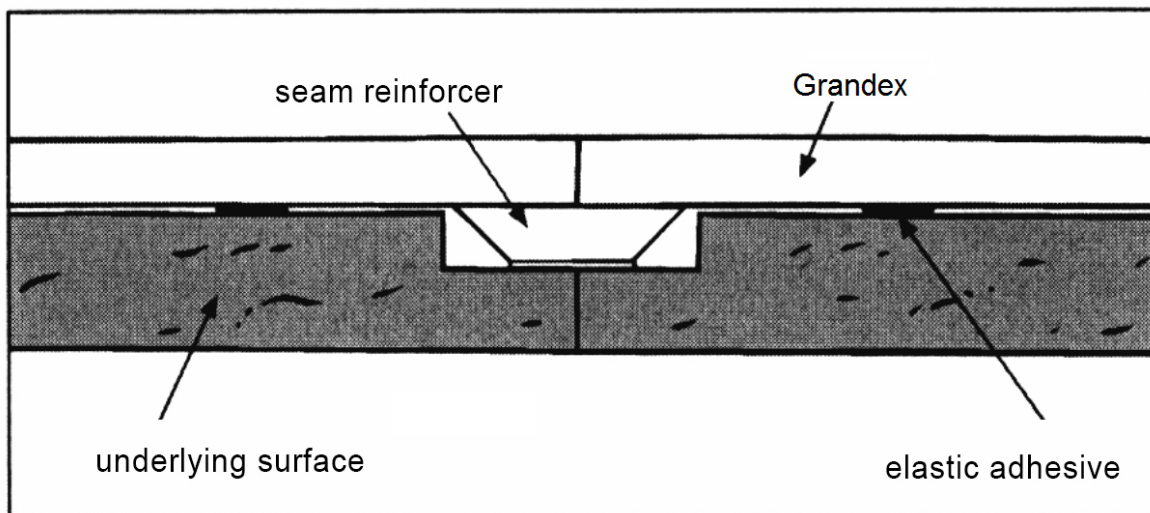


Frame components can be fastened to strengthen the mounting and give extra strength. The graph shows the effect achieved by using a solid underlying surface for GRANDEX panels.

The temperature of GRANDEX panel with and without a support surface



_____ With a support surface Without a support surface



Note: See Chapter 12 of the Fabrication Manual - "Reinforcing Seams".

6.9. Hot molding

Because of GRANDEx composition, the panel can be shaped by following the instructions given in this chapter.

Heat GRANDEx to a temperature of 150°C – 175°C (until it is flexible).

Lower temperatures can cause GRANDEx to crack and turn white. Higher temperatures can lead to the creation of bubbles on the GRANDEx panel and its discoloration. The heating time will vary depending on the furnace model and the size of the panel being molded. To determine the heating time, follow the table below:

Material thickness	Furnace temperature	Heating time
6 mm	150°C (302°F)	30-60 min
	175°C (347°F)	15-30 min
12 mm	150°C (302°F)	45-80 min
	175°C (347°F)	25-60 min

** More accurate times depend on the heating equipment*

Note: The furnace temperature of more than 175°C can overheat the panel surface before its inner part reaches the molding temperature. Do not exceed this temperature. Before starting hot molding, test your furnace to find out the ideal time and temperature for hot molding.

Proper material preparation is the key to successful hot molding. The length of the bending radius is an essential element of hot molding.

To determine the minimum internal radius length for hot molding of GRANDEx panels with standard thickness, see the table below:

Material thickness	Minimum Inner Radius	Material Series
6 mm	25 mm	All series, except E
12 mm	75 mm	All series, except E
12 mm	180 mm	E

6.10. Wall covering

GRANDEx panels are ideal for vertical applications.

