

**Ministry of Defence  
Defence Procurement Agency, ADRP2  
Abbey Wood  
Bristol  
BS34 8JH**

## **OBSOLESCENCE NOTICE**

All DTD specifications were declared obsolescent from 1<sup>st</sup> 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.

**Aerospace Material Specification  
FOAMING AND GENERAL PURPOSE CLEANING MATERIAL FOR EXTERIOR  
SURFACES OF AIRCRAFT**

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**APPENDIX I**

*Delete* the whole of Appendix I

*Insert*

**Preparation of painted panels**

The panels shall be of hard or soft aluminium as required and shall comply with the specification and gauge described in the appropriate Appendix and shall be acid chromate pickled, as described in Part A3 of B.S. 3900.

1. Epoxy primer to D.T.D. 5567 shall be applied and allowed to dry for four hours and then coated with glossy acrylic finish to D.T.D. 5599.
2. Epoxy primer to D.T.D. 5567 shall be applied and allowed to dry for four hours and then overcoated with glossy polyurethane finish to D.T.D. 5580.

The panels shall be allowed to dry for not less than 28 days after application of the finish coat.

**APPENDIX III**

*Delete* “(a) *Bend test.* Method No. 13 of specification DEF-1053 shall be used, employing a mandrel of  $\frac{1}{4}$  inch diameter in the case of D.T.D. 827 and D.T.D. 754A, and  $\frac{3}{8}$  inch in the case of D.T.D. 5580. The test shall be made at room temperature.”

*Insert* “(a) *Bend test.* The bend test shall be carried out in accordance with B.S. 3900 Part E1 using type 1 apparatus employing a mandrel of  $\frac{3}{8}$  inch. The test shall be made at room temperature.”

*Delete* “(b) *Scratch test.* Method No. 14 of specification DEF-1053 shall be used, employing the following loads:

|                                    |       |       |       |        |
|------------------------------------|-------|-------|-------|--------|
| Glossy pigmented enamel D.T.D. 827 | ..... | ..... | ..... | 1500g  |
| Cellulose finish D.T.D. 754A       | ..... | ..... | ..... | 600g   |
| Polyurethane finish D.T.D. 5580    | ..... | ..... | ..... | 1500g” |

*Insert* “(b) *Scratch test.* When tested in accordance with B.S. 3900 Part E2 using a load of 1500g any scratch produced shall not penetrate the top coat.”

**APPENDIX VII**

*Cadmium plated steel:*

*Delete* “B.S. 1449, Part 1B, CR3/FF cadmium plated to specification D.T.D. 904C, not passivated, and aged for not less than 4 weeks and freshly chromated in accordance with specification D.T.D. 904C, para. 5.”

*Insert* “Steel to B.S. 1449, Part 1B, CR3/FF, cadmium plated to a bright finish to specification D.T.D. 904C but not passivated, aged for not less than 4 weeks after plating and dipped in a solution of sodium dichromate in accordance with para. 5.1 of D.T.D. 904C immediately before use.”

**Aerospace Material Specification**  
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**EXTERIOR SURFACES OF AIRCRAFT**

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**APPENDIX VII**

**Method for the determination of freedom from corrosive action**

Delete the first 15 lines commencing:

'a) Two sets of unused plates . . . . . ' and ending with ' . . . . . DTD 904C, immediately before use.'

*Insert*

a) Two sets of panels of the following metals, each 75 mm x 25 mm x approximately 0.91 mm (20 SWG), pretreated or plated on faces and edges as described below, shall be degreased with a suitable hydrocarbon solvent, in the manner described in BS 3900, Part A3, Clause 2.3 After a final rinse in 1:1 v/v acetone:IMS, the panels shall be dried in an oven at  $105 \pm 2^\circ\text{C}$  for 30 minutes, cooled in a desiccator and each panel weighed to within 0.1 mg.

*Aluminium alloy:* BS L156 acid chromate pickled by the process described in BS 3900, Part A3, Clause 4.4.

