

NRA ADDENDUM TO

BD 35/99

QUALITY ASSURANCE SCHEME FOR PAINTS AND SIMILAR PROTECTIVE COATINGS

Standard BD 35/99 - Quality Assurance Scheme for Paints and similar Protective Coatings - is applicable in Ireland with the following amendments:

GENERAL

1. The Standard provides specification requirements for use in public purchasing contracts. It does not lay down legislation requirements for products and materials used in road construction in Ireland.
2. All International Standards (“ISO”, “BS ISO” or “BS EN”) referred to in this Standard are UK editions. If an Irish edition of an International Standard has been published, then it shall be used in place of the UK edition.
3. This Addendum incorporates the BD 35 Errata Sheet dated October 1999, published February 2000.
4. At several locations:

For: “Overseeing Organisation”
Read: “National Roads Authority”;

For: “highway”
Read: “road”;

For: “British or ISO Standard”
Read: “Irish, British or ISO Standard”.

SPECIFIC

1. BD 35/99

- 1.1 Page 1/1, Paragraph 1.1:
Delete Paragraph 1.1 and replace with:
“1.1 This version of the standard replaces BD 35/93 issued in June 1993, having been amended to take account of: the variety of contract conditions now in use, UK legislation on the control of solvent emissions into the atmosphere, restrictions contained in the UK’s Control of Substances Hazardous to Health Regulations on the use of certain raw materials in paints, recent changes in Irish, British and European Standards and a rationalisation and simplification of the

range of products, where possible, consistent with other UK Highways Agency documents. For use in Ireland, Design Organisations shall ensure that the Quality Assurance Scheme complies with the Statutes listed in Section 5 References.”

1.2 Page 1/1, Paragraph 1.4:

Delete Paragraph 1.4 and replace with:

“1.4 This Standard should be used forthwith for all schemes for the construction and/or improvement of national roads. The Standard should be applied to the design of schemes already being prepared unless, in the opinion of the National Roads Authority, application would result in significant additional expense or delay progress. In such cases, Design Organisations should confirm the application of this Standard to particular schemes with the National Roads Authority.”

1.3 Page 2/1, Paragraphs 2.1, 2.2 and 2.3:

Delete Paragraph 2.1, 2.2 and 2.3 and replace with:

“2.1 The quality assurance scheme is administered by the National Roads Authority to ensure that only paints of acceptable quality are applied to steel road structures. The scheme requires paint manufacturers to obtain National Roads Authority registration by registering their formulations with them, before offering paints for use in the National Roads Authority contracts. Paint samples taken from painting contracts are then checked to ensure compliance with registered formulations.”

1.4 Page 3/1, Paragraph 3.1, line 10:

Delete last sentence beginning, “It is also given in...” and replace with:

“It is also given in the Series 1900 Notes for Guidance on the NRA Specification for Road Works.”

1.5 Page 4/1, Paragraphs 4.1 and 4.2:

Delete Paragraphs 4.1 and 4.2 and replace with:

“4.1 Requirements for the provision of paint samples from new works contracts are given in Series 1900 of the NRA Specification for Road Works and advice is given in the Notes for Guidance on the NRA Specification for Road Works.”

- 1.6 Page 4/1, Paragraph 4.3 (i):
Delete Paragraph 4.3(i) and replace with:
“(i) Paint samples will be sent to the following
address for testing:
- Coatings Section
Materials Technology Department
Enterprise Ireland
Dublin 9
- (or equivalent testing authority in another member
state of the European Community)”
- 1.7 Page 4/1, Paragraphs 4.4, 4.5 and 4.6:
Delete Paragraphs 4.4, 4.5 and 4.6.
- 1.8 Page 5/1, Paragraph 2:
Delete Paragraph 2 and replace with:
“2. Manual of Contract Documents for Road Works (NRA)
- Volume 1: Specification for Road Works, NRA
- Volume 2: Notes for Guidance on the Specification for Road Works”.
- 1.9 Page 5/1, Section 5:
Add the following text:
“4. Statutes
- Safety, Health and Welfare at Work Act, 1989, and the Regulations made under its powers
- Dangerous Substances Acts, 1972
- Dangerous Substances (Amendments) Acts, 1979
- Factories Act, 1955”
- 1.10 Page 6/1, Section 6:
Delete text and replace with:
“6.1 All technical enquiries or comments on this Standard should be sent in writing to:
- Head of Project Management and Engineering
National Roads Authority
St Martin’s House
Waterloo Road
Dublin 4”
- 2. Annex A: Manual for Paints for Structural Steelwork**
- 2.1 Even Pages A/14 to A/36, A/40, A/45, A/47, Odd Pages A/51 to A/67, Clause 10, Tests on each batch:
For: “6.ii”
Read: “6.iii”;
- For: “6.v”

- Read: “6.vi”;
For: “6.viii”
Read: “6.ix”;
For: “6.ix”
Read: “6.x”.
- 2.2 Even Pages A/14 to A/36, A/40, A/45, A/47, Odd Pages A/51 to A/67, Clause10, Tests on first batch for each contract:
For: “6.iv”
Read: “6.v”.
- 2.3 Page A/49, Paragraph 14, line 10:
For: “Series 1900 of the Specification for Highway Works and associated Notes for Guidance.”
Read: “Series 1900 of the NRA Specification for Road Works and the associated Notes for Guidance.”
- 2.4 Page A2/1, Paragraph 6.1, line14:
For: “on request to QSCE Division.”
Read: “on request to the QSCE Division of the UK’s Highways Agency.”
- 2.5 Page GN/1, Paragraph 7.1 (4), line 1:
For: “Specification for Highway Works”
Read: “NRA Specification for Road Works”
- 2.6 Page GN/6, Paragraph 7.3 (4), line 14:
Delete the paragraph, “The responsibilities of the Contractor...paragraph 7.” and replace with:
“The responsibilities of the Contractor with respect to the application of paint are clearly stated in the NRA Specification for Road Works, Clause 1914.”
- 2.7 Page GN/6, Paragraph 7.4, line 13:
For: “Clause 1910 of the Notes for Guidance on the Specification for Highway Works.”
Read: “Clause 1910 of the Notes for Guidance on the NRA Specification for Road Works.”
- 2.8 Page R/2, References:
Add the following note to the end of the References section:
“3. Irish Standards are published by the National Standards Authority of Ireland (NSAI), Glasnevin, Dublin 9, Ireland.”



.....
E O’CONNOR
Head of Project Management and
Engineering



THE HIGHWAYS AGENCY



**THE SCOTTISH EXECUTIVE DEVELOPMENT
DEPARTMENT**



**THE NATIONAL ASSEMBLY FOR WALES
CYNULLIAD CENEDLAETHOL CYMRU**



**DEPARTMENT OF THE ENVIRONMENT FOR
NORTHERN IRELAND**

Quality Assurance Scheme for Paints and Similar Protective Coatings

Summary:

This Standard gives details of the quality assurance scheme for paints and similar protective coatings used in the protection of motorway and other trunk road steelwork structures and includes the Manual of Paints for Structural Steelwork at Annex A. It supersedes and replaces BD 35/93.

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**VOLUME 2 HIGHWAY STRUCTURE
DESIGN
(SUBSTRUCTURES AND
SPECIAL STRUCTURES)
MATERIAL**

**SECTION 4 PAINTS AND OTHER
PROTECTIVE COATING**

PART 1

BD 35/99 ERRATA SHEET

**QUALITY ASSURANCE SCHEME FOR
PAINTS AND SIMILAR PROTECTIVE
COATINGS**

SUMMARY

This errata sheet is issued free of charge with BD 35. It lists amendments to be made under Section 10 due to the inclusion of an additional testing for “density”.

INSTRUCTIONS FOR USE

1. Insert errata sheet after page A12 of BD 35.
2. Amend the relevant pages of BD 35 indicated on the errata sheet.
3. Enter the details of the amendment on the Registration of Amendments sheet, sign and date to confirm that the amendment has been incorporated.
4. Archive this sheet as appropriate.

Note: A quarterly index with a full set of Volume Contents Pages is available separately from the Stationery Office Ltd.

ERRATA

BD 35/99 - MANUAL OF PAINTS

Volume 2 Section 4 - Part 1
Annex A - Section 4.0 - ITEM SHEETS

Please note the following modification for all item sheets:

Clause 10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

Part 6, Paint Properties:

The tests in this section, for pages:

A/14, A/16, A/18, A/20, A/22, A/24, A/26, A/28, A/30, A/32, A/34, A/36, A/40, A/45, A/47, A/51, A/53, A/55, A/57, A/59, A/61, A/63, A/65 and A/67;

should read:

On every batch:

6.iii instead of 6.ii
6.vi instead of 6.v
6.ix instead of 6.viii
6.x instead of 6.ix

On the first batch for each contract:

6.v instead of 6.iv

October/99

**VOLUME 2 HIGHWAY STRUCTURES:
DESIGN
(SUBSTRUCTURES AND
SPECIAL STRUCTURES),
MATERIALS**

**SECTION 4 PAINTS AND OTHER
PROTECTIVE COATINGS**

PART 1

BD 35/99

**QUALITY ASSURANCE SCHEME FOR
PAINTS AND SIMILAR PROTECTIVE
COATINGS**

SUMMARY

This Standard gives details of the quality assurance scheme for paints and similar protective coatings used in the protection of motorway and other trunk road steelwork structures and includes the Manual of Paints for Structural Steelwork at Annex A. It supersedes and replaces BD 35/93.

INSTRUCTIONS FOR USE

1. Remove existing contents pages for Volume 2.
2. Remove BD 35/93 from Volume 2, Section 4, Part 1 which is superseded by BD 35/99 and archive as appropriate.
3. Insert new contents pages for Volume 2 dated August 1999.
4. Insert BD 35/99 into Volume 2, Section 4, Part 1.
5. Archive this sheet as appropriate.

REGISTRATION OF AMENDMENTS

Amend No	Page No	Signature & Date of incorporation of amendments	Amend No	Page No	Signature & Date of incorporation of amendments

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**VOLUME 2 HIGHWAY STRUCTURES:
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PROTECTIVE COATINGS**

PART 1

BD 35/99

**QUALITY ASSURANCE SCHEME FOR
PAINTS AND SIMILAR PROTECTIVE
COATINGS**

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1. Introduction
2. Quality Assurance Scheme
3. Description of the Manual of Paints
4. Testing of Contract Paint Samples
5. References
6. Enquiries

Annex A Manual of Paints for Structural Steelwork

1. INTRODUCTION

1.1 This version of the standard replaces BD 35/93 issued in June 1993, having been amended to take account of: the variety of contract conditions now in use, legislation on the control of solvent emissions into the atmosphere, restrictions contained in the Control of Substances Hazardous to Health Regulations on the use of certain raw materials in paints, recent changes in British and International Standards and a rationalisation and simplification of the range of products, where possible, consistent with other Highways Agency documents.

1.2 Except where a standard specified in this document implements or is technically equivalent to a Harmonised European Standard or to a European Standard adopted for use within the European Community after 31 December 1985, any requirement for products or materials to comply with the specified standard shall be satisfied by compliance with:

(i) a relevant standard or code of practice of a national standards institution or equivalent body of any member state of the European Community

or

(ii) a relevant international standard recognised in any member state of the European Community

or

(iii) a relevant specification acknowledged for use as a standard by a public authority of any member state of the European Community

or

(iv) traditional procedures of manufacture of a member state of the European Community where these are the subject of a written technical description sufficiently detailed to permit assessment of the goods or materials for the use specified

or

(v) a European Technical Approval (ETA) issued in accordance with the Construction Products Directive 89/106/ECC (or, until procedures are available for the issue of ETAs, a specification sufficiently detailed to permit assessment) for goods or materials of an innovative nature or subject to innovative processes of manufacture and which fulfil the purpose provided for by the specified standard

provided that the proposed standard, code of practice, technical specification, technical description, or European Technical Approval provides in use levels of safety, suitability and fitness for purpose equivalent to those required by the specified standard in so far as they are not inconsistent with the 'Essential Requirements' of the Construction Products Directive (89/106/EEC).

Scope

1.3 This Standard gives details of the quality assurance scheme for paints and similar protective coatings used in the protection of steel highway structures against corrosion. The Manual of Paints for Structural Steelwork at Annex A provides data on paints and similar materials for use in the Overseeing Organisation's painting contracts.

Implementation

1.4 This Standard should be used forthwith for all schemes currently being prepared provided that, in the opinion of the Overseeing Organisation, this would not result in significant additional expense or delay progress. Design Organisations should confirm its application to particular schemes with the Overseeing Organisation.

2. QUALITY ASSURANCE SCHEME

2.1 The quality assurance scheme is administered by Quality Services Civil Engineering (QSCE) Division of the Highways Agency on behalf of all the Overseeing Organisations and its objective is to ensure that only paints of acceptable quality are applied to steel highway structures. The scheme requires paint manufacturers to obtain Highways Agency registration by registering their formulations with QSCE Division before offering paints for use in the Overseeing Organisation's contracts. Paint samples taken from painting contracts are then checked to ensure compliance with registered formulations.

2.2 The operation of the quality assurance scheme is described in Advice Note BA 27 (DMRB 2.4.2).

List of Manufacturers of Registered Paints

2.3 A list of paint manufacturers whose formulations have Highways Agency registration is contained in SA 1 (MCHW 0.3.1).

