

**Ministry of Defence
Defence Procurement Agency, ADRP2
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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.

Aerospace Material Specification

**SELECTIVELY STRIPPABLE ACRYLIC FINISHING SCHEMES -
MATT AND GLOSSY - FOR USE ON AIRCRAFT**

NOTES:- (1) This specification is one of a series issued by the Procurement Executive, Ministry of Defence either to meet a limited requirement not covered by any existing British Standard or to serve as a basis for inspection of material, the properties and uses of which are not sufficiently developed to warrant submission to the British Standard Institution for standardisation.

(2) Requirements contained herein are absolute and are not subject to corrections for tolerance of test methods. If multiple determinations are made by the Inspecting Laboratory, average results will be used except for those test methods where repeatability data is given. In those cases the average derived from the individual results that agree within the repeatability limits for the test method may be used if the Quality Assurance Authority permits.

(3) The Quality Assurance Authority responsible for the type approval of materials to this specification is shown in Clause 19. After type approval has been granted to a material, the Quality Assurance Authority responsible for any subsequent quality assurance (routine inspection) of supplies will be named in the tender or contract for the material.

(4) The related documents and test methods to be used are the latest published editions of those given in this specification.

(5) Further details concerning the test apparatus specified in this specification can be obtained from the Director of Materials Quality Assurance, E135/17 Royal Arsenal East, Woolwich, London, SE18 6TD.

1. Scope and intended application

- 1.1 This specification covers the requirements for a rapid drying finishing scheme suitable for use mainly on the exterior surfaces of aircraft.
- 1.2 The finishing coat of the scheme can if desired be removed by the use of a suitable approved paint remover without detriment to the underlying primer or filler. Paint remover complying with DEF-1443 will be used for Royal Air Force and Fleet Air Arm aircraft. The materials are intended for use over an approved pre-treated surface, and when selective strippability of the finish is required the primer or filler, as appropriate, shall be allowed to air dry for 16 hours before overcoating with the finish.

2. Related documents

The following publications (latest issues) shall form part of this specification to the extent specified therein:

British Standards Institution

BS. 381C	Colours for specific purposes.
B.S. 805	Toluenes.
BS. 872	Abrasive papers and cloths (technical products).
BS. 1470	Wrought aluminium and aluminium alloys: sheet and strip.
BS.3900	Methods of test for paints.

Ministry of Defence

DEF STAN 80-38	Thinners for cellulose nitrate paints and dopes.
DEF-1234	General requirements for packaging supplies for the Services.
DEF-1443	Paint remover, trichloroethylene based, water rinsable.
DTD 585	Hydraulic oil, petroleum base.
DEF STAN 03-7	Painting of metal and wood.
DTD 5567	Interior and exterior protective finishing schemes.
D.Eng.RD.2453	Turbine fuel, aviation kerosene type containing fuel system icing inhibitors.
D.Eng.RD.2487	Lubricating oils, aircraft turbine engines, synthetic type.

