

MINISTRY OF SUPPLY

Crown Copyright Reserved

D.T.D. 314B

Superseding D.T.D. 314A
January, 1954

Aircraft Material Specification

MATT PIGMENTED OIL VARNISHES AND PRIMER

NOTE 1.—This specification is one of a series issued by the Ministry of Supply either to meet a limited requirement not covered by any existing British Standard Specification or to serve as a basis for 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.—Where a manufacturer supplies material to more than one of the Specifications D.T.D. 63, 260, 314, 754, 772 and 796 (latest issue) the primers shall be "universal" in character, i.e., they shall be suitable for use with all the finishes supplied by the manufacturer to this range of specifications.

NOTE 3.—Specification D.F.F. 11052 Standard Methods of Testing Paints, Varnishes and Primers

MINISTRY OF SUPPLY

Crown Copyright Reserved

D.T.D. 314B

Amendment No. 1
May, 1956

Aircraft Material Specification

MATT PIGMENTED OIL VARNISHES AND PRIMER

Clause 1 (c) After "D.T.D. 840."

insert "The finish shall be compatible also with Thinners to D.T.D. 96".

Printed in Great Britain by M. Harland & Son, Ltd.
and published by
HER MAJESTY'S STATIONERY OFFICE
Price 2d. net

(5.6.56) (SO.591) Wt.2457-8768 K10 7/56 M.H. & S. Ltd. G.345

70-9999

in equal parts by volume, shall produce a material suitable for spray application. Where thinners are required, the amount to be added to the mixture of Base and Accelerator shall not exceed 10 per cent. by volume and only Thinners for Cellulose Paints and Dopes to Specification D.T.D. 843 or other approved cellulose thinners shall be used.

(ii) The mixtures prepared as above shall remain suitable for use for not less than the following periods of time after mixing—

- 8 hours at a temperature of 65° F. to 70° F.
- 4 hours at a temperature of 90° F. to 95° F.

(iii) Test panels shall be prepared by the method described in Appendix I.

(f) When supplied for use in the Royal Air Force or the Royal Naval Air Service, etching primer shall comply with the requirements of Specification D.T.D. 868.

2. Rate of drying.

(a) Primer—The priming coat shall become sufficiently dry at room temperature for the application of the finish in not more than the following times :—

etching primer	...	...	...	...	...	...	...	...	1 hour
p.s.r. primer	...	...	...	...	...	...	...	...	4 hours

There shall be no blistering, wrinkling or lifting of the primer on overcoating with the finish when tested by the method described in Appendix II (a).

When a stoving primer is required, the time and temperature shall be as specified by the manufacturer.

Aircraft Material Specification

MATT PIGMENTED OIL VARNISHES AND PRIMER

NOTE 1.—This specification is one of a series issued by the Ministry of Supply either to meet a limited requirement not covered by any existing British Standard Specification or to serve as a basis for 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.—Where a manufacturer supplies material to more than one of the Specifications D.T.D. 63, 260, 314, 754, 772 and 796 (latest issue) the primers shall be "universal" in character, i.e., they shall be suitable for use with all the finishes supplied by the manufacturer to this range of specifications.

NOTE 3.—Specification D.E.F./1053 Standard Methods of Testing Paint, Varnish, Lacquer and Related Products published for the Ministry of Defence by H.M.S.O. and is on sale to the public.

NOTE 4.—Points of difference from D.T.D. 314A are indicated by marginal lines.

Description.

(a) The finishing scheme shall consist of—

(i) a primer—which shall be suitable for direct application to metal and which shall be one or other of the following types :

—a pigmented synthetic resin vehicle (p.s.r.),

—an etching primer conforming to the requirements described additionally in Clause 1 (b), (c) and (e) below.

The type of primer to be supplied shall be stated on the contract.

(ii) a finish—which shall be a matt pigmented synthetic resin vehicle suitable for application over the primer by means of brush or spray.

The ingredients shall comply with the requirements of relevant B.S. or D.T.D. specifications where available.

(b) The materials shall be suitable for application to metal to give when dry, the weight additions indicated :—

Primer ... p.s.r. not less than 1.0 oz. nor more than 1.25 oz. per sq. yard
etching not less than 0.4 oz. nor more than 0.6 oz. per sq. yard.

Finish ... Not less than 0.75 oz. nor more than 1.25 oz. per sq. yard.

