



Bienfang® Foam Board
Technical Guide

The diverse types of Bienfang® Foam Boards are applicable to a wide range of end uses. This guide is designed to give you expert advice on the best fabricating and finishing techniques to use for everything from cutting to final finishing, whatever the product or project at hand.

Methods and materials used to manufacture Bienfang® Foam Board yield superior performance capabilities. The board is strong and rigid, lightweight, easy to cut. Its clay-coated surface is ultra-smooth, front and back. The core, made of resilient polystyrene, is totally free of environmentally harmful chlorinated fluouorocarbons (CFCs). When being fabricated, it resists denting and crushing, and its built-in memory makes cut edges spring back to their original thickness. These properties serve to maintain the integrity of the board and its uniform surface – both indispensable for a professional look in your finished projects.

White Foam Board

Bienfang® White Foam Board has a double-clay paper coating with an ultra-smooth, even finish that's become a standard in the industry. It's available in brilliant white and a wide range of colors, in thicknesses of 1/8", 3/16" and 1/2". Very versatile and suitable for a broad range of mounting techniques and end uses.

Primary Applications:

- General framing, using wet glues, spray adhesives or dry mounting

- Shadow boxes, deep bevel designs, fabric wraps and embossing
- Point-of-purchase, sign and display applications using screen printing and/or vinyl lettering
- Mounting and laminating lithos, digital images and photographs not requiring archival procedures

Black-On-Black® Foam Board

This board is made with the deepest, richest, black paper and foam available. It's totally black – front surface, core, and back surface – so there's no need to cover or disguise the edges to produce a professional finish. Thicknesses available: 3/16" and 1/2".

Primary Applications:

- Framing, dry mounting, model-making – where you want a different and dramatic look
- Shadow boxes, deep bevel designs, 3-D display objects with added impact
- Signs and displays involving screen printing, vinyl lettering
- Specialty mounting and laminating of prints, digital images and photographs
- Prevents ghosting of mounted pieces when used with images and text printed on two-sides

Acid-Free Foam Board

Totally acid-free, this board is manufactured with a facing paper buffered with calcium carbonate to a pH between 7.7 and 8.5, in accordance with Library of Congress cold-extraction methods for non-photographic materials. The buffering protects both the board and the image from deterioration due to atmospheric pollutants and will be maintained for many years. Available in 1/8" and 3/16" thicknesses.

Primary Applications:

- Mounting artwork, photographs, etc., with conservation methods or dry mounting, wet glues or spray adhesives
- More elaborate projects such as shadow boxes and deep bevel designs, embossing, wrapping and reverse mats
- Any indoor usage where stability is important

Bright White Acid-Free Foam Board

It's whiter than the whites you've used before. Acid-Free Bright White has met all the tests for archival usage. Mounting on Bright White Foam Board will dramatically enhance the colors of any artwork and provide a smoother surface than traditional acid-free boards. For cutting ease and clarity of color, Bright White is a brilliant choice.

Primary Applications:

- Mounting artwork, photographs, etc., with conservation methods or dry mounting, wet glues or spray adhesives
- More elaborate projects such as shadow boxes and deep bevel designs, embossing, wrapping and reverse mats
- Any indoor usage where stability is important

100% Cotton Rag Foam Board

Designed especially for professional-quality archival mounting, this board is constructed with facings made of pure, naturally white cotton fibers and is bonded to a chemically inert, non-acidic polystyrene core. It contains no lignin, alum or harsh chemicals. The facing paper on both sides has a pH of 8.2 +/- 0.5, with an alkaline reserve of 2-to-3% and is buffered with calcium carbonate. Available in 3/16" and 1/8" thickness.

Primary Applications:

- Preserving limited-edition prints, important photographs, one-of-a-kind documents of valuable, historic, institutional or personal importance
- Dry mounting and wet- or spray-adhesive mounting appropriate to the requirements of the end use

Pressure-Sensitive Foam Board

A time-saving convenience for practically any general-purpose mounting operation, Pressure-Sensitive Foam Board has a pressure-sensitive adhesive on one side, with an easy-release protective liner. Firm, uniform pressure permanently bonds the artwork to the substrate.

