

Fabrication

Shipping / Handling*

Abrasion resistant Makrolon® Marine 5 and Makrolon® AR sheets should be shipped to the fabricator on a flat shipping pallet and should not be rolled or bent.

Makrolon® VR can be shipped in either a shipping tube or by flat pallet.

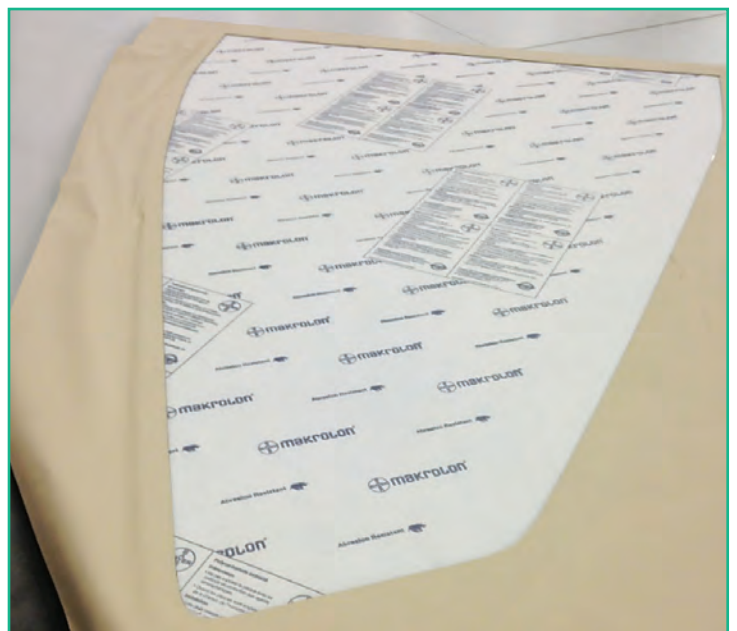
**The protective film masking should remain on the sheet during fabrication. Cut away only enough masking for seam work. Peel the masking back and then trim it off – do not score the sheet and peel the masking. This helps reduce the risk of scratching from the cutting and sewing process. Remove the remainder of masking after enclosure is installed on the boat.*

Cutting

Makrolon sheets can be cut with electric metal shears, tin snips or cutlery grade, carbon steel scissors (e.g. Kai scissor #7280 or Fiskars® 8" Titanium Nitrate Shop Snip for a tight radius). Wiss® Multi-Purpose Snip model A10BS, has an offset for table work.

Edge finishing: Remove burred edges caused by cutter using a deburring tool, a very fine metal file or lightly sand to deburr edges of the sheet along cut lines prior to sewing.

Corners: Remove sharp corners to keep polycarbonate from wearing through the canvas fabric over time.



Sewing

Commercially available, heavy duty sewing machines capable of sewing through polycarbonate are recommended. See machine supplier for brand and model.

General sewing recommendations:

Sewing machine speed: Use a slow feed rate. Top feed preferred – bottom feed will build up polycarbonate plugs/chips dislodged by the needle.

Stitch rate: Average (4) stitches per inch. A faster feed will add excess heat to the sewing needle.

Stitch: Square Feet or Step Stitch are commonly used. Distance from edge of sheet should be $>1/2"$.

Seams: The most popular seams used in canvas tops and covers are: the overlapping seam, the semi-flat felled seam, and the full flat felled seam. Seams can be waterproofed by using acrylic or Mylar® film basting tape. This double-sided adhesive tape bonds well with coarse canvas fabric. Use a soapstone pencil to mark stitching lines. Lines wash away when exposed to water.

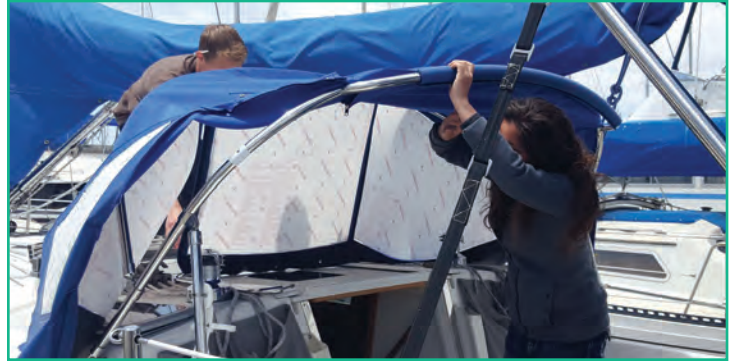
Motor: A servo motor instead of a DC stepper/clutch motor will allow for a more controlled sewing feed rate.

