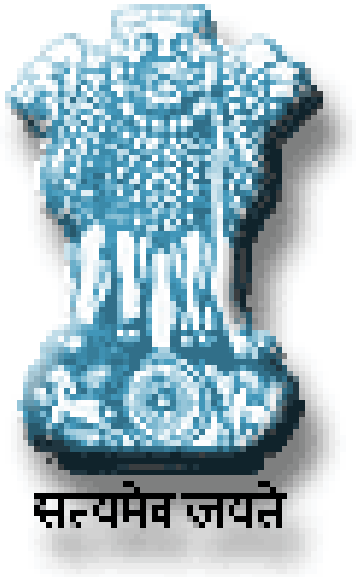

PRECAUTIONS IN MANUFACTURING OF PLUG-IN TYPE (METAL TO CARBON) RELAYS

Version 0

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Title of Document **Precautions in Manufacturing of Plug-in Type (Metal To Carbon) Relays**			
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Abstract This document defines the Precautions in Manufacturing of Plug-in Type (Metal To Carbon) Relays			

DOCUMENT CONTROL SHEET

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AMENDMENTS

Version	Chapter/Annexure	Amendment	Effective date
0	-	First issue	**04-12-2009**

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1. FOREWORD

1.1 This document is issued under the fixed serial No. RDSO/SPN/198/2009 (Draft). The final number indicates the year of issue or, in the event of revision, the year of last revision.

1.2 This document is intended primarily to lay down the precautions in manufacturing of plug-in type (Metal to Carbon) signalling relays and does not include all the necessary provisions of a contract.

2. SCOPE

2.1 Various types of plug-in type (Metal to Carbon) relays are manufactured as per specification of BRS:930 series. These relays are non-proved type using metal and carbon contacts. A number of steps have been taken in the recent past to ensure manufacturing of proper quality relays. Although, these steps have been circulated to all relay manufacturers from time to time, the same are now summarized in this document. These precautions are to be ensured by all relay manufacturers of plug-in type (Metal to Carbon) relays in addition to the relevant specification applicable for the relay being manufactured by them.

3. REFERENCES

3.1 This document requires reference to the following Indian Railways Standard (IRS) specification, Indian Standards (IS) specification & British Railways Specifications (BRS):-

BRS:930 series	-	Specifications for various Miniature Tractive Armature Plug-in type Relay for Railway Signalling purposes
IRS:S 23-1988	-	Electrical Signalling and Interlocking Equipment
IRS:S 34-1968	-	Testing of Railway Signalling Relays (General)
IS:1070-1992	-	Reagent Grade Water
IS:1359-1992	-	Electroplated Coating of Tin
IS:1572-1986	-	Electroplated coating of Cadmium on Iron & Steel
IS:2036-1995	-	Phenolic Laminated Sheets

3.2 Wherever in this document, any of the above mentioned specifications is referred to by numbers only without mentioning the year of issue, the latest issue of that specification is implied; otherwise, the particular issue referred to is meant.

4. TERMINOLOGY

The terminology referred to in this document is covered by the definitions given in the specifications referred in Clause 3 of this document.

5. CADMIUM PLATING ON MAGNETIC COMPONENTS

5.1 Cadmium plating to Grade FE/CD 12" as per IS:1572/1986 (Table 1) on magnetic components shall be done. Electro-plating thickness on two relay samples shall be checked and it shall not be less than 12 Microns.

6. TIN PLATING OF PLUGBOARD CONNECTOR

6.1 Electroplated coating of tin of minimum thickness of 10 micrometer as per IS:1359:1992 on plugboard connectors shall be adopted to avoid problem of corrosion/sulphation of plugboard connectors.

7. BREAKAGE OF OPERATING ARM/ADJUSTMENT CARD

7.1 To avoid the problem of breaking of operating arm/adjustment arms, phenolic laminated sheet shall be heated up to 100^{o}C before punching.

8. MELTING OF OPERATING ARM/ADJUSTMENT CARD

8.1 To avoid the problem of melting of operating arm/adjustment card, only phenolic laminated sheet of grade F2/P3/P4 of IS:2036 is to be used for operating arm/adjustment card. Moulded plastic material shall not be used for operating arm/adjustment card.

9. PREVENTIOIN OF INGRESS OF ANTS

9.1 It is noticed that most probable place for ingress of ants is the gap at the top end of four stacks of moulded relay base, which can generally be taken care by improved tools for moulding and workmanship so that no gaps are left for ants to enter. It shall be ensured that no gaps are left for ants to enter at other probable places also.