*Magnesium alloy:* BS 3370, type AZ31, acid chromate pickled by the process described in both DTD 911C, Appendix II, Clause 2 (Bath iv), and BS 2L500/1973, Appendix A, Clause 5.3 (Bath iv).

Before use, the chromate film shall be removed by complete immersion in a boiling aqueous solution of 150g/l chromic anhydride for 15 minutes, followed by swabbing under running water, rinsing in distilled water then in 1:1 v/v acetone:IMS before drying and weighing.

*Copper:* BS 2870, C101, half hard, freshly pickled by the process described in Defence Standard 03-2/1, Annex Method R2, 'Bright' dip.

*Steel:* BS 1449, Part 1, CR1/FF freshly burnished by the method described in BS 3900, Part A3, Clause 2.4.

*Cadmium plated steel:* Steel to BS 1449, Part 1, CR1/FF, cadmium plated to a bright finish to DTD 904C but not passivated, aged for not less than 4 weeks after plating, and dipped in an aqueous solution of sodium dichromate in accordance with Clause 5.1 of DTD 904C immediately before use.

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**Aircraft Material Specification****FOAMING AND GENERAL PURPOSE CLEANING MATERIAL  
FOR EXTERIOR SURFACES OF AIRCRAFT**

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*NOTE 1. This specification is one of a series issued by the Ministry of Aviation either to meet a limited requirement not covered by any existing British Standard or to serve as a basis for the inspection of materials, the properties and uses of which are not sufficiently developed to warrant submission to the British Standards Institution for standardisation.*

*NOTE 2. The cleaning material is intended to be used for the rapid removal of dirt, grease and oil from exterior surfaces of aircraft in the field, under climatic conditions ranging from temperate to tropical.*

*The material together with the contaminants is intended to be readily removed from the surfaces to which it is applied, by finally washing with cold water. The material is also intended for similar use on aircraft components.*

*NOTE 3. Specification DEF-1053, Standard Methods of Testing Paint, Varnish, Lacquer and Related Products, is published for the Ministry of Defence by H.M.S.O. and is on sale to the public.*

*NOTE 4. This issue differs from D.T.D.5507 A in that a new Clause 9, controlling viscosity variation, has been included.*

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**1. Description**

- (a) The material shall be a liquid concentrate which, when used, will be diluted with water in the ratio by volume, 1 part concentrate to 9 parts of water. It shall then be usable in each of the following ways:
- (i) Spraying as a foam.
  - (ii) Spraying as a liquid.
  - (iii) Brushing or swabbing.
  - (iv) Dipping.
- (b) The material shall be a homogeneous solution free from abrasive matter, visible impurities and obnoxious odour.
- (c) The ingredients shall comply with the requirements of relevant B.S., DEF or D.T.D. specifications where available.

**2. Flash point**

The flash point of the material, as delivered, shall be not lower than 100°F when tested by Method 5A of specification DEF-1053.

**3. Cleaning power**

The material, when tested as described in Appendix II, shall readily clean the standard panels at least as well as the standard reference fluid.

**4. Freedom from damage**

- (a) After cleaning by the method described in Appendix II the paint films shall show negligible change in colour and finish and no other visible damage.
- (b) *Bend test.* Films of the paint when tested by the method described in Appendix III (a) shall withstand being bent double round a rod of the appropriate diameter without becoming detached or damaged.
- (c) *Scratch test.* The resistance to scratching of the paint films tested as described in Appendix III (b) shall be such that a scratch through the film is not obtained. The scratch shall also be free from jagged edges of overall width greater than 1 mm.

**5. Freedom from crazing action**

The material shall be free from crazing action on polymethyl methacrylate sheet when tested by the method described in Appendix IV.

**6. Ease of rinsing**

The material when tested by the method described in Appendix V, shall require not more than 20 ml of distilled water to effect complete rinsing.