Needles: Groz Beckert needle points – Tripoint size 22,23 or Groz Beckert San 5.2 double grooved. Although diamond tip needles are capable of sewing through polycarbonate (size 20,21,22), they may abrade the weave of the fabric more than tripoints. A more roundly pointed needle will move between fabric fibers versus physically cutting the weave, which may eventually cause the fabric to fray.

Needle Cooling: Using a mini-cooler to blow cold air over the needle will keep it from overheating during long runs.

Thread: Standard choices include Solarfix® and Tenara® PTFE thread.* PTFE thread is commonly used due to the heat buildup in the needle from the sewing process.

*Fabricator is responsible for evaluating thread brand.



Troubleshooting

Thread breakage:

Check for rough metal surfaces within sewing area: needle, needle plate, feed dog, sewing hook or foot. Deburr metal surfaces where needed. Sand down burrs with emery string cord.

- Slow down stitching speed
- Replace worn needle
- Use mini-cooler to cool needle which keeps thread from melting and breaking at the needle due to heat buildup
- Thread can split at needle eyehole. Clean debris from eyehole
- Switch to larger needle

Excess heat buildup within sewing needle:

- Slow feed rate
- Use mini-cooler to cool needle

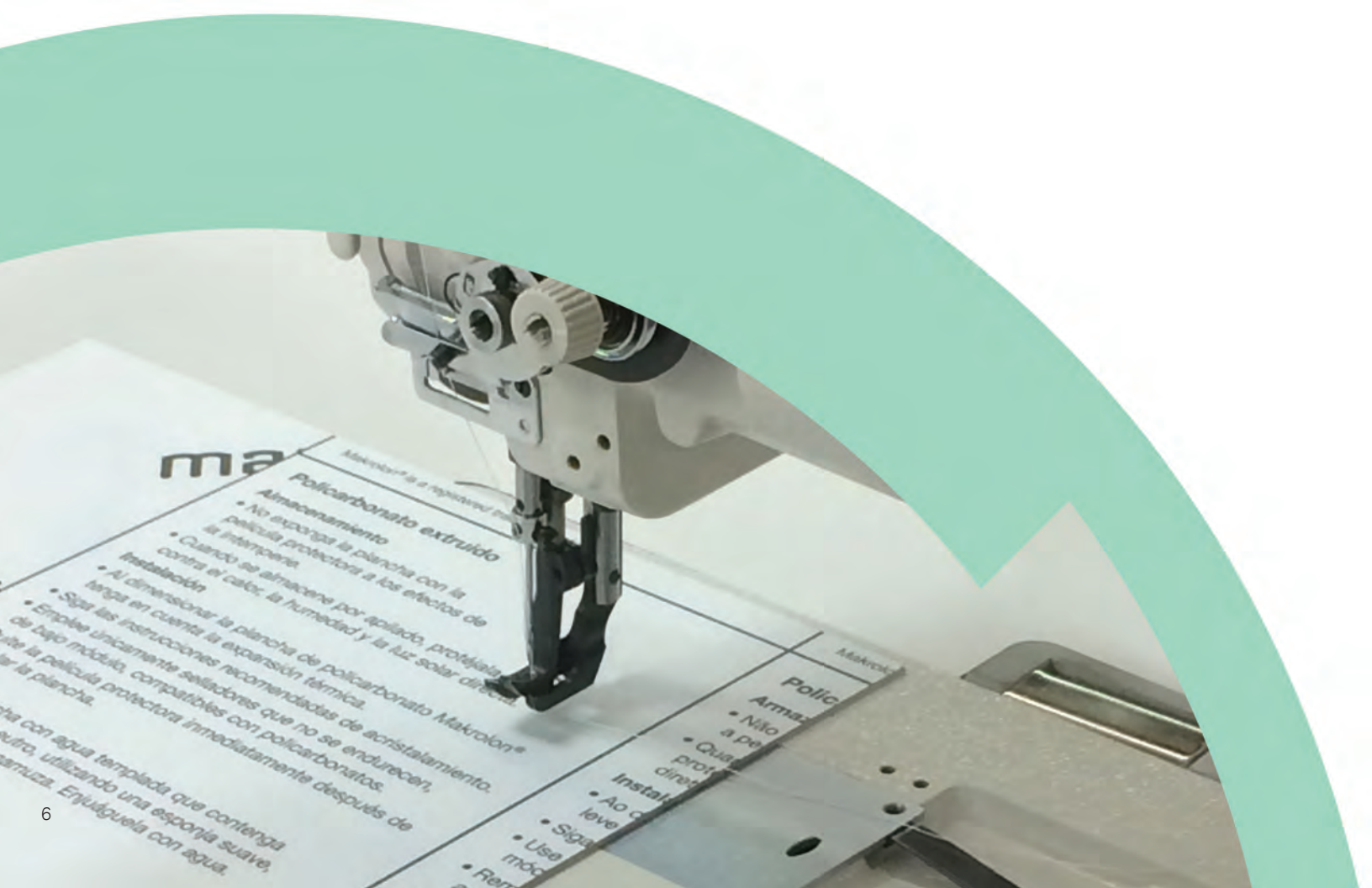
Thread ravel issues:

