

# Making Cable Boot

Howard Budd, Daniel Ruggiero

Sep 25, 2008

- PPE items:
  - Nitrile Gloves
  - Safety Glasses
  - Lab Coat
  - Chemical hood, (for spraying the mold release)
  - N2/compressed gas cylinder safety training enquired
  - Follow compressed gas safety procedure
- Equipment
  - 6 Cables to be encapsulated
  - 6 Molds
  - Chiller & 6 plates to chill molds
  - Blue Tape, (3M 8902 2 mil Polyester Composite Bonding Tape)
  - Mold release (Ease Release 200, ER200)
    - Epoxy put in refrigerator overnight to prechilled the epoxy to 60F

- MP 5405 BK-MOD Heigl Epoxy
- Air pressured Henkel Loctite gluing Gun and Henkel Loctite mixing nozzle (98365, 1:1)
- Bottle of N<sub>2</sub>
- Ethyl alcohol
- Ejection strips
  - FNAL Stock number 1130-4480
  - Shrinkable, Irradiated Polyolefintubing, 50 pct shrinkage, 4-ft. lg. Alpha Wire
- Scissors, tongue depressor, scalpel

- Procedure

- Pre-glued and visually inspected cable, see Pre-gluing procedure.
- Atleast 1 hour before making boots, the chiller should be turned on and set to 13C.
- The mold temperature should be at 60F in the center of the mold measured by the LT300 Sixth Sense Infrared Thermometer.
- Connect N2 gas to Henkel Loctite gluing gun
- 6 boots will be molded during this process, so all 6 molds should be prepared using the steps below.
- Prepare mold for booting, clean any debris in the mold and from blocks, Check tape on bottom of mold to be sure the holes are covered.
- Move molds from cooling plates to chemical hood.
- Spray mold with mold release under chemical hood. Wipe off any excess. One spraying of a mold should satisfy 2 boots moldings.

- Place the molds back on the cooling plates and in order of use on the table.
- Insert cable in the mold with beveled connector facing down. Position black tubing at mark in mold. Insert one ejector strips near the black tube.
- Push mold clip holder against connector clip. Hand tighten screws on clip holder.
- Close mold clamps down
- Insert HMP 5405 BK-MOD epoxy cartridge into Loctite mixing gun with mixing nozzle.
- Inject epoxy into mold region starting at the ferrule and working towards the tube. Make sure the epoxy completely covers black tubing and fibers.
- Release any air trapped inside the tube by gently pressing on it.
- Fill mold to almost the top of the mold
- Repeat this process for the other 5 cables and molds
- Wait 12 minutes after filling 1st mold

- Eject 1st cable from boot by pulling up on ejector straps.
  - If boot is stuck, carefully push it from the mold by way of the ejector holes.
- Sequentially remove the other 5 boots in a similar manor.
- Examine boot to see if it is tacky. If not completely hardened, wait until it becomes firm.
- Wipe off boot with ethyl alcohol to remove any residual mold release.
- Cut ejector straps with sissors so that imbedded straps are flush with the boot.

# DDK Clips Preguling Procedure

- PPE items:
  - Safety Glasses
  - Nitrile gloves
  - Lab coat
- Equipment:
  - Cables to be glue
  - Hand press DMA 50 gluing gun
  - Plunger (1:1)
  - EFD pink tip 20 ga
  - Epoxy (MP 5405 BK-MOD)

- Procedure

- Place cables into gluing fixture.
- Hold cables with rope to secure from moving.
- Insert teflon needle from top of the clip and outside fiber, apply epoxy to top of connector carefully until you see it coming out on front of clip.
- Wait 15 minutes and remove cables.
- Inspect all cables; remove any excess epoxy to insure flatness of the clip.
- Repeat as needed.

# Applying fire resistant paint (HCF-688) to boot

- PPE items:
  - Chemical splash goggles
  - Nitrile gloves
  - Face mask
  - Lab coat
- Equipment:
  - Paint stirrer
  - HCF-688 fire resistant paint
  - Cable with boot
  - Tape (3M 8902 2 mil Polyester Composite Bonding Tape)
  - Sponge brush
  - Ethyl alcohol



- Procedure

- Wipe off boot with ethyl alcohol to remove any residual mold release.
- Tape connector face to prevent paint from coming in contact with it.
- Stir HCF-688 paint thoroughly
- Apply paint to boot using a 1” sponge brush. Be careful not to paint connector face.
- Allow paint to dry 4 hours
- Touch up any areas missed.