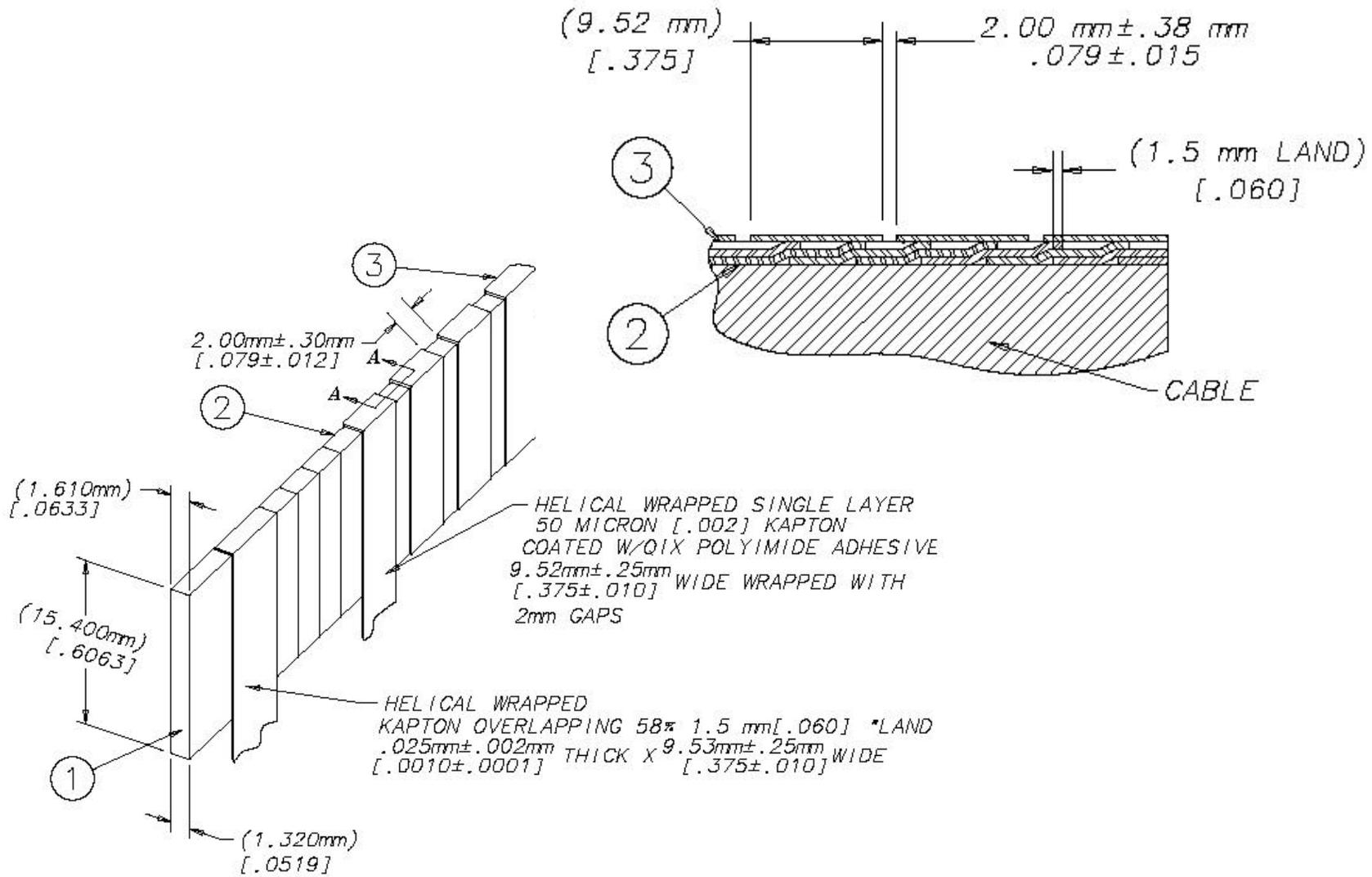
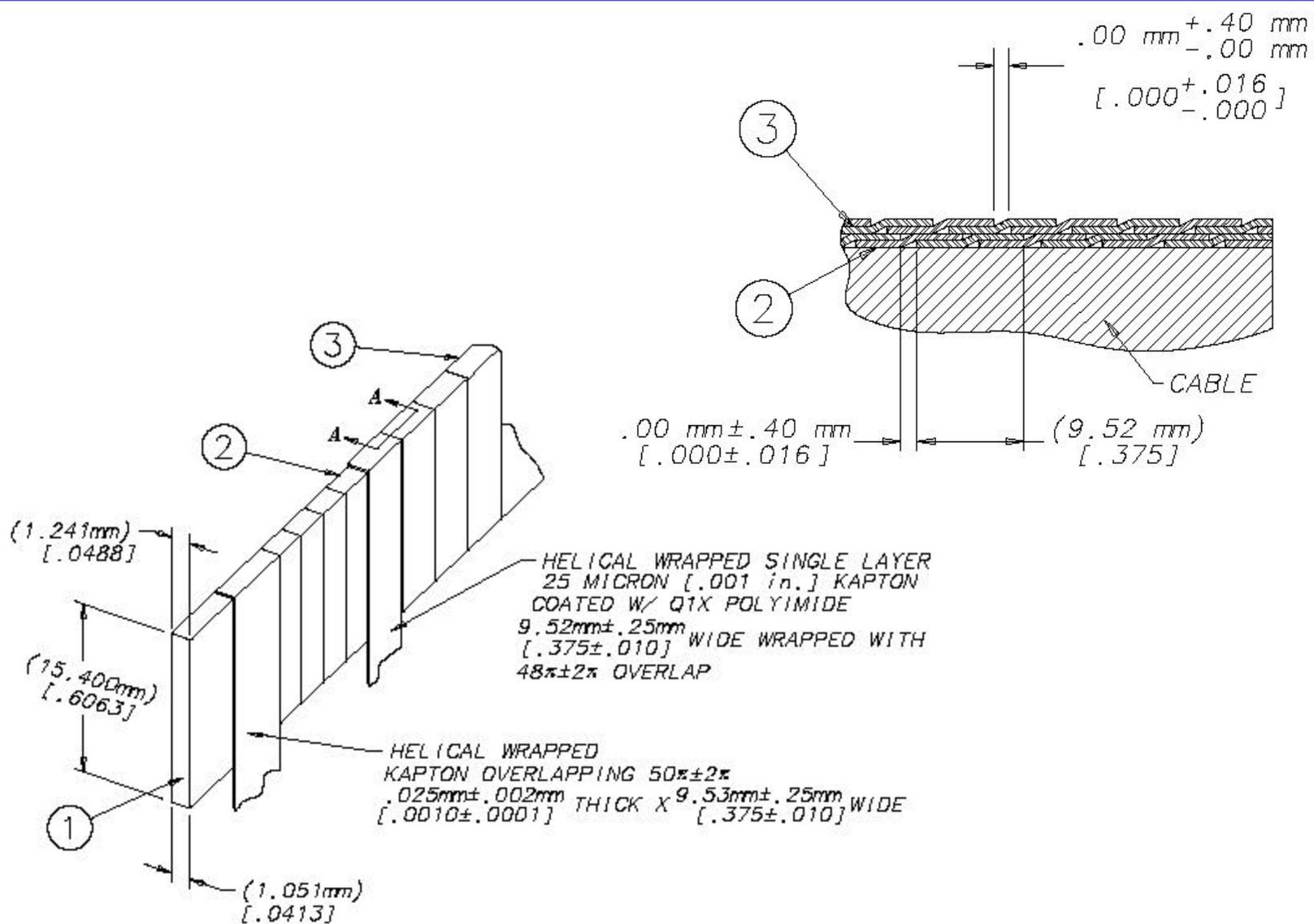