Available in two adhesive levels:

- Repositionable Tack allows some repositioning of lightweight, uncoated bond papers and is available in white, 3/16" thickness.
- Permanent Tack is specially formulated to handle hard-to-hold items. It is the ideal choice for permanently mounting heavy posters, large maps or architectural drawings, all types and weights of photographic papers, plastic sheets and other coated, non-porous materials. Available in White or Black-On-Black® in 3/16" thickness.

Primary Applications:

- Mounting posters, layouts and other large or small items that don't require archival conservation methods
- Roller mounting and laminating digital images and photographs
- Commercial graphics – presentations, signs, displays, etc.

SingleStep® Foam Board

SingleStep® Foam Board is pre-coated on one side with a heat-activated adhesive for use with a dry mounting press. Since it does not require dry mount tissue, it forms a permanent bond without the usual trimming of tissue and tacking in place, a substantial improvement in production efficiency. The heat-activated adhesive works at a relatively low temperature, but is not recommended for resin-coated (RC) photographs. Available in 3/16" and 1/8" thicknesses.

Primary Applications:

- Mounting posters, prints, smooth-paper artwork, newspapers.

Step® 150 Foam Board

Bienfang® Step 150 has speedier bonding at 150°, a lower temperature for safer, easier mounting. It is easy to use, and saves you valuable time by eliminating extra prep work. Each board is pre-coated on one side with an adhesive that acts like a mounting tissue. When heat is applied the image is quickly, easily, and permanently bonded safely to the board's supersmooth surface. Available in white and Black-On-Black®.

Primary Applications:

- Mounting posters, newsprint, RC photos, magazine pages, fabric.

PilloCore® Foam Board

This Foam Board was specifically developed to create tightly closed edges with a "pillowed" dimensional effect when the board is die-cut. It has an ultra-smooth,

white finish that accepts a variety of media and enhances the appearance of embossed and debossed designs. PilloCore® Foam Board also comes in a Black-On-Black® version with a solid black, compressible core. Thickness is 3/16".

Primary Applications:

- Die-cut displays, exhibits and signs
- Screen printing
- Mounting lithographs for die cutting

MightyCore® Foam Board

The strongest Foam Board product currently available for indoor use, MightyCore® Foam Board, has a rigid, rock-solid center that makes it especially suitable for large fabricated pieces. Its smooth, chemical-free paper enhances ink coverage and needs no surface preparation for mounting or laminating. Available in white in thicknesses of 1/4" and 1/2".

Primary Applications:

- Mounting oversize photos, lithographs and digital images
- Building exhibits, signage, and displays where structural strength is required
- Screen printing

For complete MightyCore Technical Information, see *MightyCore Technical Guide*.

DIMENSIONAL SPECIFICATIONS Bienfang® Foam Board

| | |
|--------------------|------------------|
| Width | ±1/16" (1.59 mm) |
| Squareness | ±1/8" (3.18mm) |
| Length | ±1/8" (3.18mm) |
| Nominal Thickness* | ±0.2" (0.51mm) |

*±0.3" (0.76mm) on sheets thicker than 3/16"

MANUAL CUTTING

Straight Cuts

We recommend using the X-ACTO® #1 knife with #11 blades for simple, straight cuts. Other suitable manual cutting tools include: the X-ACTO® Utility Knife, X-ACTO® Board Cutter, single-edge razor blades, mat cutters and powered cutters.

The tool choice isn't as critical as keeping the blade clean of adhesive or paint residue and changing blades frequently. A dulled, burred or broken tip will damage the foam and tear the paper facing. Using a soft surface support— for example, the X-ACTO® Self-Healing Cutting Mat— under the Foam Board will prolong the life of a blade.

To make a cut, use a straightedge or metal ruler as guide. Hold the blade at a 30° angle to allow more of the cutting edge to do the work. Use steady pressure, pulling the knife along the entire length of the cut. Don't use a sawing motion or force the blade back and forth. Sometimes, it may be necessary to make more than one pass, particularly with 1/2" boards.

| RECOMMENDED CUTTING TOOLS | |
|---------------------------|-------------------|
| Tool | Blade |
| X-ACTO® Board Cutter | X-ACTO® #11 |
| X-ACTO® #1 Knife | X-ACTO® #11 |
| X-ACTO® #8R Knife | X-ACTO® #8R |
| Standard Utility Knife | Single-Edge Razor |
| Logan® Mat Cutter | Standard Size 12 |
| Alto™ EZ Mat | X-ACTO® #19 |
| Dexter® Mat Cutter | #3306800 |
| X-ACTO® Mat Cutter | X-ACTO® #19 |
| Fletcher®2000 Mat | Cutter Size 15 |
| C & H® Mat Cutter | Single-Edge Razor |

Holes

To cut a circular hole, penetrate through the board with your knife blade, cutting carefully. Unless a circular hole is mandatory, you'll find it easier to cut a square opening. Proceed as you would for making a straight line cut, as described above.

