D.T.D.5600

Ministry of Defence
Defence Procurement Agency, ADRP2
Abbey Wood
Bristol
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.

**PROCUREMENT EXECUTIVE,
MINISTRY OF DEFENCE**

D.T.D. 5600

Amendment No. 1
December, I971

Aerospace Material Specification

HEAVY DUTY CLEANER FOR THE EXTERIOR SURFACES OF AIRCRAFT

APPENDIX V

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."

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PROCUREMENT EXECUTIVE

MINISTRY OF DEFENCE

D.T.D. 5600

Amendment No. 2
May, 1980

Aerospace Material Specification
HEAVY DUTY CLEANER FOR THE EXTERIOR SURFACES OF AIRCRAFT

APPENDIX V

Method of determination of freedom from corrosive action

Delete the first 14 lines commencing:

'Two sets of unused panels . . . . . .' and ending with . . . . . 'DTD 904C, para 5.'

Insert

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 ± 2°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:l v/v acetone:IMS before drying and weighing.

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

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

Cadmium plated steel: Steel to BS 1449, Part 1, CRl/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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MINISTRY OF TECHNOLOGY

D.T.D. 5600

June, 1969

Aerospace Material Specification

HEAVY DUTY CLEANER FOR THE EXTERIOR SURFACES OF AIRCRAFT

NOTE. This specification is one of a series issued by the Ministry of Technology to meet a requirement not covered by an existing British Standard for aerospace material.

1. Description

(a) The material is intended for use in conjunction with Foaming and General Purpose Cleaner to D.T.D. 5507B.

(b) The material shall be a liquid which shall work readily into heavily soiled surfaces of aircraft by brushing. The softened soil shall be completely removed by the normal cleaning techniques using Foaming and General Purpose Cleaner to specification D.T.D. 5507B.

(c) The material shall be a homogeneous solution free from abrasive matter, visible impurities and obnoxious odour. It shall not contain any chlorinated hydrocarbons and any solvent used shall be volatile.

(d) 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 in accordance with B.S.3442.

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*(b)* 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*(c)*, 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. Stability

When tested as described in Appendix IV the mixtures shall remain clear and bright and there shall be no phase separation. At the discretion of the Approving Authority no more than a slight turbidity will be permitted.

6. Freedom from corrosive action

Continued immersion. The freedom from corrosive action of the material shall be such that, when determined by the method described in Appendix V 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.

7. Freedom from damage on repeated cleaning (Type test)

The material, when tested by the method described in Appendix VI, 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.

8. 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.

9. Keeping properties

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.

10. 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/Aviation that his material is suitable for the cleaning of exterior painted surfaces of aircraft.

(b) He shall submit to the Director of Chemical Inspection (DCI), 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 10,000:1 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 l-7 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 VI 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.

11. 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 6 inclusive before release is authorised. The Director of Chemical Inspection may require the manufacturer to test to Clause 7 at any time.

APPENDIX I

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.5580 shall be applied and allowed to dry for 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

Method for the determination of cleaning power

(a) Soiled panels. Two sets of hard aluminium panels to B.S.1470 Grade SIC-H 0.028 in (0.7 mm) thick (22 s.w.g.) prepared and coated as described in Appendix I shall be soiled by smearing each with a thin film, 0.05 g on a 5" x 2" panel, of a mixture of equal parts of lubricating oil to specification D.Eng.RD. 2472 B/O and pyrolised ester lubricant (prepared as in specification D.Eng.RD.2487) to which 1% of lampblack has been added.

After soiling the panels both schemes shall be stoved for 150 minutes at 150°C. All panels shall be allowed to cool at room temperature for one hour before proceeding with the test.

Pyrolised ester lubricant shall be prepared by heating lubricating oil : aircraft turbine engines-synthetic type, to specification D.Eng.RD.2487 (RDE/0/463) in a standard distillation apparatus until approximately one-third of the lubricant has broken down and distilled over. The rate of heating shall be such that the thermometer at the top of the distillation column reaches 175°C at the end of the process, although the temperature of the lubricant itself may be approximately 500°C. The distillate and residue shall be allowed to cool to room temperature and then mixed together. Further details of this preparation may be obtained from the Director of Chemical Inspection, El35/17, Royal Arsenal East, Woolwich, London, S.E. 18.

(b) Reference fluid. Kerosene.

(c) Procedure. The material under test shall be applied liberally by swab to the set of prepared panels lying on a horizontal surface. After fifteen minutes an approved sample of the manufacturer's cleaner to specification D.T.D.5507B shall be applied liberally and allowed to remain undisturbed for five minutes. The panel shall then be brushed vigorously with a one inch stencil brush until the soil is lifted and can be washed off readily and completely with a jet of water. The time taken for the brushing and rinsing operation is noted.

The procedure is repeated using kerosene in place of the material under test and the two times compared.

APPENDIX III

Method for the determination of freedom from damage

Two sets of aluminium panels, one hard conforming with B.S.1470 Grade SIC-H 0.028 in (0.7 mm) thick (22 s.w.g.), the other soft conforming with B.S.1470 Grade SIC-O 0.0124 in (0.3 mm) thick (30 s.w.g.) prepared and coated as described in Appendix I shall be immersed for 20 minutes in the cleaning fluid diluted 1:9 with standard hard water described in Appendix IV. 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 one set (hard aluminium) shall be used for the scratch test and the other (soft aluminium) shall be used for the bend test.

(a) Bend test. Carry out the bend test, as described in B.S.3900 Part E1 at room temperature using a mandrel size of ½ inch diameter in the case of D.T.D.5599 and ⅝ inch in the case of D.T.D.5580 using a Type I apparatus.

(b) Scratch test. Carry out the scratch test as described in B.S.3900 Part E2 employing the following loads:

Acrylic finish, D.T.D.5599 … … …	1500g
Polyurethane finish, D.T.D.5580 … … …	1500 g

APPENDIX IV

Method for the determination of stability

The material under test shall be diluted with standard hard water in the following proportion:

100 parts cleaner to 20 parts hard water

The mixture shall be shaken gently and allowed to stand for five minutes. Any tendency to emulsification, precipitation or turbidity shall be noted.

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 V

Method of determination of freedom from corrosive action

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, dried at l00° ±2°C for ½ hour, cooled and weighed to 0.0001g.

Aluminium alloy: B.S.2L70 acid chromate pickled by the process described in specification B.S.3900 Part A3.

Magnesium alloy:	Magnesium-zinc-zirconium alloy sheet B.S.L.504 acid chromated by the process described in specification D.T.D.911C Appendix II, para. 2.
Copper:	B.S.899, Cl04 half hard freshly pickled by the process described in specification D.T.D.901F, Appendix I, para. 12B.
Steel:	B.S.1449, Part 1B, CR3/FF freshly burnished by the method described in specification B.S.3900 Part A3.
Cadmium plated steel:	B.S.1449, Part 1B. CR3/FF cadmium plated to specification D.T.D904C, 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 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 IV.

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 l00°-105°C for ½ hour, cooled and weighed to 0.0001g.

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

APPENDIX VI

Method for determination of the effect of repeated cleaning

Two sets of hard aluminium panels to B.S.1470 Grade SIC-H 0.028 in (0.7 mm) thick (22 s.w.g.) prepared and coated 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 IV, 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 lint free cloth. 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 9 cycles (3 weeks, 3 cycles per week) of cleaning.

Approved for issue,

E. W. RUSSELL,

Director of Materials Research and Development/Aviation.

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