Acrylic Fabrication Methods

The following fabrication manual addresses the general methods pertaining to the fabrication and installation of ALKEMI-acrylic.

ALKEMI should ONLY be fabricated and installed by qualified solid surface professionals, properly trained in the safety and fabrication methods that are accepted by the industry standards of the ISFA and ICPA. For further information on required qualifications, please visit www.isfanow.org.

*Always make safety your absolute priority. Before proceeding with fabrication and the installation procedures of ALKEMI, please thoroughly read and follow the **Safety Precautions** provided at the end of this manual.*

PRODUCT DESCRIPTION

ALKEMI-acrylic is a recycled composite material made using 96% pre-consumer soft alloy scrap aluminum, acrylic and solid surface waste. General fabrication and installation methods of ALKEMI-acrylic are similar to conventional solid surface material techniques. However, due to its unique inherent and visual characteristics, ALKEMI-acrylic does require slightly different fabrication and installation techniques.

NATURE OF THE PRODUCT

ALKEMI colors and patterns are a direct result of the available scrap and waste materials at the time of manufacturing. Color and pattern may appear to vary throughout the sheet, as well as from one sheet to another. As with all random patterned materials such as wood or stone, regular matching of pattern or color consistency of the product should not be expected. Always check sheets for best color and material orientation before cutting and seaming parts together.

Some ALKEMI colors are crystalloid products with inherent light reflecting qualities and may appear as having a definite linear direction. Under certain light conditions, the aluminum particulate may appear brighter or more animated. As such, caution is advised during seaming or joining of various parts to keep them consistent in their natural direction to avoid a mismatched appearance. To identify the inherent directionality of the material, place the panels side by side under a direct light source and turn the pieces perpendicular to each other in order to ensure that the direction of one matches the other.

ALKEMI is offered with a factory standard clear coat buildup on face surface. Final surface sheen is to be achieved by fabricator, from matte to high-gloss.

GENERAL SPECIFICATIONS

Thickness dimension:	.625″ (+ -.03″) *15.88 mm (+ - .76 mm)*
Sheet dimension:	36″x72″ (+ -.50″) and 48″x96″ (+ -.50″) *914 x 1828 mm and 1219 X 2438 mm (+ -13 mm)*
Factory surface finish:	Sanded 800 grit wet

MACHINING

ALKEMI-acrylic can be cut and shaped using conventional woodworking machinery and tools such as saws and routers, including CNC machines.

The use of carbide-tipped saw blades, router bits and compression CNC bits designed specifically for **solid surface or acrylic** products is essential in order to achieve quality cut results.

SAW CUTTING

For best results, only cut ALKEMI-acrylic with carbide tipped blades specifically designed for **solid surface** or **acrylic** materials. While there may be many models of saw blades available on the market to choose from, the following products may be considered for use:

1) “Amana LB220-641” plastic cutting, non-melt saw blade, MTC grind - 220mm diameter; 64 tooth.

2) “Freud Diablo” blade with non-stick Perma shield coating, 40 tooth.

TIPS:

- *When sawing material, feed product as quickly as possible making sure the RPM of the saw does not decrease noticeably during cutting.*
- *Avoid stopping the cutting process until completely through the material.*
- *After each cut make sure there is no material buildup on the saw blade.* ***CAUTION: Always unplug and disconnect the Saw from the power source before checking the blade.***
- *Should material buildup occur on the saw blade surface during cutting, apply silicone lubricant to blade.*
- *Avoid the use of Saber Saw or Jig Saw to cut this product. However, if one must be used, do so using a Fine Tooth Metal Cutting Blade. The feed rate during cutting should be as quick as possible. Avoid stopping the cutting process until completely through the material.*

ROUTER CUTTING

Always use High Speed Carbide Router Bits specific to **solid surface** or **acrylic** materials.
Apply a silicone lubricant to router blade and bearing before each cut.
Cut material at a minimum router speed of 21,000 RPM.
Feed rate should be moderate or fast.

CNC CUTTING

Settings: 18,000 rpm, 300 ipm with 3/8” *(9.5 mm)* helix bit specific for **solid surface** or **acrylic** materials.
Do not make any inside corner radius smaller than 1/4” *(6.5 mm).*

TIP: *Always test cut scrap material using various feed rates to determine appropriate speed for best results before proceeding with the actual work.*

HORIZONTAL FLAT SURFACE SEAMING

The horizontal joint seaming is performed using eco-friendly, GREENGUARD certified, ALKEMI adhesives available through Renewed Materials, Inc.