Circles and Curves

To cut circles, use an X-ACTO knife with a #11 blade and a circle guide or template to help maintain a smooth, even edge throughout the cut. For curves, first draw a guide line on the board surface. Make a shallow cut, then gradually and smoothly deepen the cut through to the other side of the board. Remember, let the sharp edge of a clean blade do the work for you.

MACHINE CUTTING

Die-Cutting

You can achieve a variety of effects by adjusting the various aspects of the process. It's a good idea to make a test run before working on the actual piece. Ideally, the die should be constructed with a 1/2" die board, 2-3 point center bevel. For embossing, to add dimension within an image, use a 2-3 point blunt or creasing rule with a medium-hard temper. The choice of ejection rubbers depends on the particular Bienfang® Foam Board you're using and the type of finished edge you want:

- White Foam Board: soft-density ejection rubber for open edges
- PilloCore®: hard-density ejection rubber for closed edges and embossing
- 1/4" MightyCore®: medium-density ejection rubber for open edges

For Black-On-Black® PilloCore® Foam Board, use a double-rule die to add embossing within an image. Up to one-third the thickness of the board may be compressed.

Embossing effects on Bienfang® White Foam Board and MightyCore Foam Board is not recommended because of the boards' respective resilient and extra-rigid foam characteristics.

| DIE-CUTTING RECOMMENDATIONS | | | |
|-----------------------------|-------------|-------------------|--------------------|
| Bienfang® Product | Process | Rule | Ejection Rubber |
| Foam Board | Die-Cutting | 2-3 pt. | Soft Center Bevel |
| PilloCore® Foam Board | Die-Cutting | 2-3 pt. | High Density Bevel |
| PilloCore Foam Board | Embossing* | Blunt or Creasing | High Density |
| All | Scoring | Blunt or Creasing | N/A |

*Compress no more than 1/3 thickness of material

SCREEN PRINTING

Guillotine Cutting

In general, guillotine cutting is not recommended. Satisfactory results may be obtained by cutting 3 or 4 sheets at a time with a sheet of cardboard on top of the stack to dissipate blade pressure and minimize surface marking. Proper machine upkeep and a sharp cutter blade are essential.

Machine Cutting

For intricate patterns we suggest using the Black & Decker® Piranha carbide saw blade (40 teeth, fine crosscutting) on a table, radial, or circular saw. You can also use a band saw with a very fine blade or the Cutawl® K-11 with 21D or 23D blades for intricate cuts. Corrugated board or chipboard placed beneath the Foam Board will minimize rough edges. It's a good idea to sand the cut edges with fine-grit paper for a cleaner finish.

Routing

In general, routing is not really suitable for laminated paper products. But you can produce a clean, finished edge with the proper bit, a "compression spiral" or an "up-shear/down-shear" router bit. Sand all machined edges with a fine-grit paper.

The brilliant white surfaces of Bienfang® Foam Boards are perfect for screen printing, roller coating, flexography, and many other printing processes designed for flat board stock. The Bienfang® Foam Boards' double-clay coated surfaces make them very receptive to printing inks, providing sharp definition, superior ink holdout, and exceptional coverage. The ripple-free, ultra-smooth surface does not require any preparation or priming. Be sure that the surface is clean and free of dust or debris, especially for boards that have been cut down to size.

For printing applications that require an extra-rigid substrate resistant to denting, bending, crushing, cracking and splintering, MightyCore® Foam Board is the product of choice. An added advantage: a cap sheet with a specially formulated moisture barrier to make it resistant to environmental changes.