3. DESCRIPTION OF THE MANUAL OF PAINTS

Standard Technology

3.1 Paints are described in standard generic terms throughout the Manual of Paints so that the Specifier can identify them without having to use manufacturer's proprietary names. When preparing paint specification requirements the Specifier shall state the Manual of Paints' item numbers and describe each paint using standard terminology so that the paint manufacturer and the Contractor can readily identify each coat of the system. The standard terminology is explained in Section 2 of the Manual of Paints. It is also given in the Series 1900 Notes for Guidance on the Specification for Highway Works (MCHW 2) and in the Specification Notes for Guidance on Maintenance Painting of Steel Highway Structures (MCHW 5.2.5).

Item Sheets

3.2 Paints in the Manual of Paints are covered by item sheets. Sections 1 to 6 of each item sheet give a description of the paint, its use, dry film thickness range and provide the manufacturer with outline composition and paint properties. Sections 7 to 9 give details of performance tests to be carried out before the paint formulation is offered for registration. Blank spaces in Sections 7 to 9 denote no test requirement. Section 10 lists tests to be carried out by the manufacturer on retained paint samples from batches of paint supplied to Overseeing Organisation's contracts. Section 11 provides recommendations regarding the use of the paint.

Appendix 1. Additional, Substitute and Supplementary Test Clauses to BS 3900

3.3 Standard methods of test for paint to be used by paint manufacturers and the testing authority are referred to for each item number. An index of standards referred to in the Manual of Paints is included in the General Notes Section of Appendix 2. Additional, substitute, and supplementary test clauses are provided in Appendix 1.

Appendix 2. Materials Requirements

3.4 Materials for paints are to be in accordance with the relevant British or ISO Standard where required in the item sheet. Supplementary material requirement clauses are provided in Appendix 2 of the Manual of Paints to modify or expand part of a British or ISO Standard.

General Notes Section

3.5 The Notes Section provides information on corrosion protection and gives guidance on such matters as checking paint film thicknesses in a paint system and calculating paint quantities and costs.

4. TESTING OF CONTRACT PAINT SAMPLES

Standard Testing Arrangements

4.1 Requirements for the provision of paint samples from new works contracts are given in Series 1900 of the Specification for Highway Works (MCHW 1) and advice is given in the Notes for Guidance on the Specification for Highway Works (MCHW 2).

4.2 Requirements for the provision of paint samples from maintenance painting contracts are given in the specification clauses in Maintenance Painting of Steel Highway Structures (MCHW 5.2).

4.3 The specification clauses, guidance clauses and associated standard paint forms have been compiled on the basis that:

- (i) Paint samples will be tested at the Defence Evaluation Research Agency (DERA)
Stores Receiving Section 107
DERA Farnborough
A7 Building, Room G010
Ively Road
Farnborough
HANTS
GU14 OLX

(or equivalent testing authority in another member state of the European Community)

- (ii) 'A' samples and 'B' samples will be taken, despatched and tested as specified.

Alternative Testing Arrangements

4.4 In England and Wales, alternative testing arrangements shall not be used.

4.5 In Scotland, depending upon the importance of the proposed paint application, the Overseeing Organisation may elect only to have 'A' samples sent for limited testing by a local paint testing firm or other agency approved by the Overseeing Organisation. Appropriate forms for use in connection with testing (in lieu of the standard paint forms) are available from the Overseeing Organisation at the address given in Chapter 6.

4.6 In Northern Ireland, an alternative testing laboratory will normally be used but the frequency of the sampling and testing of 'A' samples and 'B' samples shall not be changed. Appropriate forms for use in connection with testing (in lieu of the standard paint forms) are available from the Overseeing Organisation at the address given in Chapter 6.

5. REFERENCES

1. Design Manual for Roads and Bridges

Volume 2: Section 4: Paints and Other Protective Coatings

- BA 27 Quality Assurance Scheme for Paints and Similar Protective Coatings (DMRB 2.4.2).

2. Manual of Contract Documents for Highway Works

Volume 0: Section 3: Advice Notes

- SA 1 Lists of Approved/ Registered Products (MCHW 0.3.1).

Volume 1: Specification for Highway Works (Mar 98): HMSO (MCHW 1)

Volume 2: Notes for Guidance on the Specification for Highway Works (Mar 98): HMSO (MCHW 2)

Volume 5: Section 2: Maintenance Painting of Steel Highway Structures (May 94): HMSO (MCHW 5.2)

3. Standards associated with the testing of paints are listed in Section 8 of the Manual of Paints for Structural Steelwork at Annex A.

6. ENQUIRIES

All technical enquiries or comments on this Advice Note should be sent in writing as appropriate to:

Chief Highway Engineer
The Highways Agency
St Christopher House
Southwark Street
London SE1 0TE

J KERMAN
Chief Highway Engineer

Director, Road Network Management
and Maintenance Division
The Scottish Executive Development Department
Victoria Quay
Edinburgh EH6 6QQ

N B MACKENZIE
Director, Road Network Management
and Maintenance Division

Director of Highways
The National Assembly for Wales
Cynulliad Cenedlaethol Cymru
Highways Directorate
Government Buildings
Cathays Park
Cardiff CF1 3NQ

K J THOMAS
Director of Highways

Director of Engineering
Department of the Environment for
Northern Ireland
Roads Service Headquarters
Clarence Court
10-18 Adelaide Street
Belfast BT2 8GB

V CRAWFORD
Director of Engineering

Manual of Paints for Structural Steelwork

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1.0 HEALTH AND SAFETY

This Manual calls for the use of substances and test procedures that may be injurious to health if adequate precautions are not taken. It refers only to technical suitability and in no way absolves either the designer, the producer, supplier or the user from statutory obligations relating to health and safety at any stage of manufacture or use.

2.0 STANDARD TERMINOLOGY FOR THE DESCRIPTION OF PAINT

The Standard Terminology enables paints to be described without using proprietary names. It is used for the Registered Description in Item Sheets, in Paint System Sheets, in Data Sheets and for Specifications, and must convey the following information in the order given:

- (i) Name of Pigment: Where a pigment provides inhibitive and or structural properties it must be named, eg MIO, Zinc Phosphate. Where pigments provide colour, opacity or act as extenders etc the pigments should not be named, eg in Silicone Alkyd paints and in phenolic decorative paints.
- (ii) Type of Medium: Excepting for acid type Etch and Blast Primers the type of medium must be stated: eg Modified Phenolic, Phenolic (ie pure Phenolic), Silicone Alkyd, Polyurethane, Epoxy.
- (iii) Use: ie Blast Primer, Etch Primer, Undercoat or Finish. If two pack add (2 pack). The 1st coat only of a new system is described as a Blast Primer, Etch Primer or Primer, all subsequent intermediate coats are described as Undercoats, the last coat being the Finish. A Primer or Primer/Undercoat (ie a dual purpose paint) may be used on items blast cleaned after fabrication, such as lighting columns, where welding hazards do not occur and where it may be necessary to obtain relatively high film build in the first coat.
- (iv) Colour: A descriptive colour for each paint must always be stated as part of the Registered Description in a BE/P2 Paint System Sheet. If a BS colour is specified for the finish the reference should follow the descriptive colour, eg: blue 18 D 43 to BS 4800.

Examples:

Zinc Phosphate Epoxy Ester Undercoat, yellow
MIO Phenolic Finish, natural grey (ie with pure phenolic resin)
MIO M/Phenolic finish, medium grey (ie with modified phenolic resin)

AR Undercoat, green-yellow)
Silicone Alkyd Finish, white) pigments not stated
Zinc Phosphate AR Undercoat, blue
MIO AR Finish, medium grey

Abbreviations are used where these can be easily understood

eg	MIO	Micaceous Iron Oxide
	M/Phenolic	Modified Phenolic
	AR	Acrylated Rubber

For the meaning of terms used in painting practice reference should be made to BS 2015 and BS EN 971-1 'Glossary of Paint Terms'.

3.0 INDEX OF PAINTS

NOTE 1: Blank spaces in the index are where paints have been deleted since issue of the Bridge Paint Manual in 1976 or are where item numbers have been provided for later additions.

NOTE 2: All paints are single pack unless noted.

NOTE 3: Under BUILD, ‘HB’ = High Build
 ‘NB’ = Normal Build

Under APPLIED BY, ‘B’ = Brushing
 ‘AS’ = Airless spray
 ‘S’ = Air pressure spray

NOTE 4: Figures in the item sheets for Viscosity are ‘advised’ and manufacturers may vary within reason but are responsible for adequate application characteristics.

3.1 PAINTS FOR OLEO-RESINOUS SYSTEMS

DESCRIPTION	BUILD	APPLIED BY	ITEM SHEET NO
PAINTS WITH DESIGNATED PIGMENTS			
CURRENT ITEMS IN USE:			
Zinc Phosphate Epoxy Ester Undercoat/Primer	NB	B or AS	14
<i>ITEMS DELETED IN THIS REVISION:</i>			
<i>Red Oxide/Zinc Chromate Blast Primer</i>	<i>NB</i>	<i>B or AS</i>	<i>2</i>
<i>Zinc Chromate Etch Primer (2 pack)</i>	<i>NB</i>	<i>B or S</i>	<i>7</i>
<i>Zinc Phosphate Vinyl Alkyd Primer</i>	<i>NB</i>	<i>B or AS</i>	<i>12</i>
<i>Zinc Phosphate Epoxy Ester Undercoat</i>	<i>NB</i>	<i>AS</i>	<i>15</i>
<i>Zinc Chromate Phenolic Primer/Undercoat</i>	<i>NB</i>	<i>B or AS</i>	<i>22</i>
SPARE ITEM NUMBERS:			
1, 3, 4, 5, 6, 8, 9, 10, 11, 13, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31			
MIO MODIFIED PHENOLIC UNDERCOATS/FINISHES			
CURRENT ITEMS IN USE:			
MIO M/Phenolic Undercoat, Khaki	NB	B or AS	32
MIO M/Phenolic Undercoat/Finish, Black, Natural Grey, Medium Grey, Dark Blue or Dark Green	NB	B or AS	35

DESCRIPTION	BUILD	APPLIED BY	ITEM SHEET NO
<i>ITEMS DELETED IN THIS REVISION:</i>			
<i>MIO M/Phenolic Undercoat, Khaki Combined with Item 32</i>	<i>HB</i>	<i>AS</i>	<i>34</i>
<i>MIO M/Phenolic Undercoat/Finish, Black Combined with Item 35</i>	<i>HB</i>	<i>AS</i>	<i>37</i>
<i>MIO M/Phenolic Undercoat/Finish, Natural Grey Combined with Item 35</i>	<i>NB</i>	<i>B</i>	<i>38</i>
<i>MIO M/Phenolic Undercoat/Finish, Natural Grey Combined with Item 35</i>	<i>HB</i>	<i>AS</i>	<i>40</i>
<i>MIO M/Phenolic Undercoat/Finish, Medium Grey Combined with Item 35</i>	<i>NB</i>	<i>B</i>	<i>41</i>
<i>MIO M/Phenolic Undercoat/Finish, Medium Grey Combined with Item 35</i>	<i>HB</i>	<i>AS</i>	<i>43</i>
<i>MIO M/Phenolic Finish, Dark Green or Dark Blue Combined with Item 35</i>	<i>NB</i>	<i>B</i>	<i>44</i>
<i>MIO M/Phenolic Finish, Dark Green/Dark Blue</i>	<i>HB</i>	<i>AS</i>	<i>46</i>

SPARE ITEM NUMBERS:

33, 36, 39, 42, 45

MIO PURE PHENOLIC UNDERCOATS/FINISHES

CURRENT ITEMS IN USE:

MIO Phenolic Undercoat, Khaki	NB	B or AS	47
MIO Phenolic Undercoat/Finish, Black, Natural Grey Medium Grey, Dark Blue or Dark Green	NB	B or AS	50

ITEMS DELETED IN THIS REVISION:

<i>MIO Phenolic Undercoat, Khaki</i>	<i>HB</i>	<i>AS</i>	<i>49</i>
<i>MIO Phenolic Undercoat/Finish, Black Combined with Item 50</i>	<i>HB</i>	<i>AS</i>	<i>52</i>
<i>MIO Phenolic Undercoat/Finish, Natural Grey Combined with Item 50</i>	<i>NB</i>	<i>B</i>	<i>53</i>
<i>MIO Phenolic Undercoat/Finish, Natural Grey Combined with Item 50</i>	<i>HB</i>	<i>AS</i>	<i>55</i>
<i>MIO Phenolic Undercoat/Finish, Medium Grey Combined with Item 50</i>	<i>NB</i>	<i>B</i>	<i>56</i>
<i>MIO Phenolic Undercoat/Finish, Medium Grey Combined with Item 50</i>	<i>HB</i>	<i>AS</i>	<i>58</i>
<i>MIO Phenolic Finish, Dark Green or Dark Blue Combined with Item 50</i>	<i>NB</i>	<i>B</i>	<i>59</i>
<i>MIO Phenolic Finish, Dark Green or Dark Blue</i>	<i>HB</i>	<i>AS</i>	<i>61</i>

Note: Both types of MIO are considered to be equally durable and hence either M/Phenolic or Phenolic may be offered for a specified MIO system.