To achieve high quality inconspicuous seam results, please follow these step-by-step instructions:

Step 1: Edge preparation

One of the following preparation techniques is recommended to achieving proper flush and level alignment of the parts being seamed together.

Option 1: Block and clamp method

Machine cut edges to be seamed flat and smooth. It is critical that the two vertical planes of the joining edges are perfectly square and tight when pushed together. Any irregular surfaces being glued together will result in a noticeable seam line.

Temporarily apply wood clamp blocks on to the top surface of the parts being joined together, a few inched back from the seam edge, as frequently as necessary, to pull the joining parts together using clamps.

Option 2: Wavy router cut method

Router or shaper cut edges of the parts to be seamed together using carbide tipped "Wavy" bit to ensure flush and level alignment of the top surfaces.

CAUTION: *The joining edges must make full edge-to-edge contact of the glue surfaces to prevent noticeable seam line. Do not machine a glue trough or gutter to hold excess adhesive as with conventional solid surface techniques, because this technique will eliminate the aluminum filler, resulting in a noticeable clear or opaque adhesive-filled seam line.*

Step 2: Preparation of the parts for adhesive application

a) Thoroughly clean edges to be seamed with Denatured Alcohol Solvent, using a clean cotton rag.

b) Lay the sheets to be joined on a flat horizontal work surface, bringing the machined edges together. Leave the parallel edges to be seamed apart to allow the adhesive nozzle to fit between them (approximately ¼" to 3/8").

TIP: *To avoid contaminating the work area, place a disposable work surface protector under the seam area, such as scrap plastic laminate, melamine or wax paper, etc.*

CAUTION: *Some ALKEMI-acrylic colors are crystalloid products with inherent light reflecting qualities and may appear as having a definite linear direction. Under certain light conditions, the aluminum particulate may appear brighter or more animated. As such, caution is advised during seaming or joining of various parts to keep them consistent in their natural direction to avoid a mismatched appearance. Place the panels side by side under a direct light source and turn the pieces perpendicular to each other, highlighting and identifying the inherent direction of the material before seaming.*

CAUTION: *ALKEMI is made from recycled scrap materials. By its nature, ALKEMI does not have a regular or consistent pattern. Depending on the ratio and scale of the aluminum scrap fillers, color and pattern may appear to vary throughout the sheet, as well as from one sheet to another. As with all random patterned materials, such as wood or stone, regular matching of pattern or color consistency of the product should not be expected. Always check sheets for best color and material orientation before cutting and seaming parts together.*

Step 3: Adhesive application techniques

Apply two beads of adhesive from the dispensing nozzle, one on top of the other, into the ¼" to 3/8" gap, entire length of the seam.

Push the two panels together to squeeze out seaming compound onto the surface. To achieve a tight joint, bar clamps, as described above, or straps should be used to apply slight pressure on the seam. Do not wipe away excess adhesive from the surface. Seamed panels should be allowed to set and cure properly, approximately 30 minutes at 77 degrees F (22 degrees C).

NOTE: *ALKEMI adhesive working time is 8 to 14 minutes after mixing. Mixing is performed internally in the dispensing nozzle. Apply adhesive only after all the parts to be seamed have been prepared properly to avoid premature setting of the mixed adhesive. Always read and follow the specific instructions provided along with the adhesive.*

Step 4: Seam reinforcement

As with conventional solid surface techniques used to prevent failure of the seam joint, all seams should be reinforced from their underside using a full length support strip, three to four inches wide, adhered using ALKEMI Adhesive. The support strip should be cut from the same ALKEMI-acrylic panel.

CAUTION:

- *Never install seam joints without the proper support strip as described above. Only produce and apply seam support strip made from the same ALKEMI material.*
- *Never perform cut outs at seam joints.*
- *Never position seams over appliances.*
- *Never allow seam joints to remain unsupported without a proper substrate backing at installation.*
- *During transportation of ALKEMI panels and parts, always support the material with the use of a temporary, full coverage substrate. Such a substrate should be clamped to hold ALKEMI firmly.*

EDGE TREATMENT OPTIONS

Various edge fabrication options can be achieved with ALKEMI-acrylic, including mitering (V Folding), and multiple layering or build-up.

