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Light Fiber Products

Technical Bulletin

November 2001

Procedure for Cutting and Polishing 3M™ Light Fiber

This procedure is designed to help produce a polished end for 3M™ HL High Luminance Light Fiber; this method can be used in the field with a standard drill.

Supplies

- Greenlee PVC cutter, model 864 or Klein Tools PVC cutter, model 50500.
These can be purchased from Grainger or a similar supply company
- Hand-held power drill (Max < 2500 rpm)
- 3M™ Wetordry™ Polishing Paper, 486Q (30 and 15 micron) and 286Q (9 and 3 micron)
- 3M™ Disc Pad 9159 (sold in the Adhesive Backed 5" Disc Sander Kit, 9176NA)
- 3M™ Reusable Lens Cleaning Cloth or a Scotchbrite™ High Performance Cleaning Cloth

3M™ Wetordry™ Polishing Paper is available through your local 3M Abrasives distributor or via the Internet: http://www.ergate.com/3MFinishingSystems/catalog_wetordry.htm

The product codes are 286Q (3 and 9 micron) and 486Q (15 and 30 micron). These come in packs of 10 each. The 486Q product is there as well.

If necessary, a preliminary step to debur roughly cut fibers can be done by using 3M™ Microfinishing Film (268L) (PSA), PN76977-3, 5" disk, 15 micron. These come in packs of 10 each.

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Cutting Procedure

- The specified PVC cutters are ratchet action cutters that give better cut quality with greater ease than other tested cutters.
- Their ratchet action creates a cut pattern across the fiber face, but they tend to give a smoother cut, with no edge burr.
- There is no need to preheat the fiber to reduce the force required to cut the fiber. Heating the fiber can cause deformation.



Figure 1. Cutting 3M™ Light Fiber

1. Position the fiber in the jaw of the cutter so that the fiber is perpendicular to the blade.
2. Slowly advance the ratchet until the blade contacts the fiber; verify that the fiber is perpendicular and seated at the bottom of the cutter's jaw.
3. Cut the fiber; use a slow cutting action. Advance the ratchet as necessary. Cutting the last portion of the fiber slowly will minimize any burring or fracturing. This will allow faster polishing.

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Polishing Procedure



Figure 2. Portable drill used to polish 3M™ Light Fiber

- The entire polishing process takes about 1 minute.
- Store the abrasive discs on the removable paper backing between polishing steps.
- For field polishing, lay the drill on its side at the edge of a flat surface so that it is easy to guide the fiber end against the rotating abrasive.
- Use a jig, if desired, to ensure that the polished end is truly perpendicular.
- To minimize off-axis polishing, view the fiber end as it contacts the polishing pad (Figure 2).

Polishing Disc Order: **Green → Grey → Blue → Pink**

Set Up: Mount a disc pad in the drill chuck
Apply 3M™ Wetordry™ Polishing Paper to the disc pad

Lubricate: Dampen the pad with several drops of water; spread it out evenly with the palm of your hand.
Water must be applied for each polishing step.

Polish: Hold the fiber 1-2 inches (2.5-5 cm) from the end
Bring the fiber end into perpendicular contact with the rotating polishing pad
Move the fiber end in and out on about the outer 1-2 inches (2.5-5 cm) of the pad
Apply even pressure to the pad while the pad is rotating
Re-dampen the pad as necessary; water lubricates the polishing process
Progress through each polishing grade

Use the coarsest pad to remove material until any big cutting nicks (chips on the edge) or blade lines. This polishing step takes the longest (20-30 sec). It is important to thoroughly remove any cut lines or defects at this stage.

Clean: Use a 3M™ Reusable Lens Cleaning Cloth or a Scotchbrite™ High Performance Cleaning Cloth to remove any debris and water droplets.

The technical information and data, recommendations, and other statements provided are based on tests or experience which 3M believes to be reliable, but the accuracy or completeness of such information is not guaranteed. The user is responsible for determining whether a product or process is fit for a particular purpose and suitable for the user's application.

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Recycled Paper
40% Post-consumer waste paper
10% Post-consumer waste paper

Printed in U.S.A.
© 3M 2001 80-8000-0002-0 Rev.2