

Chapter 7

POTTING TECHNIQUES

LIST OF APPENDICES

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1. Plugs and sockets are prone to ionisation at high altitude and are not proof against the ingress of moisture. Mechanical weakness is a further disadvantage, as the soldered joints on the pins frequently break due to the cables attached to them flexing during vibration and during servicing. These troubles can be alleviated by potting, or, as it is sometimes called, back sealing. Details of different methods of potting connectors are given in appendices to this chapter.

2. Potted connectors fitted in aircraft should be examined periodically for evidence of damage or corrosion and security of cable terminations. Potting compound should be inspected for sound adhesion and evidence of deterioration.

Note . . .

Attention is drawn to the precautions detailed in the appendices to this chapter to protect personnel from toxic vapours or the irritant effect on skin or eyes of the chemicals used during potting operations.

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1. The first part of the report is a summary of the work done during the year.

2. The second part of the report is a detailed account of the work done during the year.

3. The third part of the report is a summary of the results of the work done during the year.

The first part of the report is a summary of the work done during the year. It is a brief overview of the work done, and it is intended to give the reader a general idea of what has been accomplished. The second part of the report is a detailed account of the work done during the year. It is a more in-depth look at the work, and it is intended to give the reader a more complete picture of what has been accomplished. The third part of the report is a summary of the results of the work done during the year. It is a brief overview of the results, and it is intended to give the reader a general idea of what has been accomplished.

Appendix 1

ARALDITE

Introduction

1. Moisture can be excluded from plugs and sockets by the application of an epoxy resin to the back of the plug or socket. The addition of a plasticizer makes the seal flexible. The epoxy resin is supplied in three parts, namely, Araldite MY750 (Ref. No. 33H/943-7396), Plasticizer DY041 (Ref. No. 33C/1526) and Hardener HY951 (Ref. No. 33H/42). These three parts are all liquids, the MY750 and DY041 are supplied in 1 lb. tins and the HY951 in a 2 oz. bottle.

Preparation

2. The plug or socket to be potted should be placed in a jig, which can consist of the appropriate panel mounting component firmly secured to a wooden framework, and arranged so that the outlet bore is vertical. All the components of the plug or socket should be tightened and the threads and joints smeared with silicone grease (Ref. No. 34B/9100519) to avoid the resin interfering with the normal use of the plug or socket after potting.

3. A Mk. 4 plug or socket with a tight cable loading, i.e. little or no space between the neck of the shell and the cables, may have an $\frac{1}{8}$ in. hole drilled in the outlet to facilitate potting. Care should be taken to remove the swarf after drilling and the hole should be plugged with adhesive P.V.C. tape after potting. Illustrations of Mk. 4 plugs and sockets can be seen in A.P.4343C, Vol. 1, Book 3, Sect. 5, Chap. 8.

4. Some types of plugs and sockets are supplied with a polythene mould. When it is desired to remove this mould after potting, it can be cut and used again; celo tape being used to hold the severed edges in place. A release agent such as silicone grease will make the removal of the mould easier.

5. The plug or socket to be potted must be

perfectly clean, otherwise the resin will not adhere.

Precautions

6. This work should be done in a well ventilated area as the plasticizer has a strong smell. The hardener and the uncured mixture of hardener and resin can be harmful to sensitive skins and care should be taken to prevent contact between these materials and the hands or other parts of the body. A suitable barrier cream such as silicone grease (Ref. No. 34B/9100519) should be used.

Quantities

7. It is important to weigh the quantities accurately in the following ratio:—

MY 750	100 parts by weight
DY 041	100 parts by weight
HY951	10 parts by weight

Mixing

8. The resin and plasticizer are mixed together thoroughly at a temperature of approximately 20 deg. C in a polythene container. The hardener is then added, being stirred thoroughly into the resin-plasticizer mixture for about three minutes. The useable life of the mixture is about a half to one hour at room temperature, therefore only the required amount should be mixed.

Filling

9. The mixed resin can usually be poured into the top of the outlet or mould, but in the case of a small plug or socket or one with a tight cable loading, it may be necessary to use a polythene gun (Ref. No.) to apply the mixture. The time required for the resin to cure is approximately 24 hours at 20 deg. C.