Mitering Option:

Mitering is a laborsaving alternative edge treatment option to stacking or layering. Mitering also ensures matching pattern of the edge to top surface. Please follow these step-by-step instructions to achieve quality miter edge seam results:

Step 1: Bevel cut or "V" groove edge and deck pieces to be glued together at a 45˚ angle. Take proper protective measures to avoid chipping or damaging the resulting sharp edges of the parts.

Step 2: Laying the edge and deck pieces face up, bring them together, sharp edge to sharp edge and secure the parts along the fold joint using ***3M–355 tape***, or equal. This will act as a hinge, keeping the two parts together during gluing.

Step 3: Turning the parts face down, apply adhesive to the contact surfaces and join firmly together, forming a 90˚ angle. The two sections may be pulled together and held in place temporarily using miter clamps. Do not apply excessive clamp pressure. Wipe off excess glue compound from the finish surfaces and clean using Denatured Alcohol Solvent and a soft rag. Allow adhesive to set and cure properly, approximately 30 minutes at 77 degrees F (22 degrees C).

TIP: *Applying tape over the entire joint, will ensure that adhesive does not ooze out to contaminate the finish surface (rub the tape firmly with a roller or a non-scratch scraper to adhere firmly.*

Step 4: Using fine tooth steel file or fine grit sandpaper, dull the resulting sharp outside corner of the miter joint.

Step 5: Using seaming adhesive, apply a strip of support piece along the entire length of the miter joint from the backside to strengthen and reinforce the joint. This strip should be cut from the same material used for the edge.

CAUTION: *Avoid aggressive sanding when removing excess cured adhesive from seam joints, to prevent sanding through the clear topcoat. Follow recommended Sanding and Finishing steps as described below to finish material surface.*

Layering and Build-up Option:

Please follow these step-by-step instructions to achieve quality layering or build-up edge seam results:

Step 1: Preparation: Using coarse grit abrasive, thoroughly sand off and eliminate the clear coating from the surfaces of the parts to be glued together, making sure that the aluminum filler is exposed. This will ensure tight and inconspicuous seam results.

Step 2: Apply thoroughly mixed seaming compound (ALKEMI adhesive) to contact surfaces of the parts to be layered.

Step 3: Stacking the layers together, apply frequent pressure on the entire length of the seam, using hand clamps or "C" clamps approximately 2 to 3 inches on center. Allow the excess adhesive compound to over-flow and cure.

Step 4: Proceed to machine desired edge profile using sharp carbide bit router, followed by sanding and polishing steps to achieve desired surface finish.

CAUTION: *ALKEMI-acrylic has a thin clear buildup topcoat surface. For inconspicuous seam joints, this clear coat must be removed by sanding it off thoroughly to expose the aluminum filler before proceeding with the application of adhesive.*

TIP: *When stacking two layers together, gluing the parts together backside to backside will avoid the need to sand off the clear coat from the face side. When stacking three or more layers together, only the parts in the center, between the top and bottom layers, will require the removal of the face coating.*

SANDING AND FINISHING PROCEDURES

ALKEMI is provided to fabricator with factory surface finish of 800-grit wet abrasive. Final surface finishing, from matte to high-gloss, is to be performed by the fabricator, as per customer's specifications.

All surface final finishing of ALKEMI, including top surfaces, edges, seams and repairs, should be done using random orbital sanders and appropriate high quality abrasives, dry and wet as necessary.

The following sanding and finishing process is provided by MIRKA Abrasives.

Option: Semi-Gloss Finish (40-70 sheen)

Step one: P120 Abranet (dry) using MR-6 Mirka Sander to remove router marks / rough areas.

P120 Abranet (wet) using MR-6 Mirka Sander to remove very rough and deep scratches. (Use this step only if necessary after stroke sanding and on edges.)

Step two: P180 Abranet (wet keeping surface wet to avoid paper clogging, remove scratches and imperfections). (MR-6 Mirka Sander)

Step three: P320 Abranet Soft (wet) to prepare surface. (MR-6 Mirka Sander)

Step four: 2000 Abralon (wet to dry) to finish.

Step five: 4000 Abralon (wet to dry) to finish.