Major screen-printing ink manufacturers have recommended the following types of ink for use with our Bienfang® Foam Board:

- Water soluble inks
- Acrylic water-based inks
- UV inks
- Gloss vinyl inks
- Puff inks
- Poster inks

Choose screen mesh sizes according to the fineness of line detail required. (Your ink supplier or manufacturer is a good source for specific recommendations.) Air drying generally takes about 30 minutes or less while jet drying takes only seconds. Gloss enamels will require longer drying times. Use solvent-based inks with caution to avoid damaging the polystyrene core.

When printing on Bienfang® Foam Board with darker surface colors, you may need a white base coat to ensure opacity. It's wise to run a test before starting a production run.

RECOMMENDED SCREEN PRINTING INKS

| INK TYPE | SCREEN MESH | DRYING TIMES | |
|--------------------------------------|-------------|--------------|---------------|
| | | AIR | JET |
| Naz-Dar® | | | |
| 5500 Flat Poster | All Types | 20-30 Min. | Seconds |
| SP Satin | All Types | 15-20 Min. | Seconds |
| 7500 Gloss | All Types | 15-20 Min. | Seconds |
| 5900 Synthetic Gloss Enamel | All Types | 15-20 Min. | Seconds |
| Speedball® | | | |
| Permanent Acrylic Water-Based Poster | 110-305 | 10-20 Min. | Seconds |
| Colonial® | | | |
| ViviMatte Flat Poster B-22 | 155-260 | 10-20 Min. | Seconds |
| ViviMax® | | | |
| Satin Poster B-32 | 155-160 | 10-20 Min. | Seconds |
| Enamellux® | | | |
| Synthetic Enamel | 196-230 | 24 Min. | — |
| ViviGloss® | | | |
| Series 6700 | All Types | 30 Min. | 15-20 Seconds |

MOUNTING & LAMINATING

You can use wet glues, spray adhesives or, with suitable equipment, adhesive tissues and films having various activating temperatures. Custom Framers also use hinge-mounting for original art, signed limited-edition prints, etc. For more information, visit our website, www.forframersonly.com.

The choice of which type of Bienfang® Foam Board to use for a given application depends on the end-use and your preferences for mounting procedures and equipment. The product descriptions on pages 2 and 3 will help you determine the best board to use for a particular job.

When mounting large, oversize items, it's good practice to use a counter-mount of comparable size and strength on the reverse side of the mounting board to help maintain flatness.

Wet glues can be applied to Bienfang® Foam Board with a spray gun, brush or roller system. Manual equipment, such as cold mechanical and vacuum presses, are useful to provide consistent, even pressure. Automated equipment is available that will efficiently coat boards and mount images.

Whether you use manual or automated methods, the glue you select should have a low-water content and high-solids content to avoid bowing the board from excessive moisture. PVA glues are recommended.

There are several methods appropriate for pressure-sensitive mounting. Bienfang® Pressure-Sensitive® Foam Board, with its "built-in" pressure-sensitive adhesive, is a time-saving option. For non-adhesive-coated boards, use Scotch™ PMA Positionable Mounting Adhesive tissues with a squeegee or roller press. A roller laminator, used with Bienfang® pressure-sensitive adhesives, will greatly facilitate pressure-sensitive mounting of wide format images.

You can also use spray adhesives. Carefully follow the instructions on the can for successful, problem-free mounting. Using a cold vacuum-mount press with such products as 3M® Vac-U-Mount or Super 77®, greatly facilitates spray mounting.

The first consideration is choosing the right adhesive for the particular artwork to be mounted. The Technical Guide packaged with Bienfang® Dry Mount tissues provides a list of recommendations. Correct adjustment of four basic factors is essential for consistent, successful dry mounting:

- **Time.** Dwell time in the press is determined by the selected adhesive and the size of the project. Use the following chart as a guide.
- **Temperature.** The correct temperature is determined by the adhesive being used. Set the temperature for the tissue you're using in accordance with the Technical Guide's specification.
- **Pressure.** Proper pressure on the assembled materials for mounting is essential. Mechanical dry mount presses have provision for manually adjusting the pressure; vacuum presses make the adjustment automatically.
- **Moisture reduction.** If the humidity is 50% or more, the artwork and the mount board should be pre-dried in mechanical presses by placing them in the press between two sheets of Kraft paper for 15-30 seconds. Moisture is automatically reduced in vacuum presses.