3. Description

- 3.1 The finishing scheme shall consist of one or other of the following combinations of materials:
- Scheme 1 - primer and finish.
 - Scheme 2 - primer, filler and finish.
- 3.2 The materials shall consist of:
- (a) A *primer* - which shall be suitable for direct application to pre-treated metal and which shall be a two component chromate pigmented cold-curing epoxide resin vehicle to the requirements described additionally in Clause 3.6 and 3.8;
 - (b) A *filler* - (when required) which shall be suitable for application over the primer and which shall be a two component pigmented cold-curing epoxide resin vehicle conforming to the requirements described additionally in Clause 3.7 and 3.8;
 - (c) A *finish* - which shall be suitable for application over the primer overcoated with the filler. The finish shall be based on an air drying acrylic resin conforming to the requirements described additionally in Clause 3.11. The finish shall be matt or glossy (or at least semi-gloss and capable of being polished to give a highly glossy surface without detriment to the life of the scheme or the protection it affords the metal), as required by the terms of the contract or order.
- 3.3 The materials shall be suitable for application to metal in the following order, to give when dry the weight additions indicated, with or without flattening of the filler:
- | | |
|--------|--------------------------|
| Primer | $30 \pm 5 \text{ g/m}^2$ |
| Filler | $70 \pm 8 \text{ g/m}^2$ |
| Finish | $40 \pm 8 \text{ g/m}^2$ |
- NOTE:- The finish weight addition is normally obtained in more than one coat.*
- 3.4 The materials shall be suitable for use by spraying when diluted, if necessary, with the appropriate thinners.
- 3.5 When supplied for use in the RAF and Fleet Air Arm the primer, filler and finish shall be compatible with thinners to specification DEF STAN.80-38.
- 3.6 When supplied for use in the RAF and Fleet Air Arm the primer shall also conform to DTD 5567.
- 3.7 When supplied for use in the RAF and Fleet Air Arm the filler shall also conform to DTD 5555.
- 3.8 The cold-curing epoxide primer and filler shall each consist of an epoxide resin vehicle and curing agent. The two components shall be suitable for use when mixed together in the declared proportions which shall be in a simple ratio by volume. The manufacturers shall state which curing agent shall be used for each material and the mixing proportions for each material. The mixing instructions shall be marked clearly on the containers.
- 3.9 The mixtures of primer or filler prepared as above shall not settle unduly and shall remain suitable for use for not less than the following periods of time after mixing:
- 8 hours at a temperature of $20^\circ \pm 2^\circ\text{C}$.
 - 4 hours at a temperature of $35^\circ \pm 2^\circ\text{C}$.

3.10 The primer and filler will not cure satisfactorily at low temperatures or in conditions of high humidity. If type approval is required for conditions other than those laid down in DEF STAN 03-7 then evidence of satisfactory performance shall be supplied.

3.11 The finish shall consist essentially of a pigmented acrylic resin vehicle with plasticiser if required.

4. Freedom from objectionable ingredients

Substances which may cause injury or discomfort to operators during or after application shall not be used.

5. Rate of drying

5.1 *Primer* - the primer coat shall be capable of being overcoated in not more than 4 hours when applied as described in Appendix A.2.2. There shall be no visible defects or lifting of the primer on overcoating with the filler or the finish as described in Appendix A.2.2.

5.2 *Filler* - the filler coat shall be capable of being overcoated in not more than 4 hours when applied as described in Appendix A.2.3. There shall be no visible defects or lifting of the filler on overcoating with the finish. The filler shall be capable of being rubbed smooth without clogging the paper when tested by the method described in Appendix A.3.

5.3 *Finish* - the finishing coat shall become "Hard Dry" in not more than 2 hours when applied by the method described in Appendix A.2.4.1 or A.2.4.2 as appropriate and when tested as described in Appendix A.2.5 no visible defects shall occur.

6. Colour and finish

6.1 The colour of the finish coat should be selected from BS. 381C.

6.2 The colour of the primer, filler and finish shall be significantly different one from the other.

6.3 When applied to a hard aluminium panel, the dry film resulting from the application of one priming coat, one flatted filler coat (Scheme 2 only) and one or more finishing coats conforming to the limits of weight specified in Clause 3.3 shall match the standard in respect of colour.

6.4 Details of the standard of colour and finish are obtainable from the Director of Quality Assurance (Materials), E135/17, Royal Arsenal East, Woolwich, London, SE18 6TD.

7. Toughness, hardness and adhesion

Test Conditions and Requirements

Test	Test method	Material	Scheme 1	Scheme 2	Notes
(a) Bend	Panels shall be prepared and dried as in Appendix A1. Testing shall be in accordance with BS. 3900 Part E.1 using the Type I apparatus.	Soft aluminium	9.0 mm at 0°	19.0 mm at 0°	The paint film shall not become detached or damaged; slight strain cracking may be permitted provided there is no loss of adhesion of any part of the system.
(b) Dry scratch	Panels shall be prepared and dried as in Appendix A.I. Testing shall be in accordance with BS. 3900 Part 2.	Hard aluminium	1,500 g at room temperature	1,500 g at room temperature	Any scratch produced shall not penetrate the top coat.
(c)Wet scratch	Appendix A.4 followed by BS. 3900 Part E.2.	Hard aluminium	1,000 g at room temperature	1,000 g at room temperature	Any scratch produced shall not penetrate the top coat.