Cleaning

10. Containers and other implements can be cleaned with acetone (Ref. No. 33C/1156) before the resin has cured. If the mixture has

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hardened on a polythene container, it can be broken off as it does not adhere to polythene.

Storage

11. The resin, hardener and plasticizer must be stored separately in a cool dry place. The resin and the plasticizer require cool storage and the hardener will deteriorate with the ingress of moisture. If the containers are kept firmly stoppered when not in use, the contents have a shelf life of at least twelve

months. The hardener will turn bright green or cloudy if it is allowed to absorb moisture.

Replacements

12. Should a potted plug or socket become unservicable, it is impracticable to remove the potting compound, the cables to the plug or socket must be cut and a new plug or socket complete with short lengths of cables fitted with in-line connectors as described in Chapter 5 of this section.

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Appendix 2

PR1201 Q

Introduction

1. Potting compound, Type PR1201Q, is a two component synthetic rubber compound suitable for use on plugs and sockets. The compound cures at room temperature, without the addition of heat, to a firm solid rubber after the addition of the accelerator. Mixing should be done only when the work is ready for potting. The base compound is white and the accelerator a red-brown colour. The contrast in colour between the two materials is important, since it visually indicates when the accelerator is thoroughly blended into the base compound. The mixed material should be a homogeneous pinkish-brown colour free from streaks.

2. The cure of this compound is entirely chemical and does not depend on exposure to air, therefore it can be applied in any desired thickness.

3. PR1201Q is supplied in a set comprising two separate tins containing base compound and accelerator respectively. Two sizes of set are available, namely, $\frac{1}{2}$ pint set (Ref. No. 33H/124) and $\frac{1}{2}$ pint set (Ref. 33H/2202074).

Preparation

4. All surfaces to which the compound is to be applied should be cleaned with a brush or cloth dipped in white spirit; the surface should then be dried with a clean cloth before the solvent evaporates.

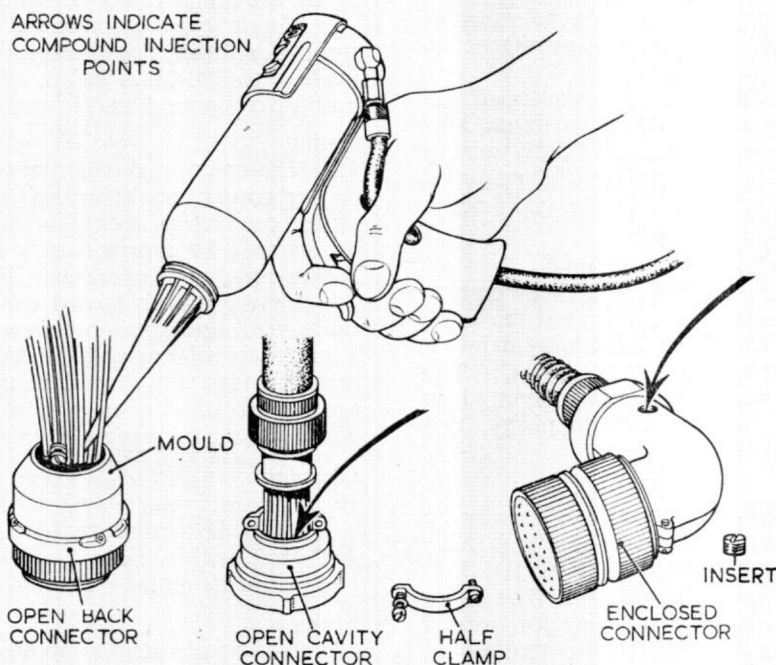


Fig. 1. Methods of injecting compound

5. The potting of three typical connectors is illustrated in fig. 1 as follows :—

(1) An enclosed connector in which the cables are clamped at the rear to form a closed cavity; the potting compound is injected through a hole in the cavity wall.

(2) An open cavity type connector in which an open cavity embodies the cables and tags; the compound is injected into the back of the connector until the cavity is filled.

(3) An open back connector with no

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cavity wall. Potting is effected by fitting a polythene mould to the back of the connector and filling the mould.

Precautions

6. This potting compound is highly inflammable and gives off a toxic vapour. Smoking and naked lights should be prohibited within the area used for potting operations and personnel should use a barrier cream to protect the skin.