SPARE ITEM NUMBERS:

48, 51, 54, 57, 60

DESCRIPTION	BUILD	APPLIED BY	ITEM SHEET NO
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PAINTS WITH NON-DESIGNATED PIGMENTS, EG GENERALLY DECORATIVE PAINTS

CURRENT ITEMS IN USE:

Silicone Alkyd Finish, White, pale, medium and dark colours	NB	B or AS	70
Silicone Alkyd Undercoat, various colours	NB/HB	B or AS	74

ITEMS DELETED IN THIS REVISION:

<i>Alkyd Undercoat, White and one other colour</i>	<i>NB</i>	<i>B or AS</i>	<i>62</i>
<i>Alkyd Finish, White, pale, medium and dark colours</i>	<i>NB</i>	<i>B or AS</i>	<i>64</i>
<i>Phenolic Undercoat, medium and dark colours</i>	<i>NB</i>	<i>B or AS</i>	<i>68</i>
<i>Phenolic Finish, medium and dark colours</i>	<i>NB</i>	<i>B or AS</i>	<i>69</i>
<i>Silicone Alkyd Finish, White and pale colours</i>	<i>HB</i>	<i>AS</i>	<i>71</i>
<i>Silicone Alkyd Finish, medium and dark colours Combined with Item 70</i>	<i>NB</i>		<i>72</i>
<i>Silicone Alkyd Finish, medium and dark colours</i>	<i>HB</i>	<i>AS</i>	<i>73</i>

SPARE ITEM NUMBERS:

63, 65, 66, 67, 75

3.2 PAINTS FOR CHLORINATED RUBBER SYSTEMS

PAINTS WITH DESIGNATED PIGMENTS

CURRENT ITEMS IN USE:

None

ITEMS DELETED IN THIS REVISION:

<i>Zinc Phosphate CR Primer/Undercoat, medium colours</i>	<i>NB</i>	<i>AS</i>	<i>77</i>
<i>Zinc Phosphate CR Undercoat, medium colours</i>	<i>HB</i>	<i>AS</i>	<i>79</i>
<i>Zinc Phosphate CR/Alkyd Undercoat, medium colours</i>	<i>HB</i>	<i>B</i>	<i>80</i>
<i>Zinc Phosphate CR/Alkyd Undercoat, medium colours</i>	<i>HB</i>	<i>AS</i>	<i>81</i>
<i>Zinc Phosphate CR/Alkyd Primer/Blast Primer, Light Blue</i>	<i>NB</i>	<i>B or AS</i>	<i>82</i>
<i>MIO CR Undercoat/Finish, Khaki and other colours</i>	<i>HB</i>	<i>AS</i>	<i>89</i>
<i>MIO CR Undercoat/Finish, Black, Natural and Medium Grey</i>	<i>HB</i>	<i>AS</i>	<i>91</i>
<i>MIO CR Undercoat/Finish, Dark Green or Dark Blue</i>	<i>HB</i>	<i>AS</i>	<i>93</i>

SPARE ITEM NUMBERS:

76, 78, 83, 84, 85, 86, 87, 88, 90, 92

DESCRIPTION	BUILD	APPLIED BY	ITEM SHEET NO
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PAINTS WITH NON-DESIGNATED PIGMENTS, EG GENERALLY DECORATIVE PAINTS

CURRENT ITEMS IN USE:

None

ITEMS DELETED IN THIS REVISION:

<i>CR Undercoat/Finish, various colours</i>	<i>HB</i>	<i>AS</i>	<i>97</i>
<i>CR Undercoat/Finish, various colours</i>	<i>NB</i>	<i>AS</i>	<i>101</i>

SPARE ITEM NUMBERS:

94, 95, 96, 98, 99, 100, 102, 103, 104, 105, 106, 107, 108

3.3 PAINTS FOR EPOXY OR EPOXY BASED SYSTEMS

New works Epoxy systems generally consist of Epoxy shop coats followed at site by further coats of Epoxy or other media paints. A high build Primer and Undercoat may well provide adequate first stage protection after fabrication. It is essential however that any problems concerning curing at low temperature or adhesion be resolved before Epoxy paints are specified. Paint manufacturers' recommendations for maximum and minimum overcoating times for Epoxy paints should be followed.

PAINTS WITH DESIGNATED PIGMENTS

CURRENT ITEMS IN USE:

Zinc Phosphate Epoxy Primer/Blast Primer/Sealer (2 pack)	NB	B or AS	110
Zinc Phosphate High Build Quick Drying Epoxy Blast Primer (2 pack)	HB	AS	111
MIO High Build Quick Drying Epoxy Undercoat/Finish (2 pack)	HB	AS	112
High Build Aluminium Epoxy Maintenance Primer for abraded surfaces (2 pack)	HB	B	115
High Build Epoxy Maintenance Undercoat for abraded surfaces (2 pack)	HB	B or AS	116
Extended Cure Epoxy MIO (2 pack)	HB	B or AS	121

ITEMS DELETED IN THIS REVISION:

<i>Zinc Phosphate Epoxy Primer/Blast Primer (2 pack)</i>	<i>NB</i>	<i>B</i>	<i>109</i>
<i>MIO Epoxy Primer (2 pack), Light Blue</i>	<i>HB</i>	<i>B or AS</i>	<i>118</i>
<i>MIO Epoxy Undercoat/Finish (2 pack)</i>	<i>HB</i>	<i>B or AS</i>	<i>120</i>

SPARE ITEM NUMBERS:

113, 114, 117, 119, 122, 123, 124, 125, 126, 127, 128, 129

DESCRIPTION	BUILD	APPLIED BY	ITEM SHEET NO
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3.4 VINYL/VINYL COPOLYMER PAINTS

CURRENT ITEMS IN USE:

None

ITEMS DELETED IN THIS REVISION:

<i>Vinyl/Vinyl Copolymer Primer/Undercoat</i>	<i>HB</i>	<i>B</i>	<i>130</i>
<i>Vinyl/Vinyl Copolymer Finish</i>	<i>HB</i>	<i>B</i>	<i>131</i>

SPARE ITEM NUMBERS:

132, 133, 134, 135, 136, 137, 138, 139, 140

3.5 BITUMINOUS COATINGS

CURRENT ITEMS IN USE:

Thixotropic Bitumen, Brown and Black	HB	B or AS	141
Pitch Epoxy (2 pack) - polyamide cured	HB	B or AS	150
High Build Epoxy Hydrocarbon Resin Modified Finish (2 pack)	HB	B or AS	151

ITEMS DELETED IN THIS REVISION:

<i>Thixotropic Bitumen, Brown and Black</i>	<i>HB</i>	<i>AS</i>	<i>142</i>
<i>Pitch Epoxy (2 pack) - isocyanate cured</i>	<i>HB</i>	<i>B or AS</i>	<i>152</i>

SPARE ITEM NUMBERS:

143, 144, 145, 146, 147, 148, 149, 153, 154

3.6 SPECIAL CATEGORY COATINGS

Items under this heading have a particular use singly or as part of a system.

CURRENT ITEMS IN USE:

'T' Wash (Mordant solution for galvanized steel)	-	B	155
Aluminium Epoxy Sealer/Primer (2 pack)	-	B or AS	159

ITEMS DELETED IN THIS REVISION:

None

SPARE ITEM NUMBERS:

156, 157, 158

DESCRIPTION	BUILD	APPLIED BY	ITEM SHEET NO
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3.7 POLYURETHANE COATINGS

PAINTS WITH DESIGNATED PIGMENTS

CURRENT ITEMS IN USE:

Red Oxide Moisture Cured Polyurethane Primer/ Blast Primer	NB	B or AS	160
MIO Moisture Cured Polyurethane Undercoat/Finish, Medium Grey and Natural Grey	HB	B or AS	162
Moisture Cured Polyurethane Finish, various colours-Semi Gloss Finish	NB	B or AS	164

ITEMS DELETED IN THIS REVISION:

None

SPARE ITEM NUMBERS:

161, 163, 165, 166, 167

PAINTS WITH NON-DESIGNATED PIGMENTS, EG GENERALLY DECORATIVE PAINTS

CURRENT ITEMS IN USE:

Polyurethane Finish (2 pack)	NB	B or AS	168
Polyurethane Finish (2 pack)	NB	B or AS	169

ITEMS DELETED IN THIS REVISION:

None

SPARE ITEM NUMBERS:

None

3.8 ACRYLATED RUBBER COATINGS

Acrylated Rubber (AR) paints were originally introduced as alternatives to chlorinated rubber (CR) paints in the basic systems for new works painting. They were easier to brush apply than CR paints and were therefore suited for smaller sections of steelwork such as parapets. AR paints typically have a high Volatile Organic Content (VOC), above 420gm/litre, and are therefore not suitable for application within workshops. They are retained, however, for site maintenance painting over existing oil based oleo-resinous systems.

PAINTS WITH DESIGNATED PIGMENTS

CURRENT ITEMS IN USE:

Zinc Phosphate AR Undercoat, medium colours	HB	B or AS	172
MIO AR Undercoat/Finish, Black, Natural and Medium Grey	HB	B or AS	174

DESCRIPTION	BUILD	APPLIED BY	ITEM SHEET NO
<i>ITEMS DELETED IN THIS REVISION:</i>			
Zinc Phosphate AR Blast Primer, Pink	NB	B or AS	170
Zinc Phosphate AR Undercoat, medium colours	HB	B	171
MIO AR Undercoat/Finish, Black, Natural and Medium Grey	HB	B	173

SPARE ITEM NUMBERS:

None

PAINTS WITH NON-DESIGNATED PIGMENTS, EG GENERALLY DECORATIVE PAINTS

CURRENT ITEMS IN USE:

AR Undercoat/Finish, various colours	HB	B or AS	176
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ITEMS DELETED IN THIS REVISION:

AR Undercoat/Finish, various colours	HB	B	175
AR Finish, various colours	NB	B	179
AR Finish, various colours	NB	B or AS	180

SPARE ITEM NUMBERS:

177, 178, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190

3.9 GREASE PAINT COATINGS (PETROLEUM WAX TYPE COATINGS)

CURRENT ITEMS IN USE:

Grease Paint Penetrating Primer	-	B or AS	200
Grease Paint Undercoat/Finish	HB	B or AS	201

ITEMS DELETED IN THIS REVISION:

Grease Paint Undercoat/Finish – Combined with Item 201	HB	AS	202
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SPARE ITEM NUMBERS:

191, 192, 193, 194, 195, 196, 197, 198, 199

4.0 ITEM SHEETS

Item No: 14

1. REGISTERED DESCRIPTION : Zinc Phosphate Epoxy Ester Undercoat/Primer
2. COLOURS : Three colours required, 10 C 35, 08 C 35, & 12 B 21 to BS 4800
3. USE See para 11 for further information : Primer/Undercoat. Dft 40 to 60 µm
4. BUILD AND METHOD OF APPLICATION : NB B or AS
5. OUTLINE COMPOSITION (5.ii, iii and iv by weight)
 - (i) Pigment volume concentration : 36 to 42%
 - (ii) Pigment : Zinc Phosphate (BS 5193) : 65% min
Extenders, tinting pigments and anti-settling agents : to 100%
 - (iii) Medium : 100% Epoxy Ester Medium.
Oil length 35 to 40%
 - (iv) Volatile : 45% max : Aromatic and/or aliphatic hydrocarbons

6. PAINT PROPERTIES

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	No specific requirement	-
(iii) Viscosity	3.0 to 3.5 Poise advised	BS 3900/A7
(iv) Tolerance to sagging	<u>130 x 60</u> microns wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	35% min	BS 3900/A10
(vi) Application and appearance	Adequate flow, even finish, free from defects	Appendix 1. Clause A2
(vii) Opacity	Complete obliteration	Visual
(viii) Colour	Approximate match to the standard	BS 3900/D1
(ix) Surface dry	1 hour max	BS EN ISO 1517
(x) Hard dry	4 hours max	BS EN 29117
(xi) Overcoating	After 6 hours with self or other oleo-resinous paint. See also para 11	Appendix 1. Clause A3
(xii) Keeping Properties	18 months min	Appendix 1. Clause A4

Item No: 14

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	To pass 800 g at 24 hours	BS 3900/E2
(ii) Impact resistance	To pass falling ball test after 7 days A/D + 2 hours at 0°C	BS 3900/E7
(iii) Adhesion	No detachment along score lines after 7 days A/D	Appendix 1. Clause A5
(iv) Salt spray	No corrosion of underlying steel	BS 3900/F4 7 days
(v) Sulphur dioxide	No corrosion of underlying steel	BS 3900/F8 15 cycles (0.2 litre)
(vi) Artificial weathering	No appreciable chalking, embrittlement or loss of adhesion. BS 3900/F16 test to be carried out after 7 days A/D	BS 3900/F16 6 weeks, followed by test BS 3900/E7

8. ADDITIONAL TESTS

6.iii, 6.viii, 6.ix & 7.iii Galvanized steel plate, 'T' Wash, one coat Epoxy Ester dft. 50 µm applied at 10°C.

9. TEST COATS AND TEST PANELS

7.i Single coat on burnished tinplate.

7.ii and 7.vi Blast primer, item 110, plus three 40 µm coats item 14 at 24 hr intervals on 4mm plate prepared in accordance with Appendix 1, Clause A7.

7.iii, 7.iv and 7.v Single 40 µm coat on 18G burnished steel plate - 7 days A/D before test.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.v, 6.viii to 6.x on every batch.

6.iv on first batch for each Contract.

6.vi, 7.i, 7.ii, 7.iv and 7.v on first 3 batches.

11. RECOMMENDATIONS/USE

As a primer on weathered galvanizing or over 'T' Wash on new galvanizing or as an undercoat in a site maintenance paint system. Epoxy Ester paints shall be overcoatable with self or other oleo-resinous paints at 6 hours. Reference should be made to the paint manufacturer's data sheet regarding any limitations which may apply to drying of Epoxy Ester paints at low temperatures or overcoating restrictions.