**7. Removal of material after drying**

The material, when tested according to Appendix VI, shall not leave visible residue on the aluminium dish, nor show a greater change in weight than that obtained with the hard water control.

## 8. Stability

The material, when diluted 1: 9 with standard hard water described in Appendix VI shall yield a solution or stable emulsion, which remains largely unchanged when kept for 24 hours at room temperature. In this respect it shall not be inferior to the type approved sample.

## 9. Viscosity

The viscosity of the material, when tested in a flow cup and to the method described in B.S. 1733 Type B2, shall have a flow time of 39±3 seconds within the temperature range 10°-20°C.

## 10. Freedom from corrosive action

- (a) *Continued immersion.* The freedom from corrosive action of the material shall be such that, when determined by the method described in Appendix VII(a), the metal panels shall not increase in weight by more than 1 mg and shall not decrease in weight by more than 5 mg. There shall be no signs of corrosion such as pitting of the edges or surfaces or formation of adherent deposits.
- (b) *Intermittent immersion (type test).* The freedom from corrosion of the material both as supplied and at 1:9 dilution shall be such that, when determined by the method described in Appendix VII(b), there shall be no corrosion or pitting on any portion of the panel. Slight discolouration shall be disregarded.

## 11. Freedom from damage on repeated cleaning (type test)

The material, when tested by the method described in Appendix VIII, shall cause no more visible damage to the paint films than that on a control set of panels held by the Inspecting Authority which show the maximum damage permitted.

## 12. Marking of containers

In addition to bearing the markings called for by statutory requirements, the packages constituting a consignment shall be clearly and durably marked with the designation of the material as shown by the title of this specification, a distinctive lot or batch number, the date of despatch, the contractor's initials or recognised trade mark and such markings as may be prescribed in the terms of the contract or required by the provisions of DEF-1234.

## 13. Keeping qualities

The cleaning material shall comply with the requirements of this specification when stored under ordinary storage conditions in its original closed containers for not less than the following periods after the date of delivery, which shall be marked on the containers:

- (a) two years in temperate climates,  
(b) one year in tropical climates.

## 14. Type approval

Before any particular manufacturer's material is accepted as complying with the requirements of this specification the manufacturer shall obtain approval thus:

- (a) He shall demonstrate to the satisfaction of the Director of Materials Research and Development that his material is suitable for the cleaning of exterior painted surfaces of aircraft.
- (b) He shall submit to the Director of Chemical Inspection (D.C.I.), E.135/17, Royal Arsenal, Woolwich, London, S.E.18:
- (i) *a certificate from an independent analyst* - (a) confirming that residues of his material, in the effluent resulting from aircraft cleaning, will not interfere with the biological treatment of sewage into which it may be discharged, assuming a final total dilution of 4000/1 by volume; and (b) indicating the nature and concentration of these residues for guidance in considering any relevant Factory Acts, River or Water Board regulations, or Public Health requirements.
- (ii) a test certificate showing the results of all tests and certifying that the material complies with Clauses 1-13 of this specification.
- (iii) a half-gallon sample of the material in an inert container (e.g. glass) together with details in duplicate of its formulation and the specification references, where applicable, of the ingredients.
- (iv) two panels prepared in accordance with Appendix VIII in respect of each paint.
- (v) his proposed instruction for the avoidance of health hazards.

The Director of Chemical Inspection may, at his discretion, grant a provisional type approval in respect of the requirements of this sub-paragraph on the basis of short term tests, before the long term "repeated cleaning" test is completed. Provisional approval will be issued only in special circumstances and after consideration of the evidence supplied by the applicant of the suitability of materials of similar formulation.