Mixing

7. Proper mixing and correct proportions are extremely important if maximum results are to be obtained. Each set has two tins, the contents of which are in proportion of one part, by weight of accelerator to ten parts by weight of base compound. If mixed in quantities other than the total contents of the tins, the compound and accelerator should each be thoroughly stirred, prior to weighing, to ensure even distribution of the chemical contents.

8. The contents of the two separate tins should be mixed as follows:—

(1) Thoroughly stir the accelerator in its container until an even consistency is obtained.

(2) Add all the accelerator to all the base compound and slowly stir until an even colour is obtained. Slow mixing by hand or by mechanical mixer is recommended; a high speed mixer should not be used.

9. After mixing, the compound has an application life dependent upon temperature and humidity and should be used the same day unless facilities are available to maintain it at a temperature below 0 deg. C. The working life of the mixed compound is shortened by heat or high humidity, and lengthened by cold.

Filling

10. The mixed compound can usually be poured into the connector but a polythene pressure gun (Admy. Patt. No. B11H (0278) 18363) can be used if necessary. The $\frac{1}{16}$ in. nozzle is the recommended size for normal operations. The connector to be potted should be laid on a flat surface and the compound injected as described in para. 5 and shown in fig. 1.

11. If the connector is of split shell construction, i.e. comprises two sections clamped or bolted together, one portion of the shell should be removed to provide access for direct injection to the connector terminals. The shell should then be re-assembled, the insert removed and the injection continued

until the compound extrudes from the injection hole. The connector should then be suspended face down for ten minutes to allow the compound to flow towards the tags. Following this suspension further potting compound should be injected into the connector if space is available.

12. Open cavity type connectors should be filled with compound and suspended face down for ten minutes. Any cavity formed while the connector is suspended should be topped up with compound.

13. A polythene mould should be fitted to open back connectors and fixed to the shell with transparent or P.V.C. adhesive tape. The cavity formed by the mould should be filled and the connector allowed to stand for ten minutes after which further compound should be added if necessary.

14. All surplus compound should be removed from the connectors with a cloth moistened with methyl-ethyl-ketone (Ref. No. 33C/1322). When the compound has cured, the moulds may be removed from the open back type connectors, cleaned and stored for future use. These moulds may be used up to 300 times before adhesion to the potting compound makes removal difficult.

Curing

15. The compound will cure to a firm solid rubber consistency at normal room temperature; connectors should be suspended face downwards for approximately 12 hours. The curing time can be reduced by suspending the connectors in a heated cabinet provided the temperature does not exceed 54.5 deg. C. Temperatures in excess of 54.5 deg. C are not recommended since residual solvent in the compound will be evaporated causing the cured sealant to become porous.

Cleaning

16. All equipment and tools should be cleaned with methyl-ethyl-ketone after use and dried with a clean cloth. Cured compound can be pulled off.

Storage

17. Non-accelerated compound has a short shelf life under normal conditions of temperature and humidity. The shelf life may be extended up to 12 months if the sets are stored in a cool dry place.

Replacements

18. A defective potted connector should be replaced by a servicable potted connector complete with suitable lengths of the correct types of cable, using in-line connectors as described in Chapter 5 of this section.

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Appendix 3

PR 905

Introduction

1. PR905 is a fluid, two part, potting compound which is cured at room temperature to a tough semi-flexible resin. This material has a low volume shrinkage and good electrical and physical properties over a temperature range of -53.9 to $+148.9$ deg. C. (-65 to $+300$ deg. F.). The cured resin has good resistance to non-oxidizing acids, alkali salt solutions, petroleum and ester base hydraulic fluids.

2. The mixing of this compound, should not be done until the work is ready for potting. The base material is transparent light amber in colour and the accelerator is transparent amber. The mixed compound should be transparent dark amber.

3. PR905 is supplied in a pre-measured kit comprising two separate containers, one with the base material (Part B) and the other with the accelerator (Part A). The $\frac{1}{4}$ pint kit (Ref. No. 33H/230) is the only one available in the Services although larger kits are manufactured.

Preparation

4. All surfaces to which the compound is to be applied should be free from grease, oil and wax. Using a small brush or oil-free cloth, cleaning can be accomplished by using an oil-free solvent, such as trichlorethylene, which will dissolve oil and wax. Wash one small area at a time, then dry with a clean cloth before the solvent evaporates. Always pour the solvent on to the washing cloth to maintain a clean supply of solvent. Cable insulation and inserts should not be exposed to the cleaning solvent beyond the time necessary for adequate cleaning. It is preferable to clean rubber or plastic covered cables with a dry clean cloth and only remove oil, grease, etc., with a solvent damp cloth and dry immediately with a dry clean cloth.