9.2 Tolerance in various mouldings to be controlled by manufacturer and any excess opening shall be covered by adhesive from base side.

10. ANNEALING TEST ON COVERS

10.1 This is the test to ensure proper annealing of the relay covers. It shall be carried out on the annealed covers as per procedure given below:-

(i) Sample cover shall be immersed completely for 15 second in carbon Tetra-Chloride solution.
(ii) After removal, it shall be allowed to dry for 3 to 5 minute at room temperature.
(iii) There shall be no crack observed on the sample relay covers.

In case any crack is found, all the covers in the lot shall be re-annealed.

This test shall be done on minimum 2 cover per 100 relay offered subject to maximum of 10 covers.

11. IDENTIFICATION MARK ON PLUGBOARD

11.1 Identification mark shall be engraved on plugboard to identify plug-in type (Metal to Carbon) relay manufacturer.

12. IDENTIFICATION MARK ON PLUGBOARD CONNECTORS

12.1 Identification mark shall be engraved on plugboard connector to identify plug-in type (Metal to Carbon) relay manufacturer.

13. OTHER PRECAUTIONS IN MANUFACTURING

13.1 After soldering the SIG contact and silver tip, the contact spring shall be cleaned by a suitable brush with solvent like trichloroethylene/ isopropyl alcohol.

13.2 Two stage cleaning of contact spring assembly after soldering of contacts shall be done. In the first stage, washing with solvent and then washing with water vapour in vapour degreasing plant shall be done. This shall be followed by drying in hot air.

13.3 Cleaning solvent shall be frequently changed.

13.4 Only triple distilled water of Grade 3 or better as per IS:1070:1992 to be used for cleaning.

13.5 Stored distilled water is prone to contamination, therefore, one stage of distillation shall be done just before use for cleaning of contact springs.

13.6 Temperature control for soldering arrangement shall be provided to avoid excessive heating of the SIG contacts.

13.7 Non-corrosive flux shall be used in soldering of SIG/silver contact.

13.8 Staff doing soldering shall be trained by manufacturers to ensure proper soldering practices.

13.9 De-soldered contacts on account of rejection of the spring or otherwise shall not be reused. Rejected springs and SIG contacts shall be destroyed under the supervision of RDSO.

13.10 Clean white hand gloves shall be used by workers during assembly.

13.11 The assembly line shall have air-conditioned environment.

13.12 Frequent life test/extended life tests for self assessment shall be undertaken by relay manufacturers.

13.13 Relay manufacturers shall ensure 100% test of all parameters after complete assembly and manufacturer's Quality Assurance Cell shall carry out checking of all relay acceptance parameters before offering to RDSO.

13.14 The relays manufacturer shall ensure quality audit of suppliers of sub-assemblies/component at least once in a year and submit report to RDSO.

14. PRECAUTIONS RELATED TO SIG CONTACTS

14.1 Only RDSO inspected SIG contacts shall be used.

14.2 SIG contacts shall be tested at the sampling rate of 5% of each lot at incoming stage by the relay manufacturer.

14.3 The relay manufacturer shall also ensure that each manufactured relay is properly identified with the batch No. of SIG contacts (containing approximately 10,000 contacts).

14.4 From every batch of 10,000 SIG contacts received from SIG manufacturers, 2 relays to be first manufactured out of SIG contacts selected at random and identified suitably by RDSO inspecting officials.

14.5 Out of these two, one relay shall be put on endurance test (Sr. No. to be noted by RDSO and verified before commencement of the test) at the rate of 400 operations/day for 30 days. The other relay shall be stored for a period of 30 days.

14.6 The assembly & testing of remaining relays manufactured with same batch of SIG contacts shall commence after parameters of these two relays are observed to be under specified limits after 30 days.

14.7 Final Inspection Certificate for relays shall be issued only after documenting traceability details (SIG contact batch and serial number of relays) in test reports.

15. LABELING AND MARKING OF RELAYS

15.1 The requirement of labeling and marking of plug-in type (Metal to Carbon) relays are specified in Cl. 22 of BRS:930 series specifications, which covers the details of information to be given on nameplate of the relay. The details on the label of relay shall be clear and printed/stamped appropriately to ensure that details do not get erased/faded away during the usage of the relay.

16. PACKING OF RELAY

16.1 To avoid exposure of relays once plugboard and connectors have been taken out for wiring etc., plugboard with connectors should be separately packed and kept in the same carton with proper identification along with relays.

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