(c) The materials other than the etching primer shall be supplied ready for use by brushing and shall be suitable use by spraying when diluted with approximately 10 per cent. of thinners, which shall be of the same formulation as the p.s.r. primer and for the matt pigmented oil varnishes. They shall be compatible with thinners to specification D.T.D. 840. Where the p.s.r. primer is required for use by dipping and/or stoving this shall be specified on contract.

(d) When supplied for use in the Royal Air Force and the Royal Naval Air Service, thinners for the materials other than the etching primer shall comply with the requirements of Specification D.T.D. 840.

(e) When an etching primer is called for in the contract it shall comply with the following requirements in addition to the requirements stated above :—

(i) The etching primer shall consist of a pigmented Base and an Accelerator. These, when mixed together in equal parts by volume, shall produce a material suitable for spray application. Where thinners are required, the amount to be added to the mixture of Base and Accelerator shall not exceed 10 per cent. by volume and only Thinners for Cellulose Paints and Dopes to Specification D.T.D. 843 or other approved cellulose thinners shall be used.

(ii) The mixtures prepared as above shall remain suitable for use for not less than the following periods of time after mixing—

8 hours at a temperature of 65° F. to 70° F.

4 hours at a temperature of 90° F. to 95° F.

(iii) Test panels shall be prepared by the method described in Appendix I.

(f) When supplied for use in the Royal Air Force or the Royal Naval Air Service, etching primer shall comply with the requirements of Specification D.T.D. 868.

2. Rate of drying.

(a) Primer—The priming coat shall become sufficiently dry at room temperature for the application of the finish in not more than the following times :—

etching primer 1 hour
p.s.r. primer 4 hours

There shall be no blistering, wrinkling or lifting of the primer on overcoating with the finish when tested by the method described in Appendix II (a).

When a stoving primer is required, the time and temperature shall be as specified by the manufacturer.

(b) Finish—The finishing coat shall become "hard dry" in not more than 8 hours when tested by the method described in Appendix II (b) and (c), and no wrinkling, bubbling or other defects shall occur.

3. Colour and finish.

(a) The colour of the primer shall be different from that of the finish.

(b) The dry film resulting from the application of one priming coat, and one finishing coat to a clean smooth metal panel and conforming to the limits of weight specified in Clause 1, shall match the standard in colour and finish. For yellow, white and sky finishes a weight addition of these finishes of not more than 2 oz. per sq. yd. will be permitted for colour and finish matching purposes.

(c) The standards of colour and finish are obtainable from the Director of Aeronautical Inspection (I.N.M.I), Harefield House, Harefield, Middlesex.

4. Toughness, hardness and adhesion.

(a) *Bend Test.*—A film of the materials consisting of primer and finish prepared and tested as described in Appendix III (a) shall withstand being bent double at 0° C. round a rod $\frac{1}{4}$ inch in diameter without becoming detached or damaged.

(b) *Scratch Test.*—The resistance to scratching of a film of the material consisting of primer and finish prepared and 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 width greater than 1 mm.

5. Resistance to salt-water.

The resistance to salt-water of a film of the material consisting of primer and finish prepared and tested as described in Appendix IV, shall be such that no flaking, change of colour, blistering or corrosion shall occur.

6. Resistance to organic solvents.

The resistance of films of the material, consisting of primer and finish, prepared and tested as described in Appendix V shall be such that organic solvents shall not cause any permanent change in the original condition or appearance of the film and it shall not become detached or damaged.

7. Resistance to natural weathering (type test).

The resistance to natural weathering of a film of the material consisting of primer and finish prepared and tested as described in Appendix VI shall be such that the film shall not show signs of cracking, chipping, flaking or blistering. Retention of colour shall be to the satisfaction of the Director of Aeronautical Inspection. Slight chalking shall be disregarded. The priming coat shall not be visible, and the metal shall be free from corrosion.

8. Keeping qualities.

The keeping qualities of the materials shall be such that, when stored in their original sealed containers, the materials shall retain the properties detailed above for not less than the following period after date of delivery :—

- (a) Twelve months in temperate climates.
- (b) Six months in tropical climates.