5. Care should be taken to ensure that where soldered terminals are used, all flux is removed. A parting agent, such as silicone grease (Ref. No. 34B/9100519) can be applied to the threads and joints of a connector to avoid the potting compound interfering with the normal use of the connector after potting.

Precautions

6. The uncured components of PR905 may produce irritation following frequent and prolonged contact with the skin, eyes or clothing. Avoid breathing the vapours. When handling the components of PR905 chemical-type goggles, protective hand cream and rubber gloves should be used. If either Part A or Part B contacts the skin, wash the area thoroughly with soap and water.

Note . . .

If any compound contacts the eyes or if skin irritation persists, obtain medical attention immediately.

7. This work should be done in a well ventilated area as PR905 has an obnoxious smell when mixed. As the mixing of Part A with Part B causes an exothermic reaction, i.e. the mixture will heat up, quantities in excess of $\frac{1}{2}$ pint should not be mixed in a container unless adequate cooling facilities are available during mixing.

Mixing

8. Proper mixing and correct proportions are extremely important if maximum results are to be obtained. PR905 is supplied in two-part premeasured kits. Each kit has two containers, the contents of which are in the proportion of twelve parts of Part A to eleven parts of Part B. The kits are designed so that adequate space is available in the Part B container for the addition of Part A and for mixing. If mixed in quantities other than the total contents of the containers, either weight or volume measurement may be used to obtain the required ratio, which is 12:11 (Part A : Part B).

9. Pour Part A into Part B and mix thoroughly. Slow mixing by hand or by a mechanical mixer is recommended; a high speed mixer should not be used as it will generate internal heat and reduce the application life. The mixing time will vary depending upon the quantities used, but the mixing should continue until a uniform consistency is obtained.

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Application

10. The application life is the time that the mixed compound remains pourable or suitable for application with an extrusion gun. It is approximately 25 minutes at 23.9 deg. C (75 deg. F) and 50 per cent. relative humidity. An increase in temperature above 23.9 deg. C will decrease the application life. An exothermic reaction results when the two components of PR905 are mixed and therefore the application life is decreased as the thickness or volume of compound is increased. The application life may be extended by pouring the mixed compound into a flat tray and retarding the exothermic reaction by dissipation of the heat.

Filling

11. The mixed compound can usually be poured into the connector but a polythene extrusion gun (Ref. No.) can be used if necessary. The $\frac{1}{8}$ in. nozzle is the recommended size for normal potting operations. The connector to be potted should be laid on a flat surface and the compound injected. Plugs and sockets should be fully assembled with the exception of the cable clamp. Care should be taken when using the pour method to ensure that no trapped air is present.

12. If a mould is necessary, e.g. when potting an open back connector, a polythene mould may be used. PR905 does not adhere very well to polythene but the use of a mould release agent, such as, silicone grease, will make the removal of the mould easier. If a polythene mould is not available a mould can be made from scotch tape.

Curing

13. Curing will commence immediately the accelerator is added to the base compound and will continue under all storage conditions. PR905 is cured by an exothermic reaction and the length of the cure period depends on the thickness or volume of material and the temperature to which it is subjected during the cure cycle. At normal room temperature the cure time is decreased as the thickness or volume is increased. The cure time can be further decreased by the application of heat up to 82.2 deg. C (180 deg. F) during the cure period.

Cleaning

14. All equipment and tools should be washed with methyl-ethyl-ketone (Ref. No. 33C/1322) immediately after use or before the material dries. Cured compound can be flaked off a polythene container or a polythene extrusion gun as PR905 has poor adhesion to polythene.

Storage

15. PR905 can be stored for approximately six months when kept at temperatures below 26.6 deg. C (80 deg. F) in the original unopened containers.

Replacements

16. In the event of a potted plug or socket becoming unserviceable it is impracticable to remove the potting compound. The cables to the defective connector should be cut and a serviceable potted connector, complete with suitable lengths of the correct type of cable fitted, using in-line connectors as described in Chapter 5 of this section.

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