

Electrical Quality Assurance

QXFA (QXFS, QXFP) Coil Fabrication

Comments:

- **Hipot tests:**
 - Power the component listed first, keep not tested components floating.
 - Test each Quench Heater separately.
 - Connect the pole segments together (3 in QXFS, 10 in QXFP, 11 in QXFA) to perform Coil to Pole Hipot. Be sure that Inner and Outer pole segments are connected.
 - Set the maximum leakage current threshold to **1 μ A** (10 μ A when 1 μ A does not work). The maximum leakage current must not be exceeded neither during Ramp up nor at Plateau.

Test parameters:

- Coil inductance (LQ) measurements at 20 Hz (unless otherwise specified)
- Coil resistance (R) and VT measurements at 1 A. After Impregnation, connect Multimeter Terminals at **7 inches from the Splice Blocks**.
- Impulse tests with direct polarity (High Outer Layer – Ground Inner Layer) at 500 V, 1000 V, 1500 V, 2000 V and then with 100 V steps up to 2500 V, 2 test pulses applied at each step
- Impulse tests with reversed polarity (High Inner Layer – Ground Outer Layer) at 500 V, 1000 V, 1500 V, 2000 V and then with 100 V steps up to 2500 V, 2 test pulses applied at each step

Pre-Fabrication Tests:

1. Trace Hipot after receiving: 3500 V

Coil Fabrication Tests:

2. Coil winding: ·Real-time monitoring of continuity between coil and parts and mandrel
3. After curing, coil on curing mandrel, OD up: ·Coil RLQ
·Continuity check:
 - coil-to-RE saddles,
 - coil-to-LE saddles,
 - saddle-to-saddle,
 - coil-to-end spacers,

- | | |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4. Before reaction, fixture open, w/o mold blocks and SS shell, OD up: | coil to pole ·Coil RLQ ·Continuity checks: coil-to-RE saddles, coil-to-LE saddles, saddle-to-saddle, coil-to-end spacers, coil to pole |
| 5. Before reaction, After close and flip, fixture open, ID up: | ·Coil RLQ ·Continuity checks: coil-to-RE saddles, coil-to-LE saddles, saddle-to-saddle, coil-to-end spacers, coil to pole |
| 6. After reaction, fixture open, OD up: | ·Coil RLQ ·Continuity checks coil-to-RE saddles, coil-to-LE saddles, saddle-to-saddle, coil-to-end spacers, coil to pole |
| 7. After splicing, OL trace installed, OD up: | ·Coil RLQ ·OL Voltage tap & OL Heater resistance |
| 8. After fixture bolted closed, OD up: | ·Coil RLQ ·Continuity checks coil-to-OL Heaters |
| 9. After flip, fixure open, ID up: | ·Coil RLQ ·Continuity checks: coil-to-RE saddles, coil-to-LE saddles, saddle-to-saddle, coil-to-end spacers, coil to pole |
| 10. After IL trace installed, ID up: | ·Coil RLQ ·IL Voltage tap & IL Heater resistance |
| 11. After fixture bolted closed, ID up: | ·Coil RLQ ·Continuity checks coil-to-IL Heaters |
| 12. After impregnation, fixture open, OD up: | ·Coil RLQ ·Continuity checks: coil-to-RE saddles, |

- coil-to-LE splice blocks,
- coil-to-OL Heaters,
- saddle-to-saddle,
- OL Heaters-to-saddles,
- coil to pole,
- pole segment to pole segment
- OL Voltage tap & OL Heater resistance

13. After flip, ID up:

- Coil RLQ
- Continuity checks:
 - coil-to-RE saddles,
 - coil-to-LE splice blocks,
 - coil-to-IL Heaters,
 - saddle-to-saddle,
 - IL Heaters-to-saddles,
 - coil to pole,
 - pole segment to pole segment
- IL Voltage tap & IL Heater resistance

/ Steps 12 and 13 can be reverse depending on the process*/*

14. Before shipping, coil in the crate on shipping
Mandrel, OD up:

- Coil RLQ (20 Hz, 100 Hz, 1000 Hz)
- Continuity checks:
 - coil-to-structure,
 - heaters-to-structure,
 - coil-to-RE saddles,
 - coil-to-LE splice blocks,
 - coil-to-heaters,
 - saddle-to-saddle,
 - heaters-to-saddles,
 - coil to pole,
 - pole segment to pole segment
- Voltage tap & Heater resistance
- Hipots:**

| | |
|----------------------------|--------|
| QH to Coil | 3200 V |
| Coil to Pole | 500 V |
| Coil to Endshoes (all) | 1000 V |
| QH IL to Endshoes IL | 2500 V |
| QH OL to Endshoes OL | 2500 V |
| Endshoes IL to Endshoes OL | 1000 V |
- Impulse tests** (Direct and Reverse)

15. After receiving, coil in the crate on shipping
Mandrel, OD up:

- Coil RLQ (20 Hz, 100 Hz, 1000 Hz)
- Continuity checks:
 - coil-to-structure,

heaters-to-structure,
coil-to-RE saddles,
coil-to-LE splice blocks,
coil-to-heaters,
saddle-to-sadle,
heaters-to-saddles,
coil to pole,
pole segment to pole segment
·Voltage tap & Heater resistances.

16. After receiving, coil on Wooden Table

·Hipots:

| | |
|----------------------------|--------|
| QH to Coil | 3200 V |
| Coil to Pole | 500 V |
| Coil to Endshoes (all) | 1000 V |
| QH IL to Endshoes IL | 2500 V |
| QH OL to Endshoes OL | 2500 V |
| Endshoes IL to Endshoes OL | 1000 V |

·Impulse tests (Direct and Reverse)