9. Type Approval.

Before any particular manufacturer's material is accepted as complying with the requirements of this specification, the manufacturer must obtain type approval. Applications for type approval shall be submitted to the Director of Aeronautical Inspection (I.N.M.I), Harefield House, Harefield, Middlesex, accompanied by :—

- (i) evidence that the materials comply with Clauses 1 to 7 inclusive of this specification,
- (ii) wet samples including thinners of all materials for which approval is sought together with details of their formulation, i.e., percentage of pigment, medium, volatile, and nature of medium, pigments and extenders, and the specification references, where applicable, of the ingredients,
- (iii) one sprayed panel prepared in accordance with Appendix VI in respect of each finishing colour for which approval is sought, and marked on the reverse with the description and film weight of each applied coat.

The Director of Aeronautical Inspection (I.N.M.I) may at his discretion grant a provisional type approval on the basis of short term tests before natural aging tests can be completed. Provisional approvals will be issued only in special circumstances and after consideration of evidence supplied by the applicant of durability of materials of the same or similar formulation, definition of the type of medium and the names of the manufacturers of any proprietary resins used, in addition to details supplied under (i), (ii) and (iii) above.

Type approval must be obtained in respect of each component and each finishing colour. After provisional or formal approval has been given no change in the formulation will be permitted unless approval of the change has been sought and given.

10. Routine Inspection.

A representative sample of each batch of each of the components of this scheme (i.e., primer and finish) shall be tested by the manufacturer and proved to comply with Clauses 1 to 6 inclusive before release is authorised.

The Director of Aeronautical Inspection may require the manufacturer to test to Clause 7 at any time.

APPENDIX I

Method for the Preparation of Panels for Tests on Etching Primers

The panels for the tests on etching primers shall be of unused metal complying with the appropriate specification and gauge (as required in the following appendices), cleaned with either—

- (a) trichlorethylene to B.S. 580 Type C (vapour or liquid) or
- (b) pure toluol to B.S. 805A used at room temperature.

They shall not otherwise be pre-treated before application of the etching primer.

APPENDIX II

Method for the Determination of Rate of Drying

(a) *Primer*.—One coat of the primer shall be applied by spray to a chromate dipped hard aluminium panel, as described in Method 2, para. 5 (a) (i) and (b) (ii) of Specification D.E.F./1053, to give a film weight when dry as specified in Clause 1 (b), and shall be kept in a horizontal position at a temperature of 65° F. to 70° F. for the following times:—

etching primer	...	...	...	...	...	...	...	...	1 hour
p.s.r. primer	...	...	...	...	...	...	...	...	4 hours

When testing an etching primer the humidity shall be controlled at 60 to 70 per cent. during this period.

When testing a stoving primer the time and temperature of stoving shall be as specified in Clause 2 (a).

One coat of finish shall then be sprayed over the primer, to give a film weight as specified in Clause 1 (b) and shall be kept in a horizontal position at a temperature of 65° F. to 70° F. for 16 hours. The panel shall then be examined visually.

(b) *Finish*.—One coat of the primer shall be applied by spray to a smooth clean metal panel as described at (a) above, to give when dry a film weight as specified in Clause 1 (b) and shall be kept in a horizontal position at a temperature of 65° F. to 70° F. for sixteen hours.

When testing an etching primer the humidity shall be controlled at 60 to 70 per cent.

When testing a stoving primer the time and temperature of stoving shall be as specified in Clause 3 (a).

One finish coat shall then be sprayed over the primer to give a film weight when dry as specified in Clause 1 (b) and shall be kept in a horizontal position at a temperature of 65° F. to 70° F. for 8 hours.

It shall then be tested as described at (c) below.

(c) *Test for Dryness*.—The panel shall be placed in one pan of a pair of scales. After balancing the scales a weight of 5 lbs. shall be placed in the other pan. The scales shall then be balanced again for 20 seconds by pressing the thumb on the film. No sign of tackiness to the thumb shall be apparent and any impression produced shall be capable of being wiped away with dry cotton wool without damaging the film or shall disappear on standing for one minute.

APPENDIX III

Method for the Determination of Toughness, Hardness and Adhesion

(a) *Bend Test*.—Method No. 13 of Specification D.E.F./1053 shall be used employing a mandrel of $\frac{1}{4}$ inch diameter. The test panel shall be coated with the materials as specified in Appendix II (b), and after the application of the finishing coat shall be allowed to dry at a temperature of 65° F. to 70° F. in a horizontal position, for 168 hours before testing. The chamber shall be fitted with a circulating fan and shall be kept closed during the test. The test shall be made at 0° C.