Item No: 32

1. REGISTERED DESCRIPTION : MIO M/Phenolic Undercoat
2. COLOUR : Khaki approx 10 B 25 to BS 4800
3. USE See Para 11 for further information : Undercoat. Dft 40 to 50 µm
4. BUILD AND METHOD OF APPLICATION : NB B or AS
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : 40 to 50%
 - (ii) Pigment : MIO (BS 3981 and Appendix 2. Clause 1) : 80% min
Extenders, tinting pigments and anti-settling agents : to 100%
Aluminium pigment not permitted
 - (iii) Medium
 - a. Cook : Rosin modified Phenolic/drying oils. Oil length 60-70%
 - b. Oils added to cold varnish : None

Volatile : Aliphatic and/or Aromatic hydrocarbons

6. PAINT PROPERTIES

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	Not less than 32°C	BS 3900/A8
(iii) Viscosity	3.0 to 5.0 Poise advised	BS 3900/A7
(iv) Tolerance to sagging	<u>130 x 50</u> microns wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	50% min	BS 3900/A10
(vi) Application and appearance	No defects	Appendix 1. Clause A2
(vii) Opacity	Complete obliteration at min dft	Visual
(viii) Colour	Approximate match to the standard	BS 3900/D1
(ix) Surface dry	4 hours max	BS EN ISO 15417
(x) Hard dry	16 hours max	BS EN 29117
(xi) Overcoating	After 16 hours with self or other oleo-resinous paint	Appendix 1. Clause A3
(xii) Keeping properties	18 months min	Appendix 1. Clause A4

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	To pass 800 g at 7 days	BS 3900/E2
(ii) Impact resistance	To pass falling ball test after 7 days A/D + 2 hours at 0°C	BS 3900/E7
(iii) Adhesion	-	-
(iv) Salt spray	No corrosion of underlying steel	BS 3900/F4 7 days
(v) Sulphur dioxide	No corrosion of underlying steel	BS EN ISO 3231 (0.2 litre) 5 cycles
(vi) Artificial weathering	No appreciable chalking, colour change, embrittlement or loss of adhesion. BS 3900/F16 test to be carried out after 7 days A/D	BS 3900/F16, 6 weeks, followed by test BS 3900/E7

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.i Single coat on burnished tinplate.

7.ii and 7.vi Blast cleaned steel plus item 110 primer plus two 40 µm coats of item 14 then two 40 µm coats MIO applied to 4mm plate prepared in accordance with Appendix 1, Clause A7.

7.iv and 7.v Single 40 µm coat on 18G burnished mild steel plate - 7 days A/D before tests.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.v, 6.viii, 6.ix and 6.x on every batch.

6.iv on first batch for each contract.

7.i, 7.ii and 7.iv on first 3 batches.

11. RECOMMENDATIONS/USE

As an undercoat in an oleo-resinous site maintenance paint system, usually applied over Epoxy Ester or self at between 40 and 50 µm dft.

Item No: 35

1. REGISTERED DESCRIPTION : MIO M/Phenolic Undercoat/Finish
2. COLOUR : Black, Natural Grey 00 A13 (prev. item 38),
Medium Grey 00 A 09 (prev item 41), Dark Green
14 C 39 (prev item 44), Dark Blue 18 C 39
(prev item 44). To BS 4800
3. USE See para 11 for further information : Undercoat or Finish. Dft 40 to 50 µm
4. BUILD AND METHOD OF APPLICATION : NB B or AS
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : 40 to 50%
 - (ii) Pigment : MIO (BS 3981 and Appendix 2.
Clause 1) : 80% min
Extenders and anti-settling agents : to 100%
Aluminium pigment not permitted.
 - (iii) Medium
 - a. Cook : Rosin modified Phenolic/drying oils.
Oil length 60-70%
 - b. Oils added to cold
varnish : None
 - (iv) Volatile 25% max : Aliphatic and/or Aromatic hydrocarbons

6. PAINT PROPERTIES

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	Not less than 32°C	BS 3900/A8
(iii) Viscosity	3.0 to 5.0 Poise advised	BS 3900/A7
(iv) Tolerance to sagging	<u>130 x 50</u> microns wft Data Sheet vs	Appendix 1, Clause A2.i
(v) Volume Solids	50% min	BS 3900/A10
(vi) Application and appearance	No defects	Appendix 1. Clause A2
(vii) Opacity	Complete obliteration at min dft	Visual
(viii) Colour	Approximate match to standard	BS 3900/D1
(ix) Surface dry	4 hours max	BS EN ISO 1517
(x) Hard dry	16 hours max	BS EN 29117
(xi) Overcoating	After 16 hours with self or other oleo-resinous paint	Appendix 1. Clause A3
(xii) Keeping properties	18 months min	Appendix 1. Clause A4

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Paint Property	Requirement	Test
(i) Scratch resistance	To pass 800 g at 7 days	BS 3900/E2
(ii) Impact resistance	To pass falling ball test after 7 days A/D + 2 hours at 0°C	BS 3900/E7
(iii) Adhesion	-	-
(iv) Salt spray	No corrosion of underlying steel	BS 3900/F4 7 days
(v) Sulphur dioxide	No corrosion of underlying steel	BS EN ISO 3231 (0.2 litre) 5 cycles
(vi) Artificial weathering	No appreciable chalking, colour change, embrittlement or loss of adhesion. BS 3900/F16 test to be carried out after 7 days A/D	BS 3900/F16, 6 weeks followed by test BS 3900/E7

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.i Single coat on burnished tinplate.

7.ii and 7.vi Blast cleaned steel primed with item 110 primer plus two 40 µm coats of item 14 then two 40 µm coats MIO applied to 4mm plate prepared in accordance with Appendix 1, Clause A7.

7.iv and 7.v Single 40 µm coat on 18G burnished mild steel plate - 7 days A/D before tests.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.v, 6.viii, 6.ix and 6.x on every batch.

6.iv on first batch for each contract.

7.i, 7.ii and 7.iv on first 3 batches.

11. RECOMMENDATIONS/USE

As an undercoat or finish in an oleo-resinous site maintenance paint system, usually applied over Epoxy Ester or self at between 40 and 50 µm dft.

Item No: 47

1. REGISTERED DESCRIPTION : MIO Phenolic Undercoat
2. COLOUR : Khaki approx 10 B 25 to BS 4800
3. USE See para 11 for further information : Undercoat. Dft 40 to 50 µm
4. BUILD AND METHOD OF APPLICATION : NB B or AS
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : 40 to 50%
 - (ii) Pigment : MIO (BS 3981 and Appendix 2. Clause 1) : 80% min
Extenders, anti-settling agents and tinting pigments : to 100%
Aluminium pigment not permitted
 - (iii) Medium
 - a. Cook
 - Pure phenolic resin : 25% min
 - Other resin : 5% max
 - Oil length 65-70%
 - Tung oil : 40% min
 - Cut back oil : 15% max
 - b. Oils added to cold varnish (solids on solids) : 15% max
 - (iv) Volatile : 25% max : Aliphatic and/or Aromatic hydrocarbons

6. PAINT PROPERTIES

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900: part A19
(ii) Flashpoint	Not less than 32°C	BS 3900/A8
(iii) Viscosity	3.0 to 5.0 Poise advised	BS 3900/A7
(iv) Tolerance to sagging	<u>130 x 50</u> microns wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	50% min	BS 3900/A10
(vi) Application and appearance	No defects	Appendix 1. Clause A2
(vii) Opacity	Complete obliteration at min dft	Visual
(viii) Colour	Approximate match to the standard	BS 3900/D1
(ix) Surface dry	4 hours max	BS EN ISO 1517
(x) Hard dry	16 hours max	BS EN 29117
(xi) Overcoating	After 16 hours with self or other oleo-resinous paint	Appendix 1. Clause A3
(xii) Keeping properties	18 months min	Appendix 1. Clause A4

Item No: 47

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	To pass 800 g at 7 days	BS 3900/E2
(ii) Impact resistance	To pass falling ball test after 7 days A/D + 2 hours at 0°C	BS 3900/E7
(iii) Adhesion	-	-
(iv) Salt spray	No corrosion of underlying steel	BS 3900/F4 7 days
(v) Sulphur dioxide	No corrosion of underlying steel	BS EN ISO 3231 (0.2 litre) 5 cycles
(vi) Artificial weathering	No appreciable chalking, colour change, embrittlement or loss of adhesion. BS 3900/F16 test to be carried out after 7 days A/D.	BS 3900/F16 6 weeks followed by test BS 3900/E7

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.i Single coat on burnished tinplate.

7.ii and 7.vi Blast cleaned steel primed with item 110 primer plus two 40 µm coats of item 14 then two 50 µm coats MIO applied to 4mm plate prepared in accordance with Appendix 1, Clause A7.

7.iv and 7.v Single 50 µm coat on 18G burnished mild steel plate - 7 days A/D before tests.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.v, 6.viii, 6.ix and 6.x on every batch.

6.iv on first batch for each contract.

7.i, 7.ii and 7.iv on first 3 batches.

11. RECOMMENDATIONS/USE

As an undercoat in an oleo-resinous site maintenance paint system, usually applied over Epoxy Ester or self at between 40 and 50 µm dft.

Item No: 50

1. REGISTERED DESCRIPTION : MIO Phenolic Undercoat/Finish
2. COLOUR : Black, Natural Grey 00 A 13 (prev item 53),
Medium Grey 00 A 09 (prev item 56), Dark Green
14 C 39 (prev item 59), Dark Blue 18 C 39
(prev item 59). To BS 4800
3. USE See para 11 for further information : Undercoat or Finish. Dft 40 to 50 µm
4. BUILD AND METHOD OF APPLICATION : NB B or AS
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : 40 to 50%
 - (ii) Pigment : MIO (BS 3981 and Appendix 2.
Clause 1) : 80% min
Extenders and anti-settling agents : to 100%
Aluminium pigment not permitted
 - (iii) Medium
 - a. Cook
 - Pure phenolic resin : 25% min
 - Other resin : 5% max
 - Oil length 65-70%
 - Tung oil : 40% min
 - Cut back oil : 15% max
 - b. Oils added to cold
varnish (solids on solids) : 15% max
 - (iv) Volatile : 25% max : Aliphatic and/or Aromatic hydrocarbons

6. PAINT PROPERTIES

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	Not less than 32°C	BS 3900/A8
(iii) Viscosity	3.0 to 5.0 Poise advised	BS 3900/A7
(iv) Tolerance to sagging	<u>130 x 50</u> microns wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	50% min	BS 3900/A10
(vi) Application and appearance	No defects	Appendix 1. Clause A2
(vii) Opacity	Complete obliteration at min dft	Visual
(viii) Colour	Approximate match to the standard	BS 3900/D1
(ix) Surface dry	4 hours max	BS EN ISO 1517
(x) Hard dry	16 hours max	BS EN 29117
(xi) Overcoating	After 16 hours with self or other oleo-resinous paint	Appendix 1. Clause A3
(xii) Keeping properties	18 months min	Appendix 1. Clause A4

Item No: 50

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	To pass 800 g at 7 days	BS 3900/E2
(ii) Impact resistance	To pass falling ball test after 7 days A/D + 2 hours at 0°C	BS 3900/E7
(iii) Adhesion	-	-
(iv) Salt spray	No corrosion of underlying steel	BS 3900/F4 7 days
(v) Sulphur dioxide	No corrosion of underlying steel	BS EN ISO 3231 (0.2 litre) 5 cycles
(vi) Artificial weathering	No appreciable chalking, colour change, embrittlement or loss of adhesion. BS 3900/F16 test to be carried out after 7 days A/D	BS 3900/F16, 6 weeks, followed by test BS 3900/E7

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.i Single coat on burnished tinplate.

7.ii and 7.vi Blast cleaned steel primed with item 110 primer plus two 40 µm coats of item 14 then two 40 µm coats MIO applied to 4mm plate prepared in accordance with Appendix 1, Clause A7.

7.iv and 7.v Single 40 µm coat on 18G burnished mild steel plate - 7 days A/D before tests.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.v, 6.viii, 6.ix and 6.x on every batch.

6.iv on first batch for each contract.

7.i, 7.ii and 7.iv on first 3 batches.

11. RECOMMENDATIONS/USE

As an undercoat or finish in an oleo-resinous site maintenance paint system, usually applied over Epoxy Ester or self at between 40 and 50 µm dft.

Item No: 70

1. REGISTERED DESCRIPTION : Silicone Alkyd Finish
2. COLOURS : BS 4800 shades required, Light Grey 00 A 05, Medium Grey 18 B 21, Dark Grey 18 B 25, Green Yellow 12 B 21.
3. USE See para 11 for further information : High durability exterior gloss finish for exposed surfaces. Dft 25 to 50 µm
4. BUILD AND METHOD OF APPLICATION : NB B or AS
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : To suit
 - (ii) Pigment : RTD (BS 1851) and tinting pigments: % age to give required opacity
 - (iii) Medium : Silicone Alkyd with 30% minimum Silicone processed with Alkyd
 - (iv) Volatile : Aliphatic and/or Aromatic hydrocarbons
 - (v) VOC limit (1998) : Not greater than 420 gm/litre

6. PAINT PROPERTIES

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	Not less than 32°C	BS 3900/A8
(iii) Viscosity	4.0 to 5.0 Poise advised	BS 3900/A7
(iv) Tolerance to sagging	<u>130 x 50</u> microns wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	50% min	BS 3900/A10
(vi) Application and appearance	Adequate flow, glossy even finish, free from defects	Appendix 1. Clause A2
(vii) Opacity	85% min	BS 3900/D4 Appendix 1. Clause B1
(viii) Colour	To match the standard	BS 3900/D1
(ix) Surface dry	6 hours max	BS EN ISO 1517
(x) Hard dry	16 hours max	BS EN 29117
(xi) Overcoating	-	-
(xii) Keeping properties	18 months min	Appendix 1. Clause A4

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	To pass 800 g at 7 days	BS 3900/E2
(ii) Impact resistance	-	-
(iii) Adhesion	No detachment along scored lines after 7 days A/D + 2 hours at 0°C	Appendix 1. Clause A5
(iv) Salt spray	-	-
(v) Sulphur dioxide	-	-
(vi) Artificial weathering	No more than slight colour change and loss of gloss permitted. BS 3900/F16 test to be carried out after 7 days A/D	BS 3900/F16 12 weeks, followed by BS 3900/E7

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.i Single coat on burnished tinplate.