RECOMMENDED DWELL TIMES

3/16" Foam Board

| Size | Time |
|--|---------------|
| Mechanical Press* | |
| 8" x 10" | 30 seconds |
| 16" x 20" | 1-1/2 minutes |
| Per section (if larger than press) | 2 minutes |
| Vacuum Press | |
| Up to 32" x 40" | 2 minutes |
| Up to 40" x 60" | 4-5 minutes |

* Recommended temperature and dwell times should be used as a guideline. The best combination will depend on humidity and board size. Increase dwell time before increasing temperature.

Mechanical Presses require an operator's attention to all of the preceding elements. However, temperature, once set, is held constant by a thermostat; mounting pressure may need adjustment when mounting extra-thick materials. With Bienfang® dry-mounting presses, correct pressure is determined by placing the assembled materials inside the press and closing, but not locking, in place. The handle's lever arm should be at a 45° angle for correct pressure. Adjustments to the pressure are possible by following the instructions located in your Owner's Manual.

Vacuum Presses control all four elements in one step, using a digital control panel for setting time, temperature and pressure; moisture content is automatically reduced in the first 30-45 seconds while the vacuum is being created. That's why the dwell time for given adhesive is longer for vacuum presses than it is for mechanical presses.

After-mounting cool-down. Immediately upon removal from the press, the mounted materials should be cooled under a Bienfang® Weight or plate glass for 30-60 seconds. This improves the bond and keeps the board flat, minimizing the tendency to bow. The weight or glass should entirely cover the mounted materials to prevent denting them.

GLUING

RECOMMENDED ADHESIVES

| Process | Product |
|--------------------------|---|
| Dry Mount Tissues | Bienfang® RagMount Bienfang® ColorMount® Bienfang® Fusion® 4000 Bienfang® BufferMount® |
| Roller Laminator | SEAL® MultiBond™ |
| Films | SEAL® Print Mount® |
| Spray Adhesives | Elmer's Repositionable Mounting Spray Elmer's Extra Strength Mounting Spray |
| Glues | Bienfang® VacuGlue™ 300 Corona Bostik |

Using Bienfang® SingleStep® and Step 150 Foam Board.

This board enhances dry-mount productivity and convenience and is applicable to both mechanical and vacuum presses.

Guidelines for its use are summarized here:

BIENFANG® SINGLESTEP® & STEP 150 FOAM BOARD Specifications Recommended

| Function | Product | Temp/time |
|---|------------|----------------|
| Temperature | SingleStep | 180°F (82°C) |
| | Step 150 | 150°F (00°C) |
| (Mech. Press) Recommended Time* | SingleStep | 2 minutes |
| | Step 150 | 30 sec.-1 min. |
| (Vacuum press) Recommended Time* | SingleStep | 3 minutes |
| | Step 150 | 3 minutes |
| Bond | Permanent | |
| Adhesive pH | 7.0-8.0 | |
| Foam Board pH | 6.5-7.5 | |

NOTE: We do not recommend dry mounting for original art, signed or numbered prints, Ilfochrome® (Cibachrome®) photographic prints or anything of exceptional value. Dry mounting is not intended for archival, conservation or preservation practices.

Laminating

Bienfang® Finish Guard®-UV films are heat-activated laminating films that eliminate the need for glass and prevent fading caused by ultraviolet light. Ideal for ink jet, photographs, and plain paper images.

Mounting and laminating in dry mount presses can be done in one easy step in 5-7min. at 215°F (102°C).

Finish Guard can also be used with roller laminators at 185°-195°F (85°-91°C).

The film comes in five finishes: Lustre, Satin Matte, Ultra Matte, Canvas and Linen. All are lightweight and washable with a damp cloth.

Roller Laminators

Bienfang® Foam Boards, with their ultra-smooth surface papers, are well suited for hot or cold roller laminating equipment.

- For heated laminators, use a heat-activated adhesive
- For cold laminators, use a pressure-sensitive adhesive.

The gap between the laminating rollers should be set to accommodate the thickness of the board being used. Roller pressure, tension, speed and temperature (if applicable) should be set in accordance with the manufacturer's recommendations found in your Owner's Manual.

Most glues work well with Bienfang® Foam Boards for edge-to-edge and surface-to-surface joining. These are the most commonly used glues:

- Hot Melt
- Contact Cement
- Carpenter's Glue
- Craft Glue
- Rubber Cement
- Spray Adhesives

Modeling cements and "super" adhesives should be used with caution. Solvent-based adhesives may react with and damage the polystyrene core.