NOTE: *Should high-gloss finish be required, follow using T10 compound with Twisted Wool Pad @ 2800-3200 rpm. (V.S. Buffer). Remember to wipe the surface clean between steps to prevent contamination scratches. Abralon may be used dry, or with a water mist for lubrication. Best results for high gloss finishes are achieved when Abralon is used wet.*

For more information on MIRKA abrasives and techniques, please contact:
MIRKA Abrasives, Inc. www.mirka-usa.com T: 800-843-3904

SURFACE REPAIRS

Minor scratches can be removed following sanding and polishing instructions. Heavy scratches or deep surface chipping may be repaired using clear ALKEMI-adhesive as filler, followed by sanding and polishing steps as described.

Step One: To repair damage, begin cleaning the surface of the area by removing all loose material and dust thoroughly using Denatured Alcohol Solvent and a soft cotton rag.

Step Two: Following application instructions precisely, mix the two part clear ALKEMI-adhesive and pour the mixture to fill slightly above the finished surface. Allow the adhesive to set and cure.

Step Three: Proceed with sanding and polishing steps as described above.

CUT OUTS

For general cutouts, use a router with a 1/2" double flute, **solid surface or acrylic** specific, carbide straight bit to follow the clamped cutout template. Inside corner radius must be as large as possible (1/4" minimum). Exposed cutout edges may be sanded and polished using the sanding and polishing steps described above.

CAUTION: *All inside cutout corners must be fully reinforced from the underside using a support strip, three to four inches wide, produced from the same ALKEMI-acrylic material and adhered using ALKEMI Adhesive.*

All cutouts must be fully supported with a substrate material, such as plywood or particleboard, to avoid over stressing of the weakened area.

Never perform cutouts at seam joints.

Never install seam joints over appliances.

When attaching an under mount sink to ALKEMI, always reinforce the sink hardware attachment insert or grommet with an additional buildup layer of ALKEMI to provide proper support for hardware. Such reinforcement should adhere to the bottom surface of the ALKEMI panel, and should be made using the same ALKEMI material and applied using ALKEMI Adhesive, following instructions for edge buildup as described above.

Never insert sink or appliance attachment hardware into the top layer of ALKEMI panel.

Never attach other solid surface sink bowls to ALKEMI, as the two different materials may expand and contract differently.

INSTALLATION

Horizontal Application: ALKEMI should always be installed over a full area of substrate support panel such as plywood or particleboard for proper structural support. Substrate should be vertically supported at every 30 to 36 inches on center to avoid bowing of the horizontal plane. ALKEMI should never be installed without the full support of a substrate.

Adhering to Substrate:
Countertop application - For countertops and other large-scale horizontal installations, use 100% silicone adhesive to allow for any expansion and contraction of materials. The flexible silicone adhesive may be applied to the substrate in dabs, 12 to 18 inches apart, to hold ALKEMI in place.

Tabletop application - For furniture and table surfaces where a permanent adhesion of the substrate is required, ALKEMI may be adhered using Epoxy Adhesives. The following adhesives from SMOOTH-ON and 3M are recommended:

Smooth-On – MT-13 (Strongest), white
Smooth-On – EA-40 clear
or
3M – Scotch-Weld Instant Adhesive CA40H

For purchasing and further product information, please contact:
SMOOTH-ON www.smooth-on.com T 800-762-0744 T 610-252-5800
Worldwide Sales 3M www.shop3m.com T: 800-234-8068

Expansion and Contraction: ALKEMI may expand and contract depending on changes in environmental and room temperatures. Allow 1/8" expansion space for every 10 linear feet of material.

Vertical application: ALKEMI may be applied to vertical surfaces using "Z clips" or similar hardware designed to allow for expansion and contraction. Such hardware should be attached to a substrate backer applied to ALKEMI. The frequency of the support hardware attachments will depend on the scale of the panel and structural design considerations. Proper engineering and testing should be done prior to final application.

Tabletop Application: When permanent adhesion of ALKEMI is necessary, as in the case of furniture or tabletop installation, substrate materials may be adhered using permanent adhesives. While there are many commercial adhesive options available on the market, one suggested adhesive for use when gluing ALKEMI-acrylic to plywood is 3M™ Pronto™ Instant Adhesive CA40H .

For more information on 3M adhesives and techniques, please contact:
www.shop3m.com T: .800.234.8068

IMPORTANT GUIDELINES

To avoid stress cracking, bowing or other failures to installations, and to improve fabrication and product performance, the following guidelines are essential.

- ALKEMI must only be fabricated and installed by qualified solid surface professionals.

- All fabrication using ALKEMI must be done in a qualified and proper solid surface fabrication facility and never performed on the job site.