8. Protection against artificial sea water

The protection against artificial sea water of a film of the material prepared and tested as described in Appendix A.5 shall be such that flaking, change of colour, blistering of the paint or corrosion of the metal shall not occur.

9. Resistance to synthetic lubricating oils

The resistance to cold and hot synthetic lubricating oils of films of the material shall be such that when tested by the method described in Appendix A.6.1 and A.6.2 the films shall not become detached and the scratch when specified shall not penetrate the finishing coat. In addition, following the tests to Appendix A.6.1 and A.6.2 the film shall show only negligible discoloration. There shall be no greater discoloration than on the approved sample.

10. Resistance to hydraulic fluid (Mineral based, type test only)

The resistance to cold DTD 585 hydraulic fluid of films of the material shall be such that when tested by the method described in Appendix 7, the film shall show no signs of blistering or lifting and the scratch shall not penetrate the finishing coat.

11. Resistance to organic solvents

The resistance to immersion for 2 hours in organic solvents (toluene/tri-methylpentane) of films of the material shall be such that when tested by the method described in Appendix A.8, the film shall retain its original appearance and shall not become detached or damaged to an extent greater than that permitted in Clause 7(a).

12. Resistance to hot kerosene

The resistance to hot kerosene to Specification D.Eng.RD.2453 of films of the material shall be such that when tested by the method described in Appendix A.9 the film shall not become detached or damaged to an extent greater than that permitted in Clause 7(a).

13. Resistance to heat

The resistance to heat of films of the material shall be such that when tested by the method described in Appendix A.10 the film shall not become detached or damaged to an extent greater than that permitted in Clause 7(a). Slight yellowing of the films shall be disregarded.

14. Resistance to temperature cycling (Cold crack test, type test only)

The resistance to temperature cycling of a film of the material shall be such that when tested by the method described in Appendix A.11 the film shall not show signs of cracking, checking, chipping, flaking, blistering, loss of gloss or other defects.

15. Overcoating test

The Scheme shall be capable of being overcoated when tested in accordance with Appendix A.12. It shall show no signs of crazing, lifting or other defects.

16. Strippability

(a) *Type test;* (b) *Batch test*

When treated as described in Appendix A.13.1 and A.13.2 the primer or filler as appropriate shall not be removed during stripping and the appearance of the refinished panel shall be in no way inferior to the appearance of the normally applied paint scheme. The scratch shall not penetrate the top coat.

17. Resistance to natural weathering

The resistance to natural weathering of a film of the material shall be such that when tested by the method described in Appendix A.14 the film shall not show signs of checking, cracking, chipping, flaking or blistering. Retention of colour and finish shall be to the satisfaction of the Director of Materials Quality Assurance. Slight chalking and slight loss of gloss shall be disregarded. Neither the filler coat nor the primer coat shall be visible and the metal shall be free from corrosion.

18. 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 described in this specification for not less than twelve months in either tropical or temperate climates after the date of despatch.

19. Type approval

19.1 Before any particular manufacturer's materials are accepted as complying with the requirements of this specification, the manufacturer shall obtain type approval. Applications for type approval shall be submitted to the Director of Materials Quality Assurance, E.135/17, Royal Arsenal East, Woolwich, London SE18 6TD accompanied by:

- (a) Evidence that the materials comply with Clauses 1-17 inclusive of this specification.
- (b) Wet samples including thinners of all materials for which approval is sought together with details of their formulation, ie percentage of pigment, medium, volatile and nature of medium, pigments and extenders and the specification references, where applicable, of the ingredients; and the weight per gallon of each material submitted.
- (c) One sprayed panel prepared in accordance with Appendix XIV in respect of each finishing colour and scheme for which approval is sought, and marked on the reverse with the description and film weight of each applied coat.

19.2 The Director of Materials Quality Assurance, may at his discretion grant a provisional type approval on the basis of short term tests before natural weathering 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 Clause 19.1(a), (b) and (c).