7.iii and 7.vi Phenolic MIO, Silicone Alkyd UC, 50 microns Silicone Alkyd Finish on 4mm plate prepared in accordance with Appendix 1, Clause A7.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.v, 6.vii to 6.ix on every batch.

6.iv on first batch for each contract.

6.vi and 7.i on first 3 batches.

11. RECOMMENDATIONS/USE

Silicone alkyd gloss finishes are suitable for oleo-resinous systems (including Epoxy Ester systems) where longer durability is required than would be obtained by the use of phenolic or other alkyd gloss finishes.

Item No: 74

1. REGISTERED DESCRIPTION : Silicone Alkyd Undercoat
2. COLOURS : Various to suit finishing colours
3. USE See para 11 for further information : Undercoat to item 70
Dft 25-50 µm Brush; 40-60 µm Airless Spray
4. BUILD AND METHOD OF APPLICATION : NB B or HB AS
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : 40 to 50%
 - (ii) Pigment : RTD (BS 1851) and tinting pigments : %age to give required opacity
: Extenders and anti-settling agents : to 100%
 - (iii) Medium
 - a. Cook : Silicone Alkyd with 30% minimum Silicone processed with Alkyd
 - b. Additions to cold alkyd (solids on solids) : 10% max
 - (iv) Volatile : Aliphatic and/or Aromatic hydrocarbons

6. PAINT PROPERTIES

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	Not less than 32°C	BS 3900/A8
(iii) Viscosity	3.0 to 4.0 Poise advised	BS 3900/A7
(iv) Tolerance to sagging	<u>130 x 60</u> microns wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	50% min	BS 3900/A10
(vi) Application and appearance	Adequate flow, glossy even finish, free from defects	Appendix 1. Clause A2
(vii) Opacity	85% min	BS 3900/D4 Appendix 1. Clause B1
(viii) Colour	Approximate match to standard	BS 3900/D1
(ix) Surface dry	4 hours max	BS EN ISO 1517
(x) Hard dry	16 hours max	BS EN 29117
(xi) Overcoating	After 16 hours with self or Silicone Alkyd finish	Appendix 1. Clause A3
(xii) Keeping properties	18 months min	Appendix 1. Clause A4

Item No: 74

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	To pass 800 g at 7 days	BS 3900/E2
(ii) Impact resistance	-	-
(iii) Adhesion	No detachment along scored lines after 7 days A/D + 2 hours at 0°C	Appendix 1. Clause A5
(iv) Salt spray	Reference to salt spray test deleted-test too severe	-
(v) Sulphur dioxide	-	-
(vi) Artificial weathering	-	-

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.i Single coat on burnished tinplate.

7.iii Blast primer item 110, 75 µm phenolic MIO and 60 µm Silicone Alkyd undercoat applied at 24 hourly intervals to 4mm plate prepared in accordance with Appendix 1, Clause A7.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.iii, 6.v, 6.viii, 6.ix and 6.x on every batch.

6.iv on first batch for each contract.

7.i, 7.iii and 6.vi on first 3 batches.

11. RECOMMENDATIONS/USE

Intended as an undercoat in an oleo-resinous new works or maintenance paint system prior to overcoating with Silicone Alkyd finish. May be applied as the final shop coat or first site coat for new steelwork. Applied over Phenolic or M/Phenolic MIO, Epoxy Ester or MIO Epoxy (2 pack) paints on bridge bearings.

Item No: 110

1. REGISTERED DESCRIPTION : Zinc Phosphate Epoxy Blast Primer/Sealer (2 pack)
2. COLOUR : 08 C 35 to BS 4800
3. USE See para 11 for further information : Extended durability Blast Primer. Dft 25 to 30 µm.
4. BUILD AND METHOD OF APPLICATION : NB AS or B (B to small areas only)
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : 45-53% (on mixed materials)
 - (ii) Pigment : Zinc Phosphate (BS 5193) : 65% min
Extenders and anti-settling agents : to 100%
 - (iii) Medium : Epoxy resin together with a separately packed Polyamide activator
 - (iv) Volatile : 45% max : No requirement
 - (v) Mixing Properties : To be blended in simple proportions (eg 3:1, 4:1) and be packed in such a way that the activator can be added to the tin containing the base component and mixed
 - (vi) VOC limit (1998) : Not greater than 780 gm/litre

6. PAINT PROPERTIES (after mixing the two components)

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	No specific requirement	-
(iii) Viscosity	1.5 to 2.0 Poise advised	BS 3900/A7
(iv) Tolerance to sagging	<u>120 x 30</u> microns wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	30% min	BS 3900/A10
(vi) Application and appearance	Adequate flow, even finish, free from defects	Appendix 1. Clause A2
(vii) Opacity	Complete obliteration at min dft	Visual
(viii) Colour	Approximate match to standard	BS 3900/D1
(ix) Surface dry	30 mins max	BS EN ISO 1517
(x) Hard dry	2 hours max	BS EN 29117
(xi) Overcoating	After 4 hours with self, Epoxy Ester other oleo-resinous paints or Pitch Epoxy	Appendix 1. Clause A3
(xii) Keeping properties	18 months (as single packs) without deterioration	Appendix 1. Clause A4
(xiii) Pot life	8 hours at 20°C	-

Item No: 110

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	To pass 800 g at 24 hours	BS 3900/E2
(ii) Impact resistance	To pass falling ball test after 24 hrs A/D + 2 hours at 0°C	BS 3900/E7
(iii) Adhesion	-	-
(iv) Salt spray	No corrosion of underlying steel	BS 3900/F4 7 days
(v) Sulphur dioxide	No corrosion of underlying steel	BS EN ISO 3231 (0.2 litre) 15 cycles
(vi) Artificial weathering	-	-

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.i Single coat on burnished tinplate.

7.ii Single 25 µm coat on 4 mm plate prepared in accordance with Appendix 1, Clause A7.

7.iv and 7.v Single 25 µm coat on 18G burnished mild steel plate.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.v, 6.viii to 6.x on every batch.

6.iv on first batch for each contract.

7.i, 7.ii and 7.iv on first 3 batches.

11. RECOMMENDATIONS/USE

It is intended that this type of blast primer/sealer should be used in place of the PVB type which has been deleted on health and safety grounds when a longer exposure is required outside or inside before applying the first undercoat.

Also as a primer on 'T' Washed galvanized lighting columns before overcoating with Epoxy Pitch, Epoxy Ester or other oleo-resinous paints.

In order to avoid impairment of welds due to the presence of blast primer, it should be ensured that weld areas are masked off prior to painting or that blast primer is removed from these areas before welding.

The manufacturers' recommendations for maximum and minimum overcoating times should be checked before Epoxy (2 pack) blast primer/sealers are specified.

When applied in low temperature conditions, the curing period may be extended, thus lengthening the time before the blast primer can be overcoated.

The effect of curing at low temperatures should also be checked with the paint manufacturer.

Adhesion of the first undercoat to the blast primer must be checked before the remainder of the paint system is applied.

This item may be used as a blast primer under acrylated rubber systems for steel surfaces prepared by abrasive blast cleaning to BS 7079 : Part A1 (ISO 8501-1) to a minimum standard of Sa 2½.

Item No: 111

1. REGISTERED DESCRIPTION : Zinc Phosphate High Build Quick Drying Epoxy Blast Primer (2 pack)
2. COLOURS : Red oxide, grey or buff
3. USE See para 11 for further information : Extended durability quick drying blast primer. Dft 70-150 µm.
4. BUILD AND METHOD OF APPLICATION : HB AS (small areas by B)
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : 35-45% (on mixed materials)
 - (ii) Pigment : Zinc Phosphate (BS 5193) : 35% min
Extenders, pigments and anti-settling agents : to 100%
 - (iii) Medium : Epoxy resin together with a separately packed Polyamide/amine adduct activator with suitable accelerator
 - (iv) Volatile : 35% max : No requirement
 - (v) Mixing Properties : To be blended in simple proportions (eg 3:1, 4:1) and be packed in such a way that the activator can be added to the tin containing the base component and mixed.
 - (vi) VOC limit (1998) : Not greater than 250 gm/litre
6. PAINT PROPERTIES (after mixing the two components)

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	Not less than 23°C	BS 3900/A8
(iii) Viscosity	No requirement	-
(iv) Tolerance to sagging	<u>130 x 150</u> µm wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	65% min	BS 3900/A10
(vi) Application and appearance	No defects	Appendix 1. Clause A2
(vii) Opacity	Complete obliteration at min dft	Visual
(viii) Colour	Approximate match to standard	BS 3900/D1
(ix) Surface dry	2 hours max	BS EN ISO 1517
(x) Hard dry	6 hours max	BS EN 29117
(xi) Overcoating	After 6 hours with 2 pack epoxy	Appendix 1, Clause A3
(xii) Keeping properties	18 months (as single packs) without deterioration	Appendix 1, Clause A4
(xiii) Pot life	2 hrs at 20°C	-

Item No: 111

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	To pass 800 g at 24 hours	BS 3900/E2
(ii) Impact resistance	To pass falling ball test after 24 hrs A/D + 2 hours at 0°C	BS 3900/E7
(iii) Adhesion	-	-
(iv) Salt spray	No corrosion of underlying steel	BS 3900/F4 7 days
(v) Sulphur dioxide	No corrosion of underlying steel	BS EN ISO 3231 (0.2 litre) 15 cycles
(vi) Artificial weathering	-	-

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.i Single coat on burnished tinplate.

7.ii Single 100 µm coat on 4 mm plate prepared in accordance with Appendix 1, Clause A7.

7.iv, 7.v Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.v, 6.vi, 6.vii, 6.viii, 6.ix and 6 xii on every batch.

6.iv on first batch for each contract.

7.i, 7.ii and 7.iv on first 3 batches.

11. RECOMMENDATIONS/USE

As a shop or site primer over steelwork prepared by abrasive blast cleaning to a minimum standard of Sa 2½ to BS 7079 : Part A1 (ISO 8501-1) quality. Usually applied by airless spray but may be applied by brush to small areas of steelwork for maintenance.

May be applied at ambient temperatures down to 5°C. Curing will be retarded at temperatures below 10°C.

Not recommended as a weldable primer.

Item No: 112

1. REGISTERED DESCRIPTION : MIO HB Quick Drying Epoxy Undercoat/Finish (2 pack)
2. COLOUR : Medium Grey Approx. 00 A 09,
Natural Grey Approx. 00 A 13 to BS 4800.
3. USE See para 11 for further information : Undercoat or finish. Dft 100 - 175 µm
4. BUILD AND METHOD OF APPLICATION : HB AS
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : 35 - 50% (on mixed materials)
 - (ii) Pigment : MIO (BS 3981 and Appendix 2.
Clause 1) : 80% min
Extenders and anti-settling agents : to 100%
 - (iii) Medium : Epoxy Resin together with a separately packed
Polyamide/amine adduct activator with suitable
accelerator
 - (iv) Volatile : No requirement
 - (v) Mixing Properties : To be blended in simple proportions (eg 4:1, 3:1)
and be packed in such a way that the activator can
be added to the tin containing the base component
and mixed.
 - (vi) VOC limit (1998) : Not greater than 250 gm./litre

6. PAINT PROPERTIES (after mixing the two components)

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	Not less than 23°C	BS 3900/A8
(iii) Viscosity	No requirement	-
(iv) Tolerance to sagging	<u>130 x 175</u> µm wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	65% min	BS 3900/A10
(vi) Application and appearance	No defects	Appendix 1. Clause A2
(vii) Opacity	Complete obliteration at min dft	Visual
(viii) Colour	Approximate match to standard	BS 3900/D1
(ix) Surface dry	2 hours max	BS 3900/C2
(x) Hard dry	6 hours max	BS 3900/C3
(xi) Overcoating	After 6 hours, self /other 2 pack epoxy	Appendix 1. Clause A3
(xii) Keeping properties	18 months (as single packs) without deterioration	Appendix 1. Clause A4
(xiii) Pot life	2 hrs pot life at 20°C	-

Item No: 112

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	To pass 800 g at 24 hours	BS 3900/E2
(ii) Impact resistance	To pass falling ball test after 24 hrs A/D + 2 hours at 0°C	BS 3900/E7
(iii) Adhesion	No detachment along intersection of scored lines after 7 days A/D + 2 hrs at 0°C	Appendix 1. Clause A5
(iv) Salt spray	-	-
(v) Sulphur dioxide	-	-
(vi) Artificial weathering	No appreciable chalking, embrittlement or loss of adhesion. BS 3900/F16 test to be carried out after 7 days.	BS 3900/F16 12 weeks, followed by BS 3900/E7

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.i Single coat on burnished tinplate.