- Reduce bobbin tension on thread

Additional information on sewing products:

Sloan Machinery Company
www.sloanmachinery.com
Salem, NH 03079
Contact: Sam Sloan
603-893-8883

Consew (Consolidated Sewing Machine Corp.)
400 Veterans Blvd.
Carlstadt, NJ 07072
800-221-8494
212-741-7788
consew@att.net



Cleaning

Makrolon®, like other polycarbonate products, requires careful cleaning to prevent crazing, cracking or yellowing of product. Clean water should be used to wash off grime and loose grit from all panels before cleaning products are applied. Only a soft microfiber cloth, or microfiber sponge should be used to clean Makrolon windows. Avoid squeegees, deck / scrub brushes, scotch pads, paper / shop towels as they can be abrasive and can cause haze or swirls in the sheet. Avoid grit polishes as abrasives can lead to haze and swirls.

Points to remember:

Do not use abrasive cleaners

Do not use high alkaline cleaners (high pH or ammoniated)

Do not leave cleaners sitting on polycarbonate for periods of time; wash off immediately

Do not apply cleaners under direct sunlight or at elevated temperatures

Do not clean polycarbonate with any unapproved cleaners. When in doubt seek guidance.

Using scrapers, squeegees, razors or other sharp instruments may permanently scratch polycarbonate.

Always avoid dry rubbing cleaning polycarbonate, as sand and dust particles clinging to the exterior of the glazing may scratch its surface.

An anti-static canned-air ionizer can reduce electrostatic charge buildup on polycarbonate, consequently reducing dirt and dust buildup that would hinder cleaning.

Photos courtesy of:

Cover: *The Canvas Guy & Mark Mitchell (Boat Owner)*

Page 2 left side, top; left side bottom; right side, bottom: *David's Custom Trimmers*

Page 2 left side, middle: *Alameda Canvas & Coverings*

Page 2 right side, top: *The Canvas Guy & Mark Mitchell (Boat Owner)*

Page 3 left: *Alameda Canvas & Coverings*

Page 3 right: *Marine Tops Unlimited, Inc.*

Page 4 top three right: *Marine Tops Unlimited, Inc.*

Page 5: *Alameda Canvas & Coverings*

Cleaners:

Use only neutral-pH cleaners or those specified to be compatible with Makrolon products. Harsh detergents may damage product. Makrolon marine windows can be cleaned with over-the-counter dishwashing liquids such as Joy® or Palmolive® soaps. Rinse thoroughly with clean water to remove all traces of cleaning products. To prevent water spots, thoroughly dry the product with a dry microfiber cloth or chamois.

Do not apply RainX® or other brands of hydrophobic surface treatments to Makrolon polycarbonate as they may damage window's protective surface.

Waxes and sealants: can be helpful to reduce accumulation of dust / dirt / salt spray and make cleaning easier. Approved products include Meguiar's #10 Clear Plastic Polish & Cleaner, Meguiar's M18 Mirror Glaze® Clear Plastic Detailer, Star Brite® Rain View Wet Weather Visibility Treatment, Golden Eagle Company 303® Clear Vinyl Protective Cleaner, Sumner Laboratories 210® Plastic Cleaner & Polish.

Removal and stowing: Extra handling care should be taken any time when windows are installed or removed. Prior to removal, Makrolon windows should be cleaned and dried thoroughly. Always protect your windows with cloth covers immediately upon removal. Store windows in a location which is not exposed to the elements. If possible lay windows in a flat position. If storing horizontally isn't possible, store in a vertical position where they will not be bumped or damaged. Keep a cloth sheet between windows during storage. We recommend placing a soft non-abrasive fabric such as Evolution® to cover over all exposed window surfaces when not in use. Covering the surface reduces heat buildup and exposure to harmful UV radiation.

All materials should be tested prior to use for compatibility.

Please contact your Covestro representative or the Technical Service Group at 800.628.5084 with any questions, or if you require additional information.

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