19.3 Type approval shall 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.

20. Routine inspection

20.1 A representative sample of each batch of each of the components of the schemes shall be tested by the manufacturer and proved to comply with Clauses 5-9 and 11, 12, 13, 15 and 16(b) (Batch test only) inclusive before release is authorised. At the discretion of the Quality Assurance Officer, the time required by Clauses 9 and 13 may be reduced from 6 weeks to 7 days.

20.2 The Director of Materials Quality Assurance, may require the manufacturer to test to Clauses 10, 14, 16 (Type test) and 17 at any time.

21. Preparation for delivery

21.1 In addition to bearing the markings called for by legal requirements, the packages constituting a consignment shall be clearly and durably marked with the description of the paint as shown by the title of this specification, the 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.A.

21.2 The following warning notices shall also be marked on the containers as appropriate:

- (a) "Use with Curing Agent . . . and Thinner . . ."
- (b) "This material shall be mixed in . . . parts by volume with Curing Agent . . . prior to use", the ratio as appropriate being stated.
- (c) In addition to the above, each container of pigmented component and curing agent shall have marked on the bottom outside surface:
 - (1) Manufacturer's proprietary reference number or description.
 - (2) Batch Number.

APPENDIX 1

Method for the preparation and painting of aluminium panels

- A.1.1 The panels which shall be hard or soft as required shall comply with the specification and gauge described in the appropriate Appendix and shall be acid chromate pickled, as described in Part A.3 of BS 3900. In all cases drying shall be carried out at a temperature of $20^{\circ} \pm 2^{\circ}\text{C}$ and a relative humidity of 60-70 per cent. All film weights shall be as specified in Clause 3.3.
- A.1.2 *Scheme 1*
One coat of primer shall be applied by spraying. After 16 hours drying the finishing coat shall be applied by spraying and allowed to dry for 7 days unless otherwise specified.
- A.1.3 *Scheme 2*
One coat of primer shall be applied by spraying. After 4 hours drying a coat of filler shall be applied by spraying and allowed to dry for 16 hours. The finishing coat shall then be applied by spraying and allowed to dry for 7 days unless otherwise specified.

APPENDIX 2

Method for the determination of rate of drying

- A.2.1 In all cases, drying shall be carried out at a temperature of $20^{\circ} \pm 2^{\circ}\text{C}$ and a relative humidity of 60-70 per cent. All film weights shall be as specified in Clause 3.3.
- A.2.2 *Primer*
- A.2.2.1 One coat of primer shall be applied by spray to a hard aluminium panel. After 4 hours drying the filler shall then be applied by spray and allowed to dry for 16 hours. The panel shall then be visually examined.
- A.2.2.2 The test shall be repeated using two or more coats of finish applied wet on wet instead of one coat of filler.
- A.2.3 *Filler (Scheme 2)*
Prepare the panel as described in A.2.2.1 but after the filler has dried for 4 hours spray two or more coats of finish applied wet on wet. Allow to dry 16 hours. The panel shall then be examined visually.
- A.2.4 *Finish*
- A.2.4.1 *Over primer (Scheme 1)* - prepare the panel as described in A.2.2.2. After the finish has been allowed to dry for 2 hours following the application of the last coat it shall then be tested as described at A.2.5.
- A.2.4.2 *Over filler (Scheme 2)* -prepare the panel as in A.2.3 above except that the primer is allowed to dry for 16 hours. When the finish has been allowed to dry for 2 hours, after the application of the last coat, then it shall be tested as described at A.2.5.
- A.2.5 *Test for dryness*

The panel shall be placed on one pan of a pair of scales. After balancing the scales, a weight of 2000 g. 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 on the film shall be capable of being wiped away with dry cotton wool without damaging the film, or shall disappear on standing for one minute.

APPENDIX 3

Method for the determination of rubbing properties of the filler

- A.3 A panel of hard aluminium 15cm x 23cm to BS. 1470 Grade SIC-H, 0.7mm thick shall be prepared in accordance with Appendix I Scheme 2 to the filler stage and allowed to dry for 16 hours.
- The panel shall then be rubbed with silicon carbide paper, Grade A 320 to BS. 872, wet with water.