## 15. Routine inspection

A representative sample of each batch of the material shall be tested by the manufacturer and proved to comply with clauses 1 to 10 (a) inclusive before release is authorised. The Director of Chemical Inspection may require the manufacturer to test to Clauses 10 (b) and 11 at any time

## APPENDIX I

### Preparation of painted panels

Panels 5 inches x 2 inches of smooth (i.e.- unabraded) (a) soft and (b) hard aluminium complying with para. 5(a) and pretreated as prescribed by para. 5(b) (ii) of Method 2 of specification DEF-1053 shall be coated as follows:

- (1) Pretreatment primer to DEF-1408, allowed to dry for not less than two hours and then coated with glossy synthetic pigmented enamel to D.T.D.827.
- (2) Pretreatment primer to DEF-1408. allowed to dry for not less than two hours and then coated with cellulose finish to D.T.D.754A.
- (3) Epoxy primer to D.T.D.5580, allowed to dry for not less than four hours and then coated with glossy polyurethane finish to D.T.D.5580.

The panels shall be allowed to dry for not less than 28 days after application of the finish coat.

## APPENDIX II

### Determination of cleaning power

(a) *Soiled panels.* Two sets of painted hard aluminium panels prepared as described in Appendix I shall be soiled by smearing each with a thin film, approximately 0.001 inch thick, of a mixture of equal parts of engine lubricating oil, to specification D.Eng.R.D.2472B/0, and boiled linseed oil to specification B.S.259, followed by heating at 98° to 100°C for one hour. The panels shall be allowed to cool at room temperature for half an hour before use.

(b) *Reference fluid.* A standard reference fluid of composition:

|                                     |        |               |
|-------------------------------------|--------|---------------|
| Trisodium phosphate (dodecahydrate) | ...    | 10.0 per cent |
| Lissapol N                          | ... .. | 2.0 per cent  |
| Ethylene glycol monoethyl ether     | ... .. | 6.0 per cent  |
| Distilled water                     | ... .. | 82.0 per cent |

shall be prepared as follows:

Dissolve the trisodium phosphate in the distilled water. Add the Lissapol N and ethylene glycol monoethyl ether. Thoroughly mix the solution.

(c) *Procedure.* The standard reference fluid shall be applied by brush or swab to one set of soiled panels and shall be washed off under running cold water after a period of ten minutes.

The second set of panels shall be cleaned by the same procedure, using the material under test diluted 1:9 with standard hard water, described in Appendix VI.

The two sets of panels shall then be examined visually.

## APPENDIX III

### Method for the determination of freedom from damage

Two sets of painted panels, one of soft and one of hard aluminium, prepared by the method described in Appendix I shall be immersed for 20 minutes in the cleaning fluid diluted 1:9 with standard hard water described in Appendix VI. At the end of this period the panels shall be washed thoroughly under running tap water, rinsed with distilled water and allowed to dry at room temperature for 24 hours.

The first set shall be used for the bend test and the second set shall be used for the scratch test.

(a) *Bend test.* Method No. 13 of specification DEF-1053 shall be used, employing a mandrel of  $\frac{1}{4}$  inch diameter in the case of D.T.D.827 and D.T.D.754A, and  $\frac{3}{8}$  inch in the case of D.T.D.5580. The test shall be made at room temperature.

(b) *Scratch test.* Method No. 14 of specification DEF-1053 shall be used, employing the following

|                                    |        |        |
|------------------------------------|--------|--------|
| Glossy pigmented enamel, D.T.D.827 | ... .. | 1500 g |
| Cellulose finish, D.T.D.754A       | ... .. | 600 g  |
| Polyurethane finish, D.T.D.5580    | ... .. | 1500 g |

## APPENDIX IV

### Method for the determination of freedom from crazing action

A strip of clear polymethyl methacrylate to D.T.D.5544, 6 inches long and 1 inch wide, shall be cut from a flat sheet of the cast material,  $\frac{1}{8}$  inch thick. The protective paper shall be removed and the strip freed from any residual adhesive by soaking in distilled water at room temperature for approximately 30 minutes. The strip shall then be rinsed with distilled water at room temperature and lightly wiped with a clean, dry polishing cloth

The strip shall then be annealed by heating for 3 hours at a temperature of 90° to 96°C followed by cooling to room temperature in the absence of draughts, and used without further delay.