7.ii, 7.iii and 7.vi item 111 at 150 µm dft plus 2 coats of item 112 at 175 µm dft applied to 4 mm plate prepared in accordance with Appendix 1, Clause A7.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.v, 6.vi, 6.vii, 6.viii, 6.ix and 6.xii on every batch.

6.iv on first batch for each contract.

7.i, 7.ii and 7.iii on first 3 batches.

11. RECOMMENDATIONS/USE

As a high build quick drying undercoat and finish in an Epoxy (2 pack) system over Epoxy primer, item 111.

Can be applied at ambient temperatures down to 5°C, but curing will be retarded below 10°C.

May be applied over sealed Aluminium metal spray.

Item No: 115

1. REGISTERED DESCRIPTION : High Build Aluminium Epoxy Maintenance Primer for abraded surfaces (2 pack)
2. COLOUR : Aluminium/Grey
3. USE See para 11 for further information : A high build modified epoxy primer (2 pack) to provide improved adhesion and flexibility when applied to hand prepared steelwork and existing aged coatings. Dft 100-150 µm.
4. BUILD AND METHOD OF APPLICATION : HB. B or AS
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : 10 - 25% on mixed materials
 - (ii) Pigment : Aluminium paste (65% solids) : 15 +/- 5%
Exterior quality pigments and anti-settling agents : to 100%
 - (iii) Medium : Modified Epoxy resin together with a separately packed Polyimide/amine adduct activator with suitable accelerator
 - (iv) Volatile 25% max : No specific blend requirement but must be compatible with existing aged coatings
 - (v) Mixing Properties : To be blended in simple proportions (eg 3:1, 4:1) and be packed in such a way that the activator can be added to the tin containing the base component and mixed
 - (vi) Volatile Organic Content (1998) : Not greater than 250 gm./litre

6. PAINT PROPERTIES (after mixing the two components)

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	Not less than 23°C	BS 3900/A8
(iii) Viscosity	5.0 to 10.0 poise	BS 3900/A7
(iv) Tolerance to sagging	<u>130 x 150</u> µm wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	70% minimum	BS 3900/A10
(vi) Application and appearance	Even, slightly textured metallic	Appendix 1. Clause A2
(vii) Opacity	Complete obliteration at min dft	Visual
(viii) Colour	Approximate match to standard	BS 3900/D1
(ix) Surface dry	6 hours max	BS EN ISO 1517
(x) Hard dry	24 hours max	BS EN 29117

Item No: 115

Paint Property	Requirement	Test
(xi) Overcoating	After 24 hours, with epoxy or polyurethane type coatings	Appendix 1. Clause A3
(xii) Keeping properties	18 months (separate packs) without deterioration	Appendix 1. Clause A4
(xiii) Pot life	2 hrs minimum pot life at 20°C	-

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	To pass 800 g at 24 hours	BS 3900/E2
(ii) Impact resistance	To pass falling ball test after 24 hrs A/D + 2 hours at 0°C	BS 3900/E7
(iii) Adhesion	-	-
(iv) Salt spray	No corrosion of underlying steel	BS 3900/F4 7 days
(v) Sulphur dioxide	No corrosion of underlying steel	BS EN ISO 3231 (0.2 litres, 15 cycles)
(vi) Artificial weathering	-	-

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.i Single 125 µm coat on burnished tinplate.

7.ii, Single 125 µm coat on 4mm plate prepared in accordance with Appendix 1, Clause A7.

7iv, 7v Single 100 µm coat on 18G burnished mild steel plate.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.v, 6 vi, 6 vii, 6.viii, 6.ix and 6.xii on every batch.

6.iv on first batch for each contract.

7.i, 7.ii and 7.iv first 3 batches.

11. RECOMMENDATIONS/USE

As a maintenance primer, applied to steel surfaces prepared by power tool cleaning or abrading; also as a patch primer for existing aged paint systems including Chlorinated Rubber, Acrylated Rubber, Oleo-resinous and Epoxies (but not Bituminous or Grease Paints). Surfaces of gloss finishes should be abraded to remove gloss, and completely degreased before overcoating with Epoxy Primer. Overcoatable with self or compatible undercoats (ie Item 116)

May be used as first coat where surfaces have been spot blasted prior to painting.

Note - Not suitable for application to wet or moist surfaces.

Item No: 116

1. REGISTERED DESCRIPTION : High Build Epoxy Maintenance Undercoat for abraded surfaces (2 pack)
2. COLOUR : Light Grey approx 00 A 05, or Medium Grey, approx 00 A 09 to BS 4800
3. USE : A high build modified Epoxy undercoat (2 pack) to provide improved adhesion and flexibility when applied to hand prepared aged coatings and newly applied primer. Dft 75 - 150 µm.
4. BUILD AND METHOD OF APPLICATION : HB. B or AS
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : 25 - 40% on mixed materials
 - (ii) Pigment : Rutile titanium Dioxide (BS 1851) : 35% min
Extenders, colouring pigments and anti-settling agents : to 100%
 - (iii) Medium : Modified Epoxy resin together with a separately packed Polymide/amine adduct activator with suitable accelerator
 - (iv) Volatile 25% max : No specific blend requirement but must be compatible with existing aged coatings/Item 115
 - (v) Mixing Properties : To be blended in simple proportions (eg 3:1, 4:1) and be packed in such a way that the activator can be added to the tin containing the base component and mixed
 - (vi) Volatile Organic Content (1998) : Not greater than 250 gm./litre

6. PAINT PROPERTIES (after mixing the two components)

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	Not less than 23°C	BS 3900/A8
(iii) Viscosity	5.0 to 10.0 poise	BS 3900/A7
(iv) Tolerance to sagging	<u>130 x 150</u> µm wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	70% minimum	BS 3900/A10
(vi) Application and appearance	Even, slightly textured finish	Appendix 1, Clause A2
(vii) Opacity	Complete obliteration at min dft	Visual
(viii) Colour	Approximate match to standard (supplied by manufacturer)	BS 3900/D1
(ix) Surface dry	6 hours max	BS EN ISO 1517
(x) Hard dry	24 hours max	BS EN 29117

Item No: 116

Paint Property	Requirement	Test
(xi) Overcoating	After 24 hours polyurethane U/ct or Finish	Appendix 1. Clause A3
(xii) Keeping properties	18 months (as single packs) without deterioration	Appendix 1. Clause A4
(xiii) Pot life	2 hrs minimum at 20°C	-

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	To pass 800 g at 24 hours	BS 3900/E2
(ii) Impact resistance	To pass falling ball test after 24 hrs A/D + 2 hours at 0°C	BS 3900/E7
(iii) Adhesion	No detachment along intersection of cross after 7 days air drying	Appendix 1, Clause A5
(iv) Salt spray	-	-
(v) Sulphur dioxide	-	-
(vi) Artificial weathering	-	-

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.i Single 125 µm coat on burnished tinplate.

7.ii, One 125 µm dft coat of Item 115 plus one coat of Item 116 at 125 µm on 4mm plate, prepared in accordance with Appendix 1, Clause A7.

7.iii Panels prepared as 7ii on 18G panels.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.v, 6 vi, 6 vii, 6.viii, 6.ix and 6.xii on every batch.

6.iv on first batch for each contract.

7.i, 7.ii and 7.iii first 3 batches.

11. RECOMMENDATIONS/USE

- a As a high build 2 pack epoxy undercoat for upgrading existing Chlorinated Rubber, Acrylated Rubber, Oleo-Resinous and most conventional coatings (but not Bituminous or grease paints).
- b To be applied over abraded and degreased aged coatings and Item 115.
- c Overcoatable with self or two pack chemically cured finish.
- d When overcoating non-convertible paints ie, Chlorinated Rubber or Acrylated Rubber, then dft should be kept to 75 microns, thus reducing the risk of solvent attack/entrapment.

NOTE Not suitable for application to wet or moist surfaces.

Item No: 117

Page reserved for new item

Item No: 117

Page reserved for new item

Item No: 121

1. REGISTERED DESCRIPTION : Extended Cure Epoxy MIO (2 pack)
2. COLOURS : Medium Grey Approx 00 A 09 to BS 4800
3. USE : Single coat MIO epoxy finish for treatment of galvanized Lighting Columns, Bracket Arms and other components. Dft 75-125 microns
4. BUILD AND METHOD OF APPLICATION : HB AS (small areas by B)
5. OUTLINE COMPOSITION : 5ii, iii, and iv by weight
 - (i) Pigment volume concentration : 40- 50 % mixed material
 - (ii) Pigment : MIO (BS 3981 and Appendix 2 Clause 1) : 80 % min
Extenders and anti-settling agents to : 100 %
 - (iii) Medium : Modified Epoxy resin together with a separately packed Polyamide/Amine adduct curing agent
 - (iv) Volatile : As advised by manufacturer
 - (v) Mixing Properties : To be blended in simple proportions (eg 3:1, 4:1) and be packed in such a way that the activator can be added to the tin containing the base component and mixed.

6. PAINT PROPERTIES (after mixing the two components)

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	Not less than 23°C	BS 3900/A8
(iii) Viscosity	As advised by manufacturer	-
(iv) Tolerance to sagging	<u>130 x 125</u> µm wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	60 % min	BS 3900/A10
(vi) Application and appearance	Even metallic finish. No defects	Appendix 1. Clause A2
(vii) Opacity	Complete obliteration at minimum dft	Visual
(viii) Colour	Approximate match to the standard	BS 3900/D1
(ix) Surface Dry	3 hours max	BS EN ISO 1517
(x) Hard Dry	Not less than 4 hours. Max 8 hours.	BS EN 29117
(xi) Overcoating	Min 8 hours with 2 pack epoxy or polyurethane	Appendix 1. Clause A3

Item No: 121

Paint Property	Requirement	Test
(xii) Keeping properties	18 months minimum in unopened containers	Appendix 1. Clause A4
(xiii) Pot Life	4 hours @ 20°C	-

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	To pass 800g at 24 hours	BS 3900/E2
(ii) Impact resistance	To pass falling ball test after 24 hrs A/D plus 2 hrs at 0°C	BS 3900/E7
(iii) Adhesion	No detachment along intersection of scored lines after 7 days A/D plus 2 hrs at 0°C	Appendix 1 Clause A5
(iv) Salt spray	-	
(v) Sulphur dioxide	-	
(vi) Artificial weathering	No excessive chalking, loss of adhesion or embrittlement	BS 3900/F16,12 weeks

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.i Single coat 75 microns dft applied to burnished tinplate.

7.ii, 7.iii, 7.vi Single 100 micron coat on 4 mm plate galvanized in accordance with EN ISO 1461 specification followed by item 155 'T' Wash.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.iii, 6.v, 6.viii, 6.ix, 6.x, and 6.xii on every batch.

6.iv on first batch for each contract.

7.i, 7.ii, and 7.iii on first 3 batches.

11. RECOMMENDATIONS/USE

Alternative slow curing single coat MIO epoxy finish which provides excellent adhesion properties for the treatment of galvanized surfaces which have been prepared using 'T' wash.

Item No: 123

Page reserved for new item

Item No: 123

Page reserved for new item

Item No: 141

1. REGISTERED DESCRIPTION : Thixotropic Bitumen
2. COLOURS : Brown and Black
3. USE : Maintenance and special new works specifications.
Dft 200 to 300 µm.
4. BUILD AND METHOD OF APPLICATION : HB B or AS
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : 5 to 15%
 - (ii) Pigment : Structuring extenders and colouring pigment
 - (iii) Medium : Bitumen MPT 80-90°C : 90% min
(Ring and Ball - BS 2000: Part 58)
 - (iv) Volatile: 35% max : Aliphatic and/or Aromatic hydrocarbons
 - (v) VOC limit (1998) : Not suitable for shop application

6. PAINT PROPERTIES

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900: part A19
(ii) Flashpoint	Not less than 32°C	BS 3900/A8
(iii) Viscosity	6.0 to 8.0 Poise advised	BS 3900/A7
(iv) Tolerance to sagging	<u>130 x 300</u> µm wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	60% min	BS 3900/A10
(vi) Application and appearance	Free from defects	Appendix 1. Clause A2
(vii) Opacity	Complete obliteration at min dft	Visual
(viii) Colour	Approximate match to the standard	BS 3900/D1
(ix) Surface dry	4 hours max	BS EN ISO 1517
(x) Hard dry	-	-
(xi) Overcoating	After 16 hours with self	Appendix 1. Clause A3
(xii) Keeping properties	-	-

7-10 NOT USED

11. RECOMMENDATIONS/USE

As maintenance material for existing Bitumen coatings over steelwork preferably prepared by abrasive blast cleaning to a minimum standard of Sa 2½ to BS 7079 : Parts A1/A2 (ISO 8501-1/ -2), or by abrading by hand and power tools to a minimum standard of St 2 to the same BS/ISO standards. A suitable primer may be used for areas of badly pitted steel or porous concrete.

Should not be used where exposed to direct sunlight, where temperatures are likely to exceed 60°C, or in contact with solvents.

Not suitable for overcoating, except with self.