Edge-to-Edge Applications

Apply a thin coat of glue to one edge and press firmly against the edge of the other piece to be joined. Hot glue will set up almost immediately. Wet glues, which will have variable drying times, require clamping or use of straight pins to secure the edges in place until the glue has dried. Curves, angles and corners should be reinforced with interior supporting ribs, when possible.

Surface-to-Surface Applications

Apply sufficient adhesive for a firm bond and press one surface firmly against the other, using a clamp or weight to maintain good contact between the two pieces. Also, if the surface area is large, you should counter-mount a similarly sized board on the back to prevent bowing. If you use rubber cement or contact cement, be sure to use a slip sheet between the surfaces to prevent accidental gluing before the pieces are properly positioned. Do not attempt to reposition surface-mounted materials after the glue has set. The paper face of the Bienfang® Foam Board will be damaged.

FINISHING

Painting

Bienfang® White Foam Board and PilloCore® Foam Board can be painted to a perfect finish using spray, roller or brush, without any special surface preparation. Suitable paints include flat, semi-gloss and enamel acrylics, poster paints, tempera, acrylic lacquers, latex paints, 3-dimensional and glitter paints. Airbrush inks, India ink, traditional markers and oil paint markers also yield excellent results on the boards' clay-coated paper surfaces.

When applying spray lacquers and enamels, it's best to seal the surface with a light coat initially, then apply a second and even a third coat to assure thorough coverage. If the project will be subjected to frequent handling or other sources of potential soiling, you might want to protect the finish with a clear acrylic varnish.

Flame Control Coatings

You can apply fire-retardant coatings. Two appropriate products are Flame Control 10-10 and 20-20® Flat Latex Fire-Retardant Paints. Both are recommended for Bienfang® Foam Board by the manufacturer, Flame Control Coatings, Inc. If you want to use other products of this type, be sure to get specific fire-retardance data from the manufacturer.

To minimize bowing, apply light coats on both sides to balance the two paper liners.

Decorative Covering

Contact papers, coated papers, wallpapers and fabric can be applied to Bienfang® Foam Board with spray adhesive, contact cement, rubber cement, white glue or dry mounting. As with other processes described in these pages, large size projects should have a counter-mount on the back of the board to minimize bowing.

PROPER HANDLING

Handling

The information summarized here will help you keep your company's Bienfang® Foam Board products in peak condition, both in inventory and in the intended end use.

Storage

- Store Foam Boards flat, not leaning on edge or standing vertically.
- Keep boards in the original shipping box, with the lid closed or store wrapped and sealed on a pallet until delivered to the end user.
- Store away from loading docks and exterior doors.
- Ideally, store in a controlled environment at 68°–75°F (20°–24°C) and at a relative humidity between 45–50% to prevent excessive expansion and contraction of the board's paper fibers.
- Allow approximately 24 hours to acclimate to a new workplace.

Display

- Use structural supports for larger size items to minimize the potential for bowing.
- Keep out of extended exposure to direct sunlight.
- Don't install close to heating and cooling units or sources of moisture.
- Avoid installing near exterior doors or open windows.
- Don't use near an open flame or other ignition source.

If you have additional technical questions, please call our Technical Support Staff Line at 1-888-240-6021.

For basic product information, sales literature or the name of a distributor near you, please call the Service Department: 1-888-240-6021.

WARNING: Bienfang® Foam Board is flammable and may constitute a fire hazard if improperly handled. Do not expose to an open flame or other ignition source.

Elmer's makes no warranty of any kind, expressed or implied, as to merchantability, fitness for a particular purpose, or any other manner with respect to Bienfang® Foam Board. This product is not recommended for outdoor use or for use with solvent-based supplies.

Bienfang®, Black-On-Black®, SingleStep®, Step 150, PilloCore®, MightCore®, are registered brands of Elmer's Products, Inc.

Bienfang Framing Products

A division of Elmer's Products, Inc.
2020 West Front Street
Statesville, NC 28677

Customer Service &

Technical Service:

Tel: 888-240-6021

Fax: 704-871-8671

Hours: 8:00 am – 5:00 pm (EST)

www.elmers.com
www.forframersonly.com
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