GRANDEx is easy to mount and can be reinforced with almost any durable material:

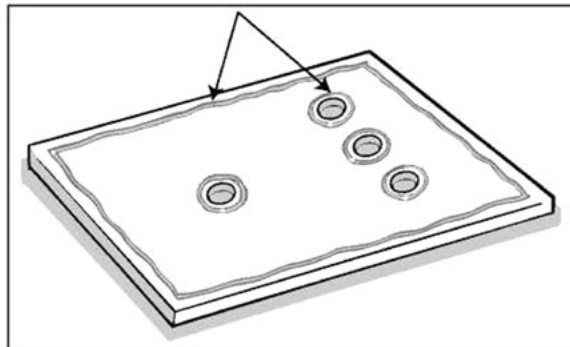
- Moisture-repellent gypsum panel
- Moisture-repellent multilayer plywood

- Cross-type MDF
- Any durable tile surface
- Sheet plastic

The 6 mm GRANDEX panel is used for vertical mounting, and it is not recommended to use it for the horizontal plane.

1. Cut the wall paneling to size and fit it to the installation spot. Leave a space of 3 mm from the wall (1 mm per running meter) to meet GRANDEX warranty requirements.
2. Clean the back of the GRANDEX wall paneling with denatured alcohol and a clean cloth.
3. Apply silicone or elastic PU adhesive to the back of GRANDEX sheet as follows:
 - Apply a solid line of adhesive around the perimeter of the Grandex panel at a distance of 25 mm from the edge.
 - Then apply smears of about 30 mm at an equal distance from each other and about 200 mm from the center of the inner side of the panel. Any cutouts, for example for electrical outlets, require a silicone gasket, 20 mm around the cutout.
 - To reinforce the cladding panel for GRANDEX walls, you can use hot-melted adhesive on the back of the sheet, just before mounting it on the wall.
 - Gently press the GRANDEX panel against the wall, use an angle piece to avoid curvature.

Glue on the panel.



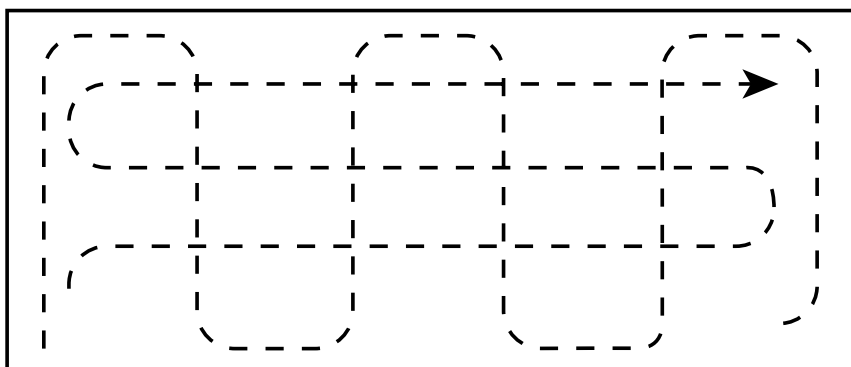
Warning: Do not use GRANDEX in saunas, swimming pools, steam rooms or underground.

Degree	Matte		Semi-glossy FILM		Glossy
Work Stages					
Stage 1	100/80 m	80/100 P	100/80 μ	80/100 P	100/80 μ
Stage 2	60 m	120 P	60 μ	120 P	60 μ
Stage 3	Burgundy Scotch-Brite™7 447 or useit™ super abrasive disc S/G 240	180 P	30/40 μ	180 P	30 μ
Stage 4		Burgundy Scotch-Brite™74 47 or useit™ Super abrasive disc S/G 240	Gray Scotch-Brite™74 48 or useit™ Super abrasive disc S/G 600	240 P	15 μ
Stage 5			Paper towel	320/360 P	9 μ
Step 6				Gray Scotch-Brite™744 8 or useit™ Super abrasive disc S/G 600	Finesse-it™ coating mixture
Step 7				Paper towel	

6.11. Coating and polishing

GRANDEX coating finishing is an important part that influences the formation of an opinion about your ability to work with GRANDEX.