APPENDIX 4

Method for the determination of toughness, hardness and adhesion after water immersion (Wet scratch test)

- A.4 A 13cm x 5cm panel of hard aluminium shall be prepared and painted as described in Appendix I.
The test described in BS. 3900 Part E.2 shall be carried out after immersion of the panel for 24 hours in distilled water at $20^{\circ} \pm 2^{\circ}\text{C}$. Surplus water shall be removed immediately from the surface of the panel by shaking and by means of clean, dry filter paper and the wet scratch test performed within 30 seconds using the specified weight.

APPENDIX 5

Method for the determination of protection against artificial sea water

- A.5 A 15cm x 10cm burnished steel panel prepared as described in BS. 3900 Part A.3 shall be painted as described in Appendix I. 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 ¼ 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.

The panels shall be partially immersed in a testing solution of the composition specified in BS. 3900 Part F.4 Clause 6.1, at a temperature of $20^{\circ} \pm 2^{\circ}\text{C}$ continuously for 7 days, immediately after which time the panel shall be examined visually. The paint film shall be removed from one half of the face of the panel by a suitable paint remover so that a representative section of the panel is exposed and the metal examined for signs of corrosion.

APPENDIX 6

Method for the determination of resistance to synthetic lubricating oils

- A.6.1 *Cold oil*
Carry out the test as described in BS. 3900, Part G.1, subject to the following special conditions:
- A.6.1.1 *Test piece.* Smooth (ie unabraded) size 13cm x 5cm hard aluminium panel to BS. 1470 Grade S1C-H, 0.7mm thick prepared, coated and dried in accordance with Appendix I.
- A.6.1.2 *Test solution.* Lubricating oil, aircraft turbine engine-synthetic type to specification D.Eng.Rd. 2487.
- A.6.1.3 *Test procedure*
- A cut shall be made through the film down to the metal using a sharp knife or razor edge. The cut shall be made down the middle of the panel parallel to the long edge.
 - Completely immerse the test piece in the test solution continuously for 6 weeks at a temperature of $20^{\circ} \pm 2^{\circ}\text{C}$.
- A.6.2 *Hot oil*
Carry out the test as described in BS. 3900 Part G. 1 subject to the following special conditions:
- A.6.2.1 *Test Piece.* Smooth (ie unabraded) size 13cm x 5cm hard aluminium panel to BS. 1470 Grade SIC-H, 0.7mm thick prepared, coated and dried in accordance with Appendix I.
- A.6.2.2 *Test solution.* Lubricating oil, aircraft turbine engine-synthetic type to specification D.Eng.RD.2487.
- A.6.2.3 *Test procedure*
- A cut shall be made through the film down to the metal using a sharp knife or razor edge. The cut shall be made down the middle of the panel parallel to the long edge.
 - Completely immerse the test piece in the test solution continuously for 8 hours at a temperature of $70^{\circ} \pm 2^{\circ}\text{C}$.
 - Remove the test piece from the test solution and wipe with a soft rag dipped in a mixture of:
75 parts by volume 2.2.4. trimethylpentane IP reference fuel quality; and
25 parts by volume pure toluene to BS. 805.
 - Carry out the scratch test as described in BS. 3900 Part E.2 under a load of 1200 grammes immediately the solvent has evaporated. The scratch shall be made parallel to approximately 1 cm from the cut described above.

APPENDIX 7

Method for the determination of resistance to hydraulic fluids

- A.7** Carry out the test as described in BS. 3900 Part G.1 subject to the following special conditions:
- A.7.1 *Test piece.* Smooth (ie unabraded) size 13cm x 5cm hard aluminium panel to BS. 1470 Grade SIC-H, 0.7mm thick prepared, coated and dried in accordance with Appendix I.
- A.7.2 *Test solution.* Mineral based hydraulic oil to DTD 585.
- A.7.3 *Test procedure*
- A cut shall be made through the film down to the metal using a sharp knife or razor's edge. The cut shall be made down the middle of the panel parallel to the long edge.
 - Completely immerse the test piece in the test solution continuously for six weeks at a temperature of $20^{\circ} \pm 2^{\circ}\text{C}$.
 - Remove the test piece from the test solution and wipe with a soft rag dipped in a mixture of:
75 parts by volume 2.2.4. trimethylpentane IP reference fuel quality; and
25 parts by volume pure toluene on BS. 805.
 - Immediately carry out the scratch test as described in BS. 3900 Part E.2 under a load of 1,500 grammes.