(b) *Scratch Test*.—Method No. 14 of Specification D.E.F./1053 shall be used employing a panel of chromate dipped hard aluminium and a load of 1,000 grams. The test panel shall be coated with the materials as specified in Appendix II (b), and after application of the finishing coat shall be allowed to dry at a temperature of 65° F. to 70° F., in a horizontal position, for 168 hours before testing.

APPENDIX IV

Method for the Determination of Resistance to Salt-Water

(a) A burnished steel panel shall be prepared by Method No. 2, para. 2 of Specification D.E.F./1053 and shall be coated with the materials as specified in Appendix II (b). After the application of the finishing coat the panel shall be allowed to dry at room temperature in a horizontal position for 168 hours. The back of the panel shall be protected either with the materials under test or with any other protective which will not affect the testing solution. The edges shall be protected by dipping for $\frac{1}{4}$ inch in melted wax.

Alternatively two panels each painted on one side only may be placed back to back and sealed round the edges with wax.

(b) the test panels shall be partially immersed in the testing solution, the composition of which is given below, at ordinary temperatures, continuously for one week, immediately after which time the panel shall be examined visually.

Composition of testing solution:—

Sodium Chloride	...	...	...	30 grams
Anhydrous magnesium chloride	...	...	...	3 grams (or equivalent in hydrated crystals)
Anhydrous magnesium sulphate	...	...	...	2 grams (or equivalent in hydrated crystals)

made up to 1,000 ml. with distilled water.

APPENDIX V

Method for the Determination of Resistance to Organic Solvents

A small panel of smooth (i.e., unabraded) soft aluminium pre-treated in accordance with Method No. 2, para. 5 (a) (ii) and (b) (ii) of Specification D.E.F./1053 shall be coated with the materials as specified in Appendix II (b) and after the application of the finishing coat shall be allowed to dry at room temperature in a horizontal position for 168 hours. It shall then be immersed for 15 minutes at room temperature in a mixture of—

75 parts by volume	...	...	2.2.4 trimethyl pentane I.P. reference fuel quality.
25 parts by volume	...	...	pure Toluol B.S. 805A.

It shall then be allowed to dry for 30 minutes. The panel after this treatment shall be examined for appearance and condition.

The panel shall be kept in a horizontal position at room temperature for 24 hours and shall then be bent over a mandrel $\frac{1}{16}$ inch in diameter at room temperature using Method No. 13 of Specification D.E.F./1053.

APPENDIX VI

Method for the Determination of Resistance to Natural Weathering

A panel of smooth hard aluminium cleaned in accordance with Method No. 2, para. 5 (a) (i) and (b) (ii) of Specification D.E.F./1053, shall be coated with the materials as specified in Appendix II (b), and after the application of the finishing coat, shall be allowed to dry at a temperature of 65° F. to 70° F. in a horizontal position for seven days. The panel shall have an exposed area of at least 35 sq. in. and the back of the panel shall be protected. The edges of the panel shall be rounded but not protected other than by application of the material under test.

The treated panel shall be exposed for 18 months in the open facing south at an angle of 45° to the horizontal. During the exposure, the panel shall be sprayed three times daily at intervals of three to four hours with a solution, the composition of which is:—

Sodium chloride	...	...	...	30 grams.
Anhydrous magnesium chloride	...	...	...	3 grams (or equivalent in hydrated crystals)
Anhydrous magnesium sulphate	...	...	...	2 grams (or equivalent in hydrated crystals)

made up to 1,000 ml. with distilled water.

Corrosion within $\frac{1}{4}$ inch of the edges of the panels may be ignored in assessing the results of the tests.

Approved for issue.

H. SUTTON,

Director of Materials Research and Development (Air).

Australian reprints of British Government specifications are published, under authority, by the Standards Association of Australia, Incorporated by Royal Charter.

Copies of these specifications may be obtained from:—Standards Association of Aust. (Headquarters), Gloucester and Essex Streets, Sydney.

Branch Offices: Melbourne, Brisbane, Adelaide, Perth, Hobart, Canberra, Newcastle (N.S.W.).

Price 1s. 3d. (Australian Currency).

Simmons Limited, Printers, Glebe.