- Always provide adequate, full coverage and level substrate support from below for all horizontal installations, with vertical structural support every 30 to 36 inches on center.

- Provide full coverage substrate support using clamps or ties during all stages of transport and handling.

- Allow for proper expansion and contraction space on all sides of the installation as recommended above.

- Always use acrylic specific carbide tipped cutting saw blades and router bits for machining, and cut at high speeds, using moderate to fast feed rates.

- Avoid inside cut outs with sharp corners. Always cut inside corners with a minimum of 1/4" radius.

- Always glue support backing blocks, made using the same material at all corners of cut outs where weight will be placed from above, such as drop-in accessories and sinks.

- Always glue full-length support backing strips to all glue or seam joints from backside, made using same material.

- Always glue full-length support backing strips to miter joints from inside of corner, made using same material.

- Always install ALKEMI-acrylic away from high heat source such as heaters, cooking tops and ovens.

- Never install ALKEMI outdoors.

CARE AND MAINTENANCE

General Cleaning: As with all acrylic products, use soap and water or gentle liquid cleansers (free of bleach and ammonia), applied to a soft cotton rag when cleaning surface of ALKEMI. Aggressive dirt spots may be cleaned using Denatured Alcohol or mineral spirits applied to soft cotton rag.

CAUTION: *Never use harsh chemicals or solvents to clean ALKEMI. Products containing bleach, ammonia, acids, or acetone will damage ALKEMI if left to remain on the product surface for extended period of time. However, light surface damage or clouding of the finish, in most cases, may be restored through proper sanding and polishing steps, as described above. For specific information regarding chemical resistance, please see* ***SGS Test Results*** *at <www.alkemi.com>.*

Never install ALKEMI near a direct heat source, as heat will affect ALKEMI, resulting in damage and expansion.

SAFETY PRECAUTIONS

ALKEMI should ONLY be fabricated and installed by qualified solid surface professionals, properly trained in the safety and fabrication methods that are accepted by industry standards of the ISFA and ICPA. For further information on required qualifications, please visit www.isfanow.org.

Always protect your health and those around you by working in a clean environment with adequate and proper lighting, air ventilation and excessive noise protection, following safety guidelines as provided by OSHA.

As with all projects involving the use of power machinery and hand tools, please thoroughly read and follow the specific use and safety instructions provided by the manufacturer of your equipment, and follow safety guidelines as provided by OSHA.

ALWAYS thoroughly read and understand the nature and characteristics of all materials via Material Safety Data Sheets (MSDS), as provided by material sources.

Following safety guidelines as provided by OSHA, ALWAYS wear proper eye protection such as safety glasses or goggles; gloves for hand protection; and steel toe protective boots when working with, handling or transporting material to prevent cuts and abrasion.

ONLY use tools and machinery supported by proper dust collection equipment, as required by OSHA guidelines.

HEALTH HAZARDS (ACUTE AND CHRONIC)

This product is non-hazardous.

This product does not contain NTP, LARC, or ASHA listed carcinogens.

This product does not have significant measurable VOC content. Tests performed by Independent laboratory, **Paradigm Laboratories,** have revealed that the VOC parts of ALKEMI-acrylic are less than 5 parts per Million (acetone).
*For more information; see **Paradigm Test Results** at <www.alkemi.com>.*

This product produces nuisance particulate as identified by ACGIH and OSHA during fabrication operations such as sawing, machining, sanding or routing. Acrylic dust, solid surface dust, and aluminum particulate are generated.

EXPOSURE CONTROL METHODS

Provide sufficient ventilation and dust pick-up at saw, sander, drill or router to keep dust levels below 10mg/cubic meter TWA, or provide and make mandatory the wearing of NIOSH approved dust respirators.

WASTE DISPOSAL METHODS:

ALKEMI-acrylic is a sustainable material that can be recycled. Scrap ALKEMI may be returned to Renewed Materials, Inc., to be recycled again. Please contact Renewed Materials to arrange for the return of any used material at the end of its life cycle, and for any scrap material.

Any disposal of scrap material and dust should be done according to applicable Federal, State, and Local regulations. ALKEMI-acrylic is a non-hazardous product.

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www.renewedmaterials.com
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Renewed Materials, Inc., is a proud member of USGBC.
ALKEMI-acrylic is LEED compliant, and may contribute to earning 4.1 and 4.2 credits.

Video of ALKEMI-acrylic fabrication methods may be viewed at www.alkemi.com.