APPENDIX 8

Method for the determination of resistance to organic solvents

- A.8** Carry out the test as described in BS. 3900 Part G.1 subject to the following special conditions:
- A.8.1 *Test piece.* Smooth (ie unabraded) size 13cm x 5cm soft aluminium panel to BS. 1470 Grade SIC-0, 0.3mm thick prepared, coated and dried in accordance with Appendix I.
- A.8.2 *Test solution.* Mixture of:
75 parts by volume 2.2.4. trimethylpentane IP reference fuel quality; and
25 parts by volume pure toluene to BS. 805.
- A.8.3 *Test procedure*
- Completely immerse the test piece in the test solution continuously for 2 hours at a temperature of $20^{\circ} \pm 2^{\circ}\text{C}$.
 - Remove the test piece from the test solution, allow to dry for 30 minutes and examine for appearance and condition.
 - Keep the test piece at room temperature for 24 hours and then carry out the bend test, as described in BS. 3900 Part E.1 at room temperature using a Type I apparatus and the mandrel size set out in Clause 7(a) for the scheme under test.

APPENDIX 9

Method for the determination of resistance to hot kerosene

- A.9** Carry out the test as described in BS. 3900 Part G.1 subject to the following special conditions:
- A.9.1 *Test piece.* Smooth (ie unabraded) size 13cm x 5cm soft aluminium panel to BS. 1470 Grade SIC-0, 0.3mm thick (30 s.w.g.) prepared, coated and dried in accordance with Appendix I.
- A.9.2 *Test solution.* Kerosene to specification D.Eng.RD.2453.
- A.9.3 *Test procedure*
- Completely immerse the test piece in the test solution continuously for 2 hours at a temperature of 120°C (250°F).
 - Remove the test piece from the test solution, allow to dry for 1 hour and examine for appearance and condition.
 - Keep the test piece at room temperature for 24 hours and then carry out the bend test, as described in BS. 3900 Part E.1 at a temperature of $20^{\circ} \pm 2^{\circ}\text{C}$ using a Type I apparatus and the mandrel size set out in Clause 7(a) for the scheme under test.

APPENDIX 10**Method for the determination of resistance to heat**

- A.10 A 13cm x 5cm panel of smooth (ie unabraded) soft aluminium panel to BS. 1470 Grade S10-0,0.3mm thick prepared, coated and dried in accordance with Appendix I. After application of the final coat it shall be allowed to dry at a temperature of $20^{\circ} \pm 2^{\circ}\text{C}$ and a relative humidity of 60-70 per cent for 7 days.

The panel shall be placed in an electrically heated air circulating oven maintained at $130^{\circ} \pm 2^{\circ}\text{C}$ for 6 weeks.

The panel shall be removed, allowed to cool to a temperature of $20^{\circ} \pm 2^{\circ}\text{C}$ and the bend test, as described in BS. 3900 Part E.1, carried out using a Type I apparatus and the mandrel size set out in Clause 7 (a) for the scheme under test.

APPENDIX 11**Method for the determination of resistance to temperature cycling (Cold crack test)**

- A.11 A 15cm x 10cm panel of hard aluminium to BS. 1470 Grade S1C-H, 0.3mm thick shall be painted as described in Appendix I with the scheme under test.

The panel shall then be subjected to a cycle of humidity, low temperature, ambient temperature as follows:

24 hours exposure under the conditions defined in specification BS. 3900 Part F.2

20 hours at $-20^{\circ} \pm 2^{\circ}\text{C}$

4 hours at $20^{\circ} \pm 2^{\circ}\text{C}$.

The cycle shall be repeated twice weekly for six weeks.