Cable Insulation Status

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- ✍ What LHC MQXB uses (C01 R Q1-Q5 baseline):
 - ✍ Kapton® H, 50% overlap, electrical insulation
 - Recently changed to Kapton® HA (292586) for MQXB16 and subsequent due to stock depletion.
 - ✍ Kapton® LT, barber poll wrap, 2 mil thick, QI X adhesive (180° C cure) for inner coil.
 - ✍ Kapton® LT, 50% overlap, 1 mil thick, QI X adhesive (180°C cure) for outer coil.
 - ✍ What model magnet HGQ05 used:
 - ✍ Kapton® H, electrical insulation
 - ✍ Kapton® LT, barber poll wrap, 2 mil thick, Scotch 2290 epoxy adhesive (135°C cure) for inner coils.
 - ✍ Kapton® LT, 1 mil thick, Scotch 2290 epoxy adhesive (135°C cure) for outer coils.





✍ What's needed for BTeV:

- ✍ 350,000 ft bare Kapton®, type H, 3/8 wide x 1 mil thick (p/n 106723)
- ✍ 67,000 ft Kapton®, type LT, with QI X adhesive, 3/8 wide x 2 mil thick (p/n 369140) (inner coils)
- ✍ 183,000 ft Kapton®, type LT, with QI X adhesive, 3/8 wide x 1 mil thick (p/n 369126) (outer coils)

✍ What's the problem?

- ✍ Kapton® LT difficult to obtain from DuPont. They have raised minimum order quantities & lead times for custom films. Difficult to complete COI R with baseline design.
- ✍ Kapton® shortage due to cell phone industry demand, therefore long lead time for Kapton® H and other films. May last another 12-18 months.
- ✍ Minimum order requirements for QI X adhesive are large (500,000 ft) for I R Quads which uses 250,000 ft including wedges and overages.

✍ Available materials are:

- ✍ Kapton® MT film, like LT film w/ 13% more alumina
- ✍ QI X adhesive with 500,000 linear feet film order
- ✍ CERN quadrupole insulation system.
 - Need to contact Apical for availability.
 - Electrical layer 11 mm wide x .025 mm thick, adhesive layer 9 mm wide x .055 mm thick, cure at 190° C.
- ✍ 40% of 1 mil Kapton® w/QI X & 100% of 2 mil Kapton® w/QI X both from Fraivillig Technologies.
- ✍ 60% Kapton® LT film w/Scotch 2290 epoxy adhesive in IB4.
- ✍ 20% 1 mil Kapton® HA in IB4, 96-120% on order.

✍ Program concerns:

- ✍ Kapton® MT film, like LT film w/ 13% more alumina
 - May increase modulus on an already high E for the outer coil
 - Not tested in an SC magnet at Fermilab.
 - Low risk.
- ✍ QI X adhesive with 500,000 linear feet film order
- ✍ Limited insulation vendors or suppliers
 - CERN quadrupole insulation system by Apical.
 - Fraivillig Technologies only supplier at this time.
 - DuPont has been contacted – long lead times, no promises.
 - Scotch 2290 epoxy adhesive not ordered in over 10 yrs.