

MAKING LEAK TEST PLASTIC STRAW TUBES

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1 Introduction

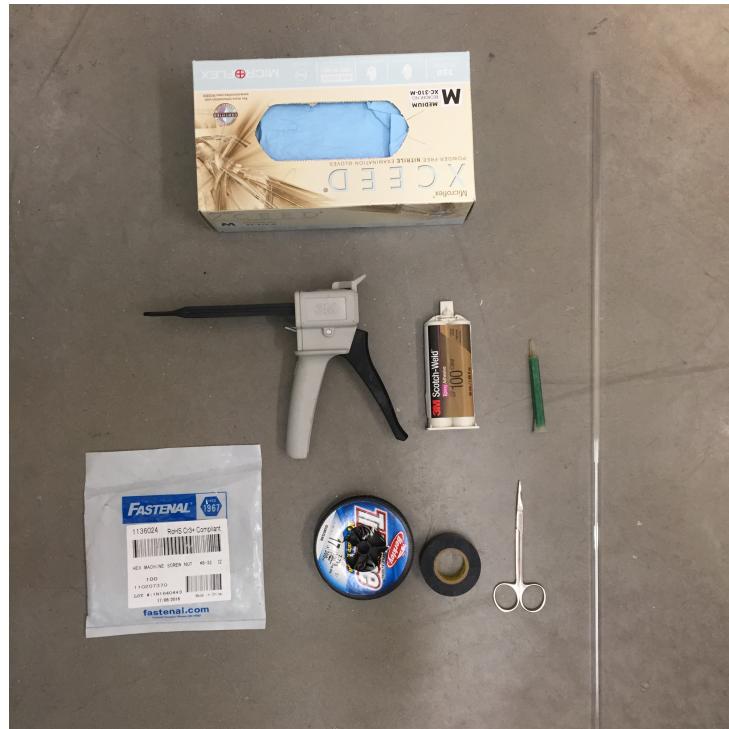
Every straw in the Mu2e tracker is checked for leaks using the leak testing chambers. During these tests, the straws are protected from rubbing against sharp objects by placing them inside of plastic tubes. At the end of the tubes, there is a steel nut attached to a piece of fishing line (Figure 1). The plastic tubes are extracted from the leak testing chambers by grabbing onto this nut with a magnet.



Figure 1: Plastic tube with steel nut tethered to the end used to protect straws during leak tests.

2 Materials Needed

- Plastic tubes
- Nylon fishing line
- #8 hex nuts
- Black electrical tape
- Scissors
- 3M Scotch-Weld DP 100 epoxy
- Epoxy mixing nozzle
- Epoxy gun
- Nitrile gloves



3 Instructions

1. Cut off approximately 6 inches of fishing line from the spool.
2. With one end of the line, tightly tie a square knot around a #8 hex nut (Figure 2). Figure 3 shows how to tie a square knot.



Figure 2: A square knot tied around a hex nut.

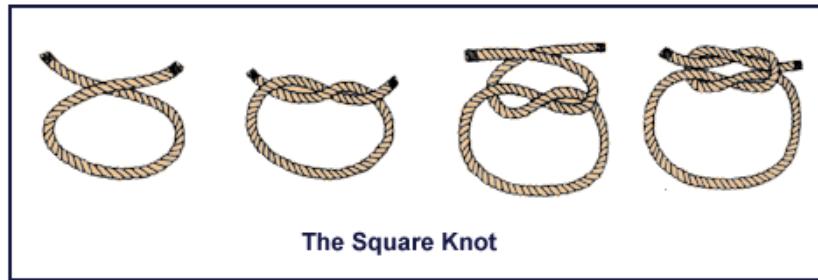


Figure 3: How to tie a square knot. The nut in these instructions should be threaded through the loop in the bottom of the knot.

3. Lay the other end of the line against a plastic tube so that the nut is about 1.5 inches from the end of the tube. Tape the fishing line to the tube at two points, leaving a segment of the line exposed (Figure 4).
4. With the mixing nozzle on the epoxy gun and the epoxy cartridge installed, put a dab of epoxy on the knot around the nut. Also epoxy



Figure 4: The fishing line is placed against the plastic tube and taped at two sections. In between these two sections, the exposed fishing line gets epoxied.



Figure 5: The knot on the nut gets a dab of epoxy applied via the epoxy gun.

the fishing line to the plastic tube on the exposed area (Figures 4 and 5).

5. Lay the tube down so that the epoxy does not touch any surface, and allow it to cure overnight.
6. Once the epoxy has hardened, wrap electrical tape several times around the epoxied area of the tube, and the area that was already taped. **Note:** the taped area must be thin enough to easily fit into the leak test chambers. Look at completed tubes to get a feel of how thick this is.
7. Check that the epoxy on the nut will secure the knot sufficiently. Cut off any excess fishing line from near the nut, as well as after the taped

segment of the tube. The tube should now look like the example in Figure 1.