APPENDIX 12**Method for the determination of overcoating resistance**

- A.12 Eight 30cm x 10cm panels (four per Scheme) of hard aluminium to BS. 1470 Grade S1C-H, 0.7mm thick shall be painted as described in Appendix I with the Scheme under test. In Scheme 2 the filler coat shall be flatted. After the application of the finishing coat each of the four panels for both Schemes shall be allowed to dry for the following periods:

(a) 4 hours

(b) 24 hours

(c) 7 days

(d) 7 days followed by heating at $70^{\circ} \pm 2^{\circ}\text{C}$ for 72 hours.

At the end of these periods the panels shall be overcoated with the finish to a weight of $40 \pm 8 \text{ g/m}^2$ allowing no more than two minutes between successive coats.

APPENDIX 13**Method of test for strippability**

- A.13.1 *Type test*

A panel 15cm x 13cm smooth (ie unabraded) hard aluminium to BS. 1470 Grade S1C-H, 0.7mm thick shall be painted as described in Appendix 1 with the Scheme under test. Expose under the conditions defined in BS. 3900 Part F.3 for 6 weeks. At the end of this period allow the panel to stand 16 hours at room temperature and then apply a brushed coat of paint remover to DEF-1443, allow to stand in a horizontal position for 30 minutes and scrape off the residue of paint remover and loosened paint film. Finally wash the panel under a jet of cold water swabbing with a pad of wet cotton wool, and allow to dry overnight. Lightly flat the primer/filler with silicon carbide paper Grade A320 to BS. 872 wet with water, wash and allow to dry for 1 hour and coat with a light coat of primer/filler as appropriate (primer $20 \pm 5 \text{ g/m}^2$, filler $40 \pm 8 \text{ g/m}^2$). Allow to dry for 16 hours and apply the finishing paint to give $40 \pm 8 \text{ g/m}^2$. Allow to dry for 7 days at a temperature of $20^{\circ} \pm 2^{\circ}\text{C}$ and a relative humidity of 60-70 per cent and then carry out a dry scratch test as described in Clause 7(b) using a load of 1,500 grammes.

A.13.2 Batch test.

A panel 6 inch x 5 inch of hard aluminium to BS.1470 Grade S1C-H, 0.7mm thick shall be painted as described in Appendix 1 with the Scheme under test. After application of the final coat it shall be allowed to dry at a temperature of $20^{\circ} \pm 2^{\circ}\text{C}$ and a relative humidity of 60-70 per cent for 4 days and then heated in an oven for 100 hours at $70^{\circ} \pm 2^{\circ}\text{C}$. After cooling for 1 hour apply a brushed coat of paint remover to DEF-1443, allow to stand in a horizontal position for 30 minutes and scrape off the residue of paint remover and loosened paint film. Finally wash the panel under a jet of cold water swabbing with a pad of wet cotton wool and allow to dry overnight. Lightly flat the primer/filler with silicon carbide paper Grade A 320 to BS.872 wet with water, wash and allow to dry for one hour and coat with a light coat of primer/filler as appropriate (primer $20 \pm 5\text{g/m}^2$, filler $40 \pm 8\text{g/m}^2$). Allow to dry 4 hours and apply the finishing paint to give $40 \pm 8\text{g/m}^2$. Allow to dry for 16 hours at a temperature of $20^{\circ} \pm 2^{\circ}\text{C}$ and a relative humidity of 60-70 per cent and then carry out the dry scratch test as described in Clause 7(b) using a load of 1,000 grammes.

APPENDIX 14**Method for the determination of resistance to natural weathering**

- A.14 Panels of hard aluminium to BS. 1470 Grade S1C-H, 0.7mm thick shall be painted as described in Appendix 1 with the Schemes under test. In Scheme 2 the filler coat shall be flatted.

The panel shall have an exposed area of at least 0.0225m^2 , 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 two years in the open facing south at an angle of 45° . During the exposure the panel shall be sprayed three times per working day at intervals of three to four hours with a solution of artificial sea water, the composition of which is given in BS. 3900 Part F.4 Clause 6.1.

At the completion of the test the panel shall be examined and half of the panel shall be stripped and inspected for freedom from corrosion.

Approved for issue,

N. L. Parr
Director of Research Materials

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