Item No: 150

1. REGISTERED DESCRIPTION : Pitch Epoxy (2 pack) Polyamide cured
2. COLOURS : Black and Brown
3. USE See para 11 for further information : Over item 110 where a high level of resistance to moisture is required. Dft 100 to 150 µm.
4. BUILD AND METHOD OF APPLICATION : HB B or AS
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : 30% max
 - (ii) Pigment : Inert extenders, colouring pigments and anti-settling agents
Aluminium pigment not permitted
 - (iii) Medium : Epoxy or Epoxy/Pitch base together with a separately packed Pitch/polyamide or polyamide curing agent: 40% min
 - (iv) Volatile : No requirement
 - (v) Mixing Properties : To be blended in simple proportions (eg 4:1, 5:1) and be packed in such a way that the activator can be added to the tin containing the base component and mixed.

6. PAINT PROPERTIES (after mixing the two components)

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	No specific requirement	-
(iii) Viscosity	4.0 to 6.0 Poise advised	BS 3900/A7
(iv) Tolerance to sagging	<u>130 x 150</u> µm wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	60% min	BS 3900/A10
(vi) Application and appearance	No defects	Appendix 1. Clause A2
(vii) Opacity	Complete obliteration at 100 microns dft	Visual
(viii) Colour	Approximate match to the standard	BS 3900/D1
(ix) Surface dry	8 hours max	BS EN ISO 1517
(x) Hard dry	16 hours max	BS EN 29117
(xi) Overcoating	After 16 hours with self	Appendix 1. Clause A3
(xii) Keeping properties	12 months min (as single packs)	Appendix 1. Clause A4
(xiii) Pot life	8 hours at 20°C	

Item No: 150

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	-	-
(ii) Impact resistance	To pass falling ball test after 24 hours A/D + 2 hrs at 0°C	BS 3900/E7
(iii) Adhesion	No detachment along intersection of scored lines after 7 days A/D	Appendix 1. Clause A5
(iv) Salt spray	No corrosion of underlying steel	BS 3900/F4, 21 days
(v) Sulphur dioxide	No corrosion of underlying steel	BS EN ISO 3231 (0.2 litre) 15 cycles
(vi) Artificial weathering	No appreciable embrittlement or loss of adhesion Tests to be carried out after 7 days conditioning of painted panels	ASTM G53 QUV A 351 lamps, 8 weeks 4 hrs UV @ 60° C 4 hrs Condensation @ 40°C

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.ii, 7.iii and 7.vi Item 110 plus three coats of item 150 applied to 4mm plate prepared in accordance with Appendix 1, Clause A7.

7.iv and 7.v Single 100 µm coat on 18G burnished mild steel plate.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.iii, 6.v, 6.vi, 6.viii, 6.ix, 6.x and 6.xii on every batch.

6.iv on first batch for each contract.

7.ii and 7.iv on first 3 batches.

11. RECOMMENDATIONS/USE

As undercoat and finish over item 110 in long term durability system where a high level of water resistance is required.

Compatibility should be checked when overcoating other paints or applying other paints over, eg lapping with item 14 at ground section of lighting columns.

Must not be used where steel temperature is likely to fall below 10°C during the curing period.

Any restrictions on maximum and minimum overcoating times should be checked with the paint manufacturer before Pitch Epoxy (2 pack) paints are specified.

Item No: 151

1. REGISTERED DESCRIPTION : High Build Epoxy Hydrocarbon Resin Modified Finish (2 pack)
2. COLOURS : Black and Brown
3. USE See para 11 for further details : Over item 110 where a high level of resistance to moisture is required. Dft 100 to 250 microns.
4. BUILD AND METHOD OF APPLICATION : HB AS or B
5. OUTLINE COMPOSITION 5ii, iii and iv by weight
 - (i) Pigment volume concentration : 35 % max
 - (ii) Pigment : Inert extenders, colouring pigments and anti-settling agents
Aluminium pigment not permitted
 - (iii) Medium : Epoxy or epoxy/hydrocarbon resin base together with a separately packed polyamide or polyamine adduct curing agent
 - (iv) Volatile : No requirement
 - (v) Mixing Properties : To be blended in simple proportions (eg 3:1, 4:1) and be packed in such a way that the activator can be added to the tin containing the base component and mixed.

6. PAINT PROPERTIES (after mixing the two components)

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	No specific requirement	-
(iii) Viscosity	As advised by manufacturer	BS 3900/A7
(iv) Tolerance to sagging	<u>130 x 250</u> µm wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	65% min	BS 3900/A10
(vi) Application and appearance	No defects	Appendix 1. Clause A2
(vii) Opacity	Complete obliteration at min recommended dft	Visual
(viii) Colour	Approximate match to standard	BS 3900/D1
(ix) Surface Dry	8 hours max	BS EN ISO 1517
(x) Hard Dry	16 hours max	BS EN 29117
(xi) Overcoating	After 16 hours with self	Appendix 1. Clause A3
(xii) Keeping properties	18 months min	Appendix 1. Clause A4
(xiii) Pot Life	4 hours @ 20°C	-

Item No: 151

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	-	-
(ii) Impact resistance	To pass falling ball test after 24 hrs A/D plus 2 hrs at 0°C	BS 3900/E7
(iii) Adhesion	No detachment along scored lines intersection after 7 days A/D	Appendix 1. Clause A5
(iv) Salt spray	No corrosion of underlying steel	BS 3900/F4, 21 days
(v) Sulphur dioxide	No corrosion of underlying steel	BS EN ISO 3231, 15 cycles
(vi) Artificial weathering	No appreciable embrittlement or loss of adhesion BS 3900/E7 after 7 days conditioning following AW test	BS 3900/F16, 12 weeks followed by BS 3900/E7 impact test

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.ii, 7.iii and 7.vi Item 110 Blast Primer 30 microns dft followed by item 151 applied at 150 microns min dft to 4mm plate prepared in accordance with Appendix 1, Clause A7.

7.iv and 7.v Single coat min 250 microns Item no 151 applied to 18G burnished mild steel plate.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1517.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.iii, 6.v, 6.vi, 6.viii, 6.ix and 6.xii on every batch.

6.iv on first batch for each contract.

7.ii and 7.iv on first 3 batches.

11. RECOMMENDATIONS/USE

As a finish coating over item no 110 Blast Primer for a long durability system where a high level of water resistance is required.

Compatibility should be checked when overcoating other paints or applying other paints over item no 151, eg lapping with item 14 at ground section of lighting columns.

Restrictions on maximum/minimum dry film thicknesses and overcoating times should be checked with paint manufacturer.

Item No: 155

- | | | | | |
|----|---------------------------------|---|--------------------------------------|---------|
| 1. | REGISTERED DESCRIPTION | : | 'T' Wash | |
| 2. | COLOUR | : | Pale Blue | |
| 3. | USE | : | Mordant wash for galvanized surfaces | |
| 4. | METHOD OF APPLICATION | : | B | |
| 5. | TYPICAL COMPOSITION (by weight) | : | Phosphoric acid 1.7 SG | : 9.0% |
| | | | Propylene Glycol Methyl Ether | : 16.5% |
| | | | Methylated Spirit/I.P.A. | : 16.5% |
| | | | Water | : 57.0% |
| | | | Copper Carbonate (Commercial) | : 1.0% |

6-10 NOT USED

11. RECOMMENDATIONS/USE

'T' Wash is a mordant treatment for galvanized steelwork and assists in the adhesion of paint coats to clean zinc surfaces. It also acts as an indicator by reacting with clean bright zinc surfaces, changing the colour to dark grey.

'T' Wash is used in the works on new galvanizing or at site on fresh galvanizing, or weathered galvanizing suitably prepared where necessary.

Typical applications include parapet railings, pedestrian railings, lighting columns and safety fences before applying paint coats.

12. APPLICATION OF 'T' WASH TO NEW GALVANIZING IN THE SHOP

'T' Wash should be applied by brush only to clean zinc surfaces within seven days of galvanizing. Application by spray or airless spray is not recommended. When applied in a flowing coat, it should change clean bright zinc surfaces to a uniform dark grey. Areas which do not change to a uniform dark grey should be considered as being contaminated and should be cleaned down using an abrasive pad, water and cleaning agent followed by rinsing, and allowed to dry. In cases where zinc surfaces are contaminated with oil or grease, solvent wiping may be used before carrying out the cleaning down procedure above. When surfaces are dry, 'T' Wash should be applied to the cleaned areas. 'T' Wash will not be effective if a galvanised surface has been treated with a protective solution such as anti - white rust treatment, or other conversion coatings.

13. APPLICATION OF 'T' WASH TO WEATHERED GALVANIZING AT SITE

The extent of weathering of galvanized surfaces will vary depending on the period of exposure and the environment in which the galvanized steelwork is situated. Generally, the reactivity of 'T' Wash with the zinc surface will diminish with the increase in time of exposure of the galvanizing. Also, the aspect of exposure may cause the oxide layer to form quicker on some parts of a galvanized structure than on other parts, this may result in the appearance of zinc surfaces, when treated with 'T' Wash, varying from dark grey to light grey. In cases where no colour change takes place, the galvanized surface should be considered as being contaminated and surfaces should be cleaned down using an abrasive pad, water and cleaning agent followed by rinsing and allowed to dry. Where Zinc surfaces are contaminated with oil and grease, solvent wiping may be used before carrying out the cleaning down procedure above. When surfaces are dry, 'T' Wash should be applied to the cleaned areas. The contractor should, whenever possible, ascertain in advance the maximum period of exposure for the satisfactory application of 'T' Wash at site eg by simulating the works, delivery and site conditions with galvanized reference panels.

14. GENERAL

Care should be taken when applying 'T' wash to avoid pooling, particularly on horizontal surfaces and in corners where 'T' Wash may run down the surfaces of the steelwork and become trapped. 'T' Wash should not be over-applied. In particular, successive coats should not be applied to overcome the lack in change of colour of the zinc surface.

When galvanizing which has been 'T' Washed is exposed to moisture, eg high humidity, a white powder may form on the zinc surface. In such cases the loose particles of zinc oxide powder should be removed by dry brushing, firmly adhering white zinc oxide not being detrimental to subsequent paint coats or adhesion.

After 'T' Wash has been allowed to dry thoroughly, surfaces must be wet cleaned down to remove excess 'T' Wash and allowed to dry prior to applying the first coat of paint. Wet cleaning down requirements and overcoating times for 'T' Wash are given in Series 1900 of the Specification for Highway Works and associated Notes for Guidance.

'T' Wash only is not a protective coating.

Item No: 159

1. REGISTERED DESCRIPTION : Aluminium Epoxy Sealer (2 pack)
2. COLOUR : Grey/red metallic when applied
3. USE See para 11 for further information : Sealer/Primer for aluminium metal spray.
Coverage - 12 to 20 m²/litre
4. METHOD OF APPLICATION : B or AS
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : 5 to 10%
 - (ii) Pigment : Non-Leafing aluminium : 98-99%
Fugitive red dye or synthetic red oxide : 1-2%
 - (iii) Medium : 100% Epoxy Resin together with a separately packed Polyamide Resin activator.
 - (iv) Volatile : No requirement.
 - (v) Mixing Properties : To be blended in simple proportions (eg 3:1, 4:1) Epoxy Resin base to Polyamide Resin activator. To be packed in such a way that the activator can be added to the tin containing the base component and mixed.

6. PAINT PROPERTIES

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	Not less than 32°C	BS 3900/A8
(iii) Viscosity	2.0 to 2.5 Poise advised	BS 3900/A7
(iv) Tolerance to sagging	-	-
(v) Volume Solids	30% min	BS 3900/A10
(vi) Application and appearance	Grey/red metallic, free from sagging or runs and other defects	Apply to glass panel 25 g/m ² dry film
(vii) Opacity	-	-
(viii) Colour	Approximate match to the standard	BS 3900/D1
(ix) Surface dry	Less than 1 hour	BS EN ISO 1517
(x) Hard dry	Less than 4 hours	BS EN 29117
(xi) Overcoating	After 8 hours with item 111 or 112	-
(xii) Keeping properties	18 months min (as single packs)	Appendix 1, Clause A4
(xiii) Pot Life	4 hours min @ 20°C	-

Item No: 159

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	-	-
(ii) Impact resistance	-	-
(iii) Adhesion	-	-
(iv) Salt spray	No rusting or rust staining. Not more than slight whitening after rinsing and 48 hrs A/D	BS 3900/F12 21 days
(v) Sulphur dioxide	No rusting or rust staining	BS EN ISO 3231 (0.2 litre) 15 cycles
(vi) Artificial weathering	-	-

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.iv and 7v Single coat applied at specified application rate to 150 x 100 x 4mm plate prepared in accordance with Appendix 1, Clause A7, using chilled cast iron grit and aluminium metal sprayed with 100 µm min on both sides and edges.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.v, 6.vii to 6.ix on every batch.
6.iv on first batch for each contract.
7.iv and 7.v on first 3 batches.

11. RECOMMENDATIONS/USE

Applied to aluminium metal spray as a sealer only and overcoated with MIO Epoxy (2 pack), Oleo-resinous, Acrylated Rubber paints.

A single coat to be applied in the shop within 4 hours of spraying on of metal coating on any part. A stripe coat is not required. The sealer may be applied by brush or spray, but must not be over-applied.

For airless spray a tip size between 0.32 and 0.41 mm. is recommended.

NOTE - Excess application, especially pooling on horizontal surfaces, must immediately be removed by brush or sponge.

Maximum and minimum overcoating times should be checked with the manufacturer before use.

Components to be handled with care as further coats are not permitted in the shop or at site.