The strip shall be stressed to an outer stress of approximately 3,000 lbf/in<sup>2</sup> by clamping it lightly at each end so that it is bent flatwise round a suitable mandrel of radius 10 inches. A liberal application of the undiluted material shall be made to the outer (tension) side of the strip and the assembly shall be kept at 20° ± 2°C for 24 hours. No attempt shall be made to keep the strip moist artificially during this interval.

The strip shall then be removed from the clamps and the mandrel. The cleaning material shall be removed from the strip by rinsing in cold distilled water. The strip shall be examined visually by transmitted light, at varying angles of incidence, for crazing which appears in a direction perpendicular to the applied stress.

## APPENDIX V

### Method for the determination of ease of rinsing

A 5 inches x 2 inches panel of hard aluminium as described in specification DEF-1053, Method 2, para. 5(a)(i) and prepared as described in para. 5(b) (ii) shall be coated with a white exterior glossy finish to D.T.D.5580. The priming coat may be omitted if desired. The panel shall be allowed to dry for not less than 28 days after application of the finishing coat.

The panel shall be immersed for 10 seconds in the material diluted with standard hard water in the ratio by volume - 1 part material to 3 parts standard hard water described in Appendix VI, and allowed to drain for 1 minute in a vertical position. The panel shall then be supported at a slope of 45° with the short edges horizontal.

Using a burette, the panel shall then be rinsed with distilled water containing about 0.5 ml of 0.5 per cent w/v phenolphthalein indicator solution per 100 ml distilled water. The jet is directed vertically along the top edge of the panel, so that the water runs down the panel and drains off the bottom edge. When 10 ml of wash water has been used, the panel shall be allowed to drain in the inclined position for 10 seconds. If the bottom water edge is still pink, the washing shall be continued with 1 ml portions until no pink colour is present. The total volume of water used shall be noted.

## APPENDIX VI

### Method for the determination of rinsability after drying

A shallow tray shall be made from a 5 inches x 2 inches panel of soft aluminium sheet (described in specification DEF-1053, Method 2, para. 5(a) (ii)), by turning up the edges  $\frac{1}{4}$  inch at about 45° around a wooden former  $3\frac{1}{2}$  inches x  $1\frac{1}{2}$  inches placed centrally on the panel. The tray shall be acid chromate pickled as described in specification DEF-1053, Method 2, para. 5(b) (ii), dried at 100° ± 2°C for  $\frac{1}{2}$  hour, allowed to cool and weighed to 0.0001 g. The bottom of the dish shall be covered with 10 ml of the concentrated material and evaporated to constant weight in an oven at 65° ± 2°C.

The tray shall then be immersed in standard hard water for one minute, removed and brushed for not more than 1 minute with a 1 inch paint or stencil brush having bristles  $1\frac{1}{2}$  inches long. The tray shall then be rinsed under running tap water for 30 seconds to remove the foam, rinsed in distilled water, dried at 100° ± 2°C for  $\frac{1}{2}$  hour, allowed to cool and weighed to 0.0001 g.

A comparison shall be made by treating 10 ml of standard hard water in a similar manner.

#### *Standard hard water*

|                                 |     |     |     |                |
|---------------------------------|-----|-----|-----|----------------|
| Calcium acetate dihydrate       | ... | ... | ... | 0.40 ± 0.005 g |
| Magnesium sulphate heptahydrate | ... | ... | ... | 0.28 ± 0.005 g |
| Distilled water (boiled)        | ... | ... | ... | 1 litre        |

## APPENDIX VII

### Method for the determination of freedom from corrosive action

(a) Two sets of unused panels of the following metals each 3 inches x 1 inch x 20 S.W.G. pretreated or plated on faces and edges as described, shall be degreased by the method described in specification DEF-1053 Method 2, para. 2(c), dried at 100° ± 2°C for  $\frac{1}{2}$  hour cooled and weighed to 0.0001 g.