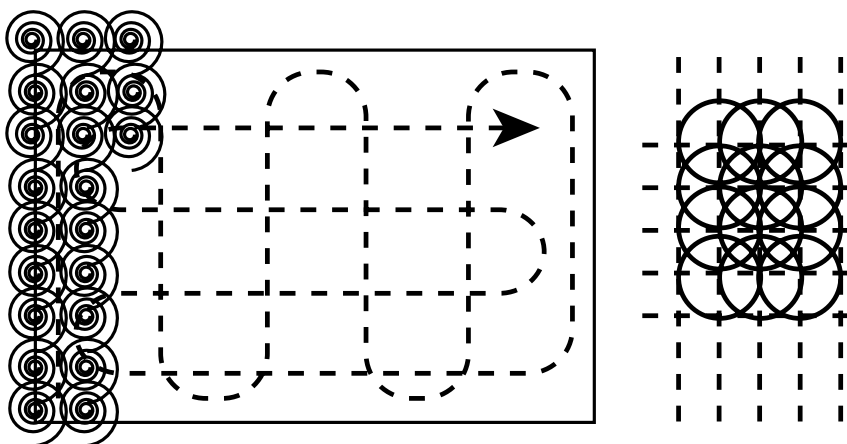
To prepare the surface of GRANDEX for polishing, remove all dirt and specks with a damp cloth and soap water.



The coating may vary depending on customer requirements. However, for a finish that is easy to maintain in everyday life, we recommend using a matte or semi-glossy coating.

Once you complete the previous stages, polish the

surface gradually from rough to smooth, removing the differences from the GRANDEx surface between different polishing stages.



Avoid excessive pressure. The best polishing technique is to turn on the tool and move it along the GRANDEx panel with equal pressure over the entire surface.

When you start polishing, for each polishing stage, follow the North-South-West-East movement directions, touching upon the edges with

small circular movements, but not rounding them (2 "patterns" are recommended for each polishing stage = 2 times in each direction at each polishing stage).

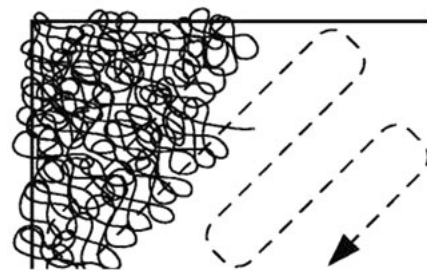
For polishing with abrasive paper with a grain of 100/80 μ or 100 P, use the eccentric mode, where available. For thin abrasive discs, use the polishing mode.

Always clean the abrasive disc and the GRANDEx surface between each polishing stage. Move the polishing tool in small circular movements in the North-South-West-East directions so that polishing areas overlap each other.

During fine polishing, change the trajectory of the North-South-West-East movements to the "infinity" pattern by randomly moving diagonally relative to the surface. (Use the same method when working with a paper towel.)

Important notes:

- Do not exert excessive pressure during polishing.
- Apply the same pressure on the entire surface.
- Use the same speed rate.
- Use the right tools.
- Change discs.
- For horizontal surfaces without a vertical cross-section, we recommend using a hard polishing disc, such as a hard backer.



GRANDEX resistance to chemicals

Class I reagents

Class I reagents do not leave persistent traces on the GRANDEx panel during 16-hour contact. Traces of chemicals can be removed with a wet Scotch-Brite™ abrasive disc and a bleaching cleaning agent. In some cases, a hardly noticeable trace remains.

Some substances included in class I reagents: acetone, ammonium hydroxide, benzene, bleach, citric acid, nicotine, food dye, and gasoline.

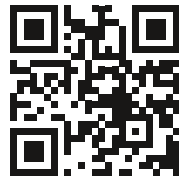
Class II reagents

It is not recommended to use GRANDEX in places where GRANDEX may come into contact with Class II reagents.

A ten-year warranty for the product and installation will not be valid if GRANDEX is used in places where there is contact with class II reagents.

A stain that may appear on the GRANDEX surface through accidental interaction with Class II reagents can usually be removed. Minor stains can be removed using household chemicals. More complex spots on the surface will require polishing, both with fine and coarse abrasive paper. Some substances included in Class II reagents: Acid for cleaning sewer pipes, hydrogen fluoride (48%), Chloroform (100%), substances based on methylene chloride, nitric acid (25, 30, 70%), phosphoric acid (75, 90%), sulfuric acid (77, 96%).

GRANDEX®



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