D.T.D.913A

Ministry of Defence
Defence Procurement Agency, ADRP2
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BS34 8JH

OBSOLESCENCE NOTICE

All DTD specifications were declared obsolescent from 1st April 1999. All DTD 900 series approvals also lapsed at that time. The standards will no longer be updated but will be retained as obsolescent documents to provide for the servicing of existing equipment.

Further Guidance

The aim in declaring the specifications obsolescent is to recognise that the documents are not being updated and thus should be used with care by both purchaser and supplier. For example, a specification could contain valid technical information but may also contain type approval clauses that contradict procurement policy and/or use materials that do not comply with environmental legislation. The obsolescent specification can still be used as a basis for a purchase provided that the supplier and purchaser agree suitable changes to the specification within the purchase order/contract.

For the DTD 900 system, each specification has provided an MoD approved material and process. For these items, the declaration of obsolescence will constitute the termination of both the extant MoD approval and the continuing MoD assessment that had underpinned those approvals. Again, the technical content of the document remains valid and can be used by both purchaser and supplier as a basis for a contract but an acceptable (to the parties) approval/assessment procedure would be required.

MINISTRY OF TECHNOLOGY

D.T.D. 913A

(Superseding D.T.D. 913)
June, 1961
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Process Specification

IDENTIFICATION COLOURING OF RIVETS IN ALUMINIUM AND ALUMINIUM ALLOYS

1. Scope

This specification describes the processes to be used for the colouring for identification purposes of rivets made from aluminium wire to B.S.L36 and aluminium alloy wires to B.S.L58 and B.S.L86. Anodising to DEF-151 may be used as an alternative to the oxidising process described below.

2. General

2.1 Soft water substantially free from chlorides shall be used in the preparation and maintenance of the oxidising, colouring and fixing solutions described below.

2.2 The processes shall be carried out in the order given below and with a minimum of delay between the various operations.

3. Preparation

3.1 All rivets shall be cleaned in accordance with D.T.D. 901.

3.2 Aluminium alloy rivets shall be etched lightly in an aqueous solution containing:

Sulphuric acid (sp. gr. 1.84) … … 10 per cent by volume
Potassium fluoride … … … 4 per cent by weight

The solution shall be used at room temperature.

3.3 After etching the rivets shall be rinsed thoroughly in clean water.

4. Oxidising

4.1 All rivets shall be immersed for 15 to 25 minutes in a boiling aqueous solution containing :

Sodium carbonate (anhydrous) … 5.0-7.0 per cent by weight
Sodium chromate … … … 1.0-1.5 per cent by weight

4.2 The composition of the oxidising solution shall be maintained within the specified limits by the addition of sodium carbonate and sodium chromate as necessary (see Appendix).

4.3 After oxidising the rivets shall be rinsed thoroughly in clean water.

5. Colouring

5.1 *Aluminium rivets.*

5.1.1 Aluminium rivets shall be coloured black by immersion for 5 to 10 minutes in an aqueous solution containing :

Potassium permanganate … … 2.5 per cent by weight
Sodium carbonate (anhydrous) … 0.1 per cent by weight

The solution shall be used at 93°C ± 3°C (200°F ± 5°F).

5.1.2 The rivets shall then be rinsed thoroughly in clean water and immersed for 5 to 10 minutes in an aqueous solution containing 2 per cent by weight of cobalt acetate and used at 93°C ± 3°C (200°F ± 5°F).

5.1.3 After colouring the rivets shall be washed thoroughly in clean water.

5.1.4 If the depth of colour is not satisfactory, the operations described in Clauses 5.1.1, 5.1.2 and 5.1.3 shall be repeated.

5.2 *Aluminium alloy rivets.*

5.2.1 Aluminium alloy rivets shall be coloured by immersion for 5 to 10 minutes in the appropriate aqueous dye solution as shown in the table below. The solution shall be used at 93°C ± 3°C (200°F ± 5°F).

Rivet wire specification	Colour of rivets	Composition of dye solution
B.S.L58	Green	Solway Blue SES … 1.5 per cent by weight Solochrome Yellow 2GS … 0.5 per cent by weight Glacial acetic acid … 0.75 per cent by volume
B.S.L86 (Superseding B.S.L69)	Violet	Benzyl Violet 5BN (170 per cent) … … … 1.0 per cent by weight Glacial acetic acid … 0.75 per cent by volume

6. Fixing

After colouring the rivets shall be rinsed thoroughly in clean cold water and immersed in an aqueous solution containing 1 per cent by weight of sodium silicate (to D.T.D. 449, Section II) and maintained at 93°C ± 3°C (200°F ± 5°F). The period of immersion shall be 1 to 2 minutes for violet-coloured rivets and 5 minutes for other rivets. The rivets shall be washed finally in clean hot water and dried.

7. Inspection

The rivets shall be of uniform colour and the depth of colour shall be sufficient to permit easy identification.

APPENDIX

Chemical analysis of oxidising solution

(a) Determination of sodium chromate content. 10 ml of the clear bath solution shall be measured accurately into a conical flask and diluted to about 150 ml with distilled water. The solution shall be acidified with 30 ml of 25 per cent (vol) sulphuric acid. An excess of $\frac{N}{10}$ ferrous ammonium sulphate solution shall be added and the total quantity added noted. The excess of ferrous ammonium sulphate solution shall be titrated with $\frac{N}{10}$ potassium permanganate solution.

1 ml $\frac{N}{10}$ ferrous ammonium sulphate = 0.114 per cent sodium chromate.

(b) Determination of sodium carbonate content. 20 ml of the clear bath solution shall be measured accurately into a 250 ml beaker, diluted to 100-150 ml with distilled water and 5 to 10 drops of a 2 per cent solution of phenolphthalein in alcohol added. The solution shall be stirred vigorously with a glass rod while normal sulphuric acid is run in from a burette in quantities of about 0.2 ml until the colour of the solution changes from red to pale orange. The stirring shall be continued and further acid shall be added dropwise until the pale orange colour changes to bright yellow. The burette reading shall then be noted .....(1).

NOTE. It is important that the solution shall be stirred vigorously and that the acid be added in small quantities in order to avoid loss of carbon dioxide from the solution during this titration.

About 5 drops of a 0.1 per cent solution of methyl orange in alcohol shall then be added and normal sulphuric acid run in until the colour of the solution is deep orange. An excess of 10 ml of acid shall then be added and the burette reading again noted. . . . . .(2).

The difference between burette readings (2) and (1) shall be recorded.. .. . .(3).

During this second titration there is no need for vigorous stirring and the acid may be added at a normal speed.

The beaker shall then be covered and the solution boiled for at least 20 minutes in order to remove carbon dioxide completely. If a precipitate forms during boiling, further acid (which must be included in the burette reading (2) above) shall be added to produce a clear solution. If further additions of acid fail to produce a clear solution, the test shall be abandoned and a new one commenced.

At the conclusion of the boiling operation, the solution shall be cooled and when cold the excess acid shall be titrated with normal sodium hydroxide or potassium hydroxide solution until the colour of the solution changes from bright yellow to a pale but definite orange.

The volume of alkali used shall be noted. . . . . (4).

Twice the difference between the values (3) and (4) will give the volume of normal sulphuric acid used in converting the sodium carbonate in the bath solution to sodium sulphate.

1 ml N sulphuric acid — 0.265 per cent anhydrous sodium carbonate.

Approved for issue,

E. W. RUSSELL,

Director of Materials Research and Development/Aviation.

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