|                              |   |
|------------------------------|---|
| <i>Aluminium alloy:</i>      | B.S.2L70 acid chromate pickled by the process described in specification DEF-1053, Method 2, para. 5(b) (ii).   |
| <i>Magnesium alloy:</i>      | Magnesium-zinc-zirconium alloy sheet D.T.D.626B acid chromated by the process described in specification D.T.D.911C Appendix II, para. 2.   |
| <i>Copper:</i>               | B.S.899, C104 half hard, freshly pickled by the process described in specification D.T.D.901F, Appendix I, para. 12B.   |
| <i>Steel:</i>                | B.S.1449, Part 1B. CR3/FF freshly burnished by the method described in specification DEF-1053, Method 2, para. 2(c).  |
| <i>Cadmium plated steel:</i> | B.S.1449, Part 1B, CR3/FF cadmium plated to specification D.T.D.904C. not passivated, and aged for not less than 4 weeks and freshly chromated in accordance with specification D.T.D.904C, para.5. |

They shall then be completely immersed separately in stoppered containers for 168 hours in (a) the material (b) the material diluted 1 : 9 with standard hard water described in Appendix VI. They shall not be disturbed during the period of immersion. On completion of the immersion period, the panels shall be removed from the liquids, and rinsed in running tap water, the surfaces being gently swabbed with cotton wool. They shall then be rinsed in distilled water, followed by a mixture of equal volumes of methylated spirit and acetone, dried at 100°-105°C for ½ hour, cooled and weighed to 0.0001 g.

No attempt shall be made to remove corrosion products from the panels before weighing. Finally they shall be examined visually.

- (b) Two panels 2 inches x 2 inches 20 S.W.G. of aluminium alloy to B.S.2L70 are prepared by drilling a hole of  $\frac{5}{8}$  inch diameter in the centre of each panel. The panel is then acid chromate pickled as described in specification DEF-1053, Method 2, para. 5(b) (ii).

The prepared panels shall be immersed separately to the bottom of the hole in (a) the material (b) the material diluted 1:9 with standard hard water described in Appendix VI, contained in a 150 ml squat pattern Pyrex beaker (approximately 50 ml liquid required). The beakers are then covered with watch glasses. The beakers are tilted once daily for five days of every week, so that the entire panel is momentarily immersed, and the top half subsequently allowed to drain on regaining its original position. Losses by evaporation are made up daily by the addition of distilled water. The test is continued for four weeks after which time the panels are removed, washed with running tap water to remove any loose accretions, rinsed with distilled water and dabbed dry with filter paper. They are then examined for visual sign of corrosion.

## APPENDIX VIII

### Method for the determination of the effect of repeated cleaning

Two sets of hard aluminium panels shall be prepared and painted as described in Appendix I.

One set of panels shall be cleaned with the material diluted with standard hard water in the ratio by volume of 1 part material to 3 parts standard hard water described in Appendix VI, and the second set shall be cleaned with standard hard water to serve as a blank.

Cleaning, which shall be done each Monday, Wednesday and Friday shall be as follows:

All the panels shall first be washed under running tap water to remove surface dirt, and then dried with clean linen rag. Each panel to be washed shall then be covered with a piece of dry filter paper - Whatman No. 1 or equivalent - and sufficient of the diluted material (or standard hard water as appropriate) applied by a cotton wool swab to wet completely the paint surface and thoroughly soak the filter paper. After standing for 10 minutes the filter paper shall be removed and the paint surface gently rubbed with the cotton wool swab for 5 seconds. Finally, the panels shall be washed free from cleaning material under running tap water, followed by rinsing in distilled water.

All sets of panels shall be exposed in the open facing south at an angle of 45° to the horizontal until the next cleaning.

The final assessment of damage shall be made after 30 cycles (10 weeks, 3 cycles per week) of cleaning.

Approved for issue,

E. W. RUSSELL,

Director of Materials Research and Development.