

Government of India
Ministry of Railways
Research, Designs & Standards Organisation
Manak Nagar, Lucknow - 226 011

No. EL/3.2.5

Dated 03.02.1995

SPECIAL MAINTENANCE INSTRUCTION NO.RDSO/ELRS/SMI/170

1. **Title :**
Check on the main pole and interpole coil or TAO- 659 Traction Motors.
2. **Application :**
All electric locomotives fitted with TAO- 659 Traction Motors.
3. **Object :**
To minimise main pole and interpole coils failure during service.
4. **Procedure :**
Following paragraphs describes the special check are to be adopted on the manufacturing repairs of TAO-659 Motor -Traction.
 - 4.1 In order to prevent the interpole and main pole coils earthed, following checks on spring and spacers shall be made
 - i) Check the free height of spring it should not be less than as specified in drawing.
 - ii) Load for specified deflection should be checked.
 - iii) Width and thickness i.e. dimensions.
 - iv) Deflection is to be kept, at 7 mm, and there should not be any permanent set.
 - v) Check for the correct material of the spring
 - vi) Check the hardness it should be between 350 to 475 HV
 - vii) Stiffness of the spring should not be less than as specified in the drawing.
 - 4.2 Spring characteristics should be verified as para 4.1 during the purchase and during the repair of the stator coils or cores.
 - 4.3 Spring support plate(CLW Drg.NO.3TW.D.092-080) should be provided with a lip on both ends instead of only one and to prevent spring to be worked out. The lip should be 40 mm in length and 2.2 mm in height.
 - 4.4 Adopt proper method of brazing of pins on support plate (Drg. No.3TWD 042.016) and in order to increase the strength of the brazed joints between the pins of the plate, the whole should be counter bored and then brazed. In view of this drilling of the holes should be done on a Jig so that the pins fit easily and quickly into the holes on the L plates.
 - 4.5 To prevent failure of IP & MP coils due to loosening of fixing screws following dimensional accuracy must be checked before fixing the screw.

- i) Screw would not be too long.
 - ii) tapered hole should not be too small
 - iii) all pins and washers should be fixed of correct thickness whenever is needed.
 - iv) All screws should be tightened fully to the specified torque.
 - v) There must be a clearance of 2 mm between screw ends and bottom of tapped and hole when screws are in fully tightened condition.
- 4.6** Carry out the HV test at 50 Hz for one minute on the manufactured coils, in fixtures, which simulate service condition, for ascertaining the healthiness of the insulation adopted on the coil.
- 4.7** In case it is noticed that the coil insulation has been damaged due to vibration, overhauling etc. then 'NOMEX'/'GMGS' liners may be provided between the coils and poles. However, precaution should be taken this insulation of 'NOMEX' or 'GMGS' does not go between the cores and stator frame. Also care should be taken that the same insulating varnish is used on NOMEX/GMGS which has been used for the impregnation of the coils.
- 4.8** Do not use 'gas flame' in brazing of IP and 'MP' coil connection
- 4.9** All brazing in stators should be done by electric brazing. The brazing current should be kept sufficiently high to ensure that brazing is completed within the time limit specified in Alstom IFC.
- 4.10** However, if it is found unavoidable to use under para 4.8 the gas flame during brazing due to non availability of electric heating facilities, the following precaution should be taken while using gas brazing.
- i) The flame from the oxy-acetylene torch should be adjusted to be about 200 mm long so that the tin is light blue or practically colourless.

- ii) Only the outermost part (about 60 mm in length) of the tip should be used for heating the copper. The other parts of the flame must not come in contact with copper. This precaution is important as only the tip of the flame would be neutral and without any traces of hydrogen.

4.11 Conduct the surge tests at 5 kv by a “surge tester” between IP busbar and earth (or stator casting), during AOH/IOH/POH.

4.12 Coils which fail in the surge test under para 4.11, should be replaced and while during so all checks as mentioned under para 4.1 to 4.11 should be implemented.

5.0 **Drawing/Sketch No.** NIL

6.0 **Agency for Implementation :**

All Electric Loco Shed and Shops of Indian Railways.

7.0 **Periodicity of Implementation :**

- i) During every AOH/POH/IOH for surge test as para 4.11 and 4.12
- ii) When IP & MP coils are manufactured or repaired.

8.0 **Reference :**

Reliability Engineering Study on electric locomotive Part-2 for stator coil failures (Specially para 5 to 9)

9.0 **Distribution :**

As per enclosed list.



(R. K. Kulshrestha)

for Director General/Electrical

DA: As Above.