Item No: 160

1. REGISTERED DESCRIPTION : Red Oxide Moisture Cured Polyurethane Primer/
Blast Primer
2. COLOUR : Red Oxide
3. USE See para 11 for further information : Primer/Blast Primer for maintenance
Dft 25 to 50 µm
4. METHOD OF APPLICATION : NB B or AS
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : 25-35%
 - (ii) Pigment : Red Oxide (BS 3981) : 20% min
Extenders and anti-settling agents : to 100%
Aluminium pigment not permitted
 - (iii) Medium : Essentially aromatic polyisocyanate and water
scavenger
 - (iv) Volatile : 50% max : Essentially Aliphatic and/or Aromatic
hydrocarbons
 - (v) VOC limit (1998) : Not greater than 780 gm./litre (if applied in shop)

6. PAINT PROPERTIES

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	No specific requirement	-
(iii) Viscosity	2.0 to 4.0 Poise advised	BS 3900/A7
(iv) Tolerance to sagging	<u>120 x 50</u> µm wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	40% min	BS 3900/A10
(vi) Application and appearance	Adequate flow, even finish, free from defects	Appendix 1. Clause A2
(vii) Opacity	Complete obliteration	Visual
(viii) Colour	Approximate match to the standard	BS 3900/D1
(ix) Surface dry	1 hour max	BS EN ISO1517
(x) Hard dry	2 hours max	BS EN 29117
(xi) Overcoating	At min 65% RH, after 24 hours with m.c. polyurethane, 72 hours with AR, Epoxy or Epoxy Ester	Appendix 1. Clause A3
(xii) Keeping properties	6 months min	Appendix 1. Clause A4

Item No: 160

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	800 g at 24 hours	BS 3900/E2
(ii) Impact resistance	To pass falling ball test after 7 days A/D + 2 hours at 0°C	BS 3900/E7
(iii) Adhesion	No detachment along scored lines after 24 hours A/D	Appendix 1. Clause A5
(iv) Salt spray	No corrosion of underlying steel	BS 3900/F4 10 days
(v) Sulphur dioxide	No corrosion of underlying steel	BS EN ISO 3231 (0.2 litre) 10 cycles
(vi) Artificial weathering	-	-

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.i Single coat on burnished tinplate.

7.ii and 7.iii Single coat on 4mm plate prepared in accordance with Appendix 1, Clause A7.

7.iv and 7.v Single 40µm coat on 18G burnished mild steel plate.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.v, 6.vi, 6.viii, 6.ix and 6.x on every batch.

6.iv on first batch for each contract.

7.i, 7.ii, 7.iii and 7.iv on first 3 batches.

11. RECOMMENDATIONS/USE

As a maintenance primer over steelwork prepared by abrasive blast cleaning to a minimum standard of BS 7079 : Part A1 (ISO 8501-1), Sa 2½. May also be applied to surfaces prepared by power tool cleaning or abrading to St 2 standard. Applied by airless spray or brush. For use with polyurethane undercoat and finishes, items 162 to 168. Also overcoatable with AR, Epoxy and Epoxy Ester paints (advice should be sought from the paint manufacturer when overcoating with other than polyurethane paints). Moisture cured polyurethanes are suitable for use in conditions of low temperature/high humidity. Under certain conditions, eg low temperature/low humidity, the curing process may be retarded. Not to be used when steel and/or ambient temperatures at the time of application or likely during the curing period are at or below 0°C.

Item No: 162

1. REGISTERED DESCRIPTION : MIO Moisture Cured Polyurethane Undercoat/Finish
2. COLOURS : Medium and natural grey
3. USE See para 11 for further information : Undercoat for maintenance. Dft 50 to 125 µm
4. BUILD AND METHOD OF APPLICATION : HB B or AS
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : 35-40%
 - (ii) Pigment : MIO (BS 3981) : 40% min
Extenders, tinting pigments and anti-settling agents : to 100%
Aluminium pigment not permitted
 - (iii) Medium : Essentially aromatic polyisocyanate and water scavenger
 - (iv) Volatile : Essentially Aliphatic and/or Aromatic hydrocarbons

6. PAINT PROPERTIES

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	No specific requirement	-
(iii) Viscosity	2.0 to 4.0 Poise advised	BS 3900/A7
(iv) Tolerance to sagging	<u>130 x 125</u> µm wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	45% min	BS 3900/A10
(vi) Application and appearance	Adequate flow, even finish, free from defects	Appendix 1. Clause A2
(vii) Opacity	Complete obliteration at min dft.	Visual
(viii) Colour	Approximate match to the standard	BS 3900/D1
(ix) Surface dry	2 hour max	BS 3900/C2 EN ISO 1517
(x) Hard dry	8 hours max	BS EN 29117
(xi) Overcoating	At min 65% RH, after 24 hours with m.c. polyurethane, 72 hours with AR, Epoxy or Epoxy Ester	Appendix 1. Clause A3
(xii) Keeping properties	6 months min	Appendix 1. Clause A4

Item No: 162

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	To pass 1500 g at 24 hours	BS 3900/E2
(ii) Impact resistance	To pass falling ball test after 7 days A/D + 2 hours at 0°C	BS 3900/E7
(iii) Adhesion	No detachment along scored lines after 24 hours A/D	Appendix 1. Clause A5
(iv) Salt spray	-	-
(v) Sulphur dioxide	-	-
(vi) Artificial weathering	No appreciable chalking, loss of gloss, embrittlement or loss of adhesion. BS 3900/F16 test to be carried out after 7 days A/D	BS 3900/F16 12 weeks, followed by test BS 3900/E7

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.i Single coat on burnished tinplate.

7.ii, 7.iii and 7.vi Blast primer item 160, plus two coats of undercoat item 162 applied at 80 µm dft on 4mm plate in accordance with Appendix 1, Clause A7.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.v, 6.vii, 6.x on each batch.

6.iv on first batch for each contract.

7.i, 7.ii and 7.iii on first 3 batches.

11. RECOMMENDATIONS/USE

As a maintenance undercoat/finish to be applied by brush or airless spray over item 160 moisture cured polyurethane primer. Overcoatable with self, moisture cured polyurethane semi-gloss finish or (2 pack) polyurethane gloss finish. Moisture cured polyurethanes are suitable for use in conditions of low temperature/high humidity. Under certain conditions, eg low temperature/low humidity, the curing process may be retarded. Not to be used when steel and/or ambient temperatures at the time of application or likely during the curing period are at or below 0°C.

Item No: 164

1. REGISTERED DESCRIPTION : Moisture Cured Polyurethane Finish
2. COLOURS : Various
3. USE See para 11 for further information : Semi-gloss finish for maintenance
Dft 30 to 40 µm Brush
Dft 40 to 60 µm Airless spray
4. BUILD AND METHOD OF APPLICATION : NB B or HB AS
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : 15% min
 - (ii) Pigment : RTD (BS 1851) and tinting pigments : %age to give required opacity
Exterior quality extenders and anti-settling agents : to 100%
Aluminium pigment not permitted
 - (iii) Medium : Aliphatic polyisocyanate and water scavenger
 - (iv) Volatile : Essentially Aliphatic/Aromatic hydrocarbons
 - (v) VOC limit (1998) : Not greater than 420 gm/litre (if used in shop)

6. PAINT PROPERTIES

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	No specific requirement	-
(iii) Viscosity	1.0 to 3.0 Poise advised	BS 3900/A7
(iv) Tolerance to sagging	$\frac{130 \times 60}{\text{Data Sheet}}$ µm wft vs	Appendix 1. Clause A2.i
(v) Volume Solids	50% min	BS 3900/A10
(vi) Application and appearance	Adequate flow, semi-gloss even finish, free from defects	Appendix 1. Clause A2
(vii) Opacity	Complete obliteration at max dft	Visual
(viii) Colour	To match the standard	BS 3900/D1
(ix) Surface dry	4 hours max	BS EN ISO 1517
(x) Hard dry	16 hours max	BS EN 29117
(xi) Overcoating	-	-
(xii) Keeping properties	6 months min	Appendix 1. Clause A4

Item No: 164

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	To pass 1500 g at 7 days	BS 3900/E2
(ii) Impact resistance	To pass falling ball test after 7 days A/D + 2 hours at 0°C	BS 3900/E7
(iii) Adhesion	No detachment along scored lines after 24 hours A/D	Appendix 1. Clause A5
(iv) Salt spray	-	-
(v) Sulphur dioxide	-	-
(vi) Artificial weathering	No appreciable chalking, loss of gloss, embrittlement or loss of adhesion. BS 3900/F16 test to be carried out after 7 days A/D	BS 3900/F16 12 weeks, followed by test BS 3900/E7

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.i Single coat on burnished tinplate.

7.ii, 7.iii and 7.vi Blast primer item 160, plus two coats of undercoat item 162 applied at 80 microns dft and one coat of finish, item 164 applied at 50 µm dft on 4mm plate in accordance with Appendix 1, Clause A7.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.v, 6.vii, 6.ix on every batch.

6.iv on first batch for each contract.

7.i and 7.vi on first 3 batches.

11. RECOMMENDATIONS/USE

As a finish over items 112, 116, or 162, where a semi-gloss finish is required. Can be applied in conditions of low temperature/high humidity where conventional paints would be unsuitable. Under certain conditions, eg low temperature/low humidity, the curing process may be retarded. Not to be used when steel or ambient temperatures at the time of application or likely during the curing period are at or below 0°C.

Item No: 168

1. REGISTERED DESCRIPTION : Polyurethane (2 Pack) Finish
2. COLOURS : Various
3. USE See para 11 for further information : Gloss Finish for new works/maintenance
Dft 40 to 50 µm Brush
Dft 50 to 70 µm Airless spray
4. BUILD AND METHOD OF APPLICATION : NB B or AS
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : 15% min
 - (ii) Pigment : RTD (BS 1851) and tinting pigments : %age to give required opacity
Exterior quality extenders and anti-settling agents : to 100%
Aluminium pigment not permitted
 - (iii) Medium : Hydroxyl functional acrylic/aliphatic poly isocyanate curing agent
 - (iv) Volatile : Essentially Aliphatic/Aromatic hydrocarbons
 - (v) Mixing Properties : To be blended in simple proportions (eg 1:1, 2:1) and be packed in such a way that the activator can be added to the tin containing the base component and mixed
 - (vi) VOC limit (1998) : Not greater than 420 gm./litre (if used in shop)

6. PAINT PROPERTIES

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	No specific requirement	-
(iii) Viscosity	1.0 to 3.0 Poise advised (mixed)	BS 3900/A7
(iv) Tolerance to sagging	<u>130 x 70</u> µm wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	min 40%	BS 3900/A10
(vi) Application and appearance	Adequate flow, glossy even finish, free from defects	Appendix 1. Clause A2
(vii) Opacity	Complete obliteration at min. dft	Visual
(viii) Colour	To match the standard	BS 3900/D1
(ix) Surface dry	2 hours max	BS EN ISO 1517
(x) Hard dry	16 hours max	BS EN 29117
(xi) Overcoating	-	-
(xii) Keeping properties	6 months min	Appendix 1. Clause A4

Item No: 168

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	To pass 800 g at 7 days	BS 3900/E2
(ii) Impact resistance	To pass falling ball test after 7 days A/D + 2 hours at 0°C	BS 3900/E7
(iii) Adhesion	No detachment along scored lines after 24 hours A/D	Appendix 1. Clause A5
(iv) Salt spray	-	-
(v) Sulphur dioxide	-	-
(vi) Artificial weathering	No appreciable chalking, loss of gloss, embrittlement or loss of adhesion. BS 3900/F16 test to be carried out after 7 days A/D	BS 3900/F16, 12 weeks followed by test BS 3900/E7

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.i Single coat on burnished tinplate.

7.ii, 7.iii and 7.vi High Build Quick Drying Blast primer item 111, applied at 50 microns dft, plus one coat of MIO High Build Quick Drying Undercoat item 112, applied at 100 microns dft, and one coat of finish, item 168, applied at 50 microns dft on 4mm plate in accordance with Appendix 1, Clause A7.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.v, 6.vii, 6.ix on every batch.

6.iv on first batch for each contract.

7.i and 7.vi on first 3 batches.

11. RECOMMENDATIONS/USE

Recommended as the final coat over 2-pack epoxy systems where a gloss finish is required. May be applied over item nos. 112, 116, or 162.

Suitable for application in shop or at site.

Item No: 169

1. REGISTERED DESCRIPTION : Polyurethane (2-pack) Finish
2. COLOURS : Various
3. USE See para 11 for further details : Semi-gloss finish for new works/maintenance
Dft 40-60 microns Brush
Dft 75-125 microns Airless Spray
4. BUILD AND METHOD OF APPLICATION : NB AS (small areas by B)
5. OUTLINE COMPOSITION :
 - (i) Pigment volume concentration : 20% min
 - (ii) Pigment : RTD (BS 1851) and tinting pigments : %age to give required opacity
Exterior quality extenders and anti-settling agents : to 100%
Aluminium pigment not permitted
 - (iii) Medium : Hydroxy functional acrylic/aliphatic polyisocyanate curing agent
 - (iv) Volatile : As advised by manufacturer
 - (v) Mixing Properties : To be blended in simple proportions (eg 3:1, 4:1) and be packed in such a way that the activator can be added to the tin containing the base component and mixed

6. PAINT PROPERTIES (after mixing the two components)

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	No specific requirement	-
(iii) Viscosity	As advised by manufacturer	BS 3900/A7
(iv) Tolerance to sagging	<u>130 x 125</u> µm wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	50% min	BS 3900/A10
(vi) Application and appearance	Even semi-gloss finish, 35 to 45% gloss 60° Head	Appendix 1. Clause A2 BS 3900/D5
(vii) Opacity	Complete obliteration at 75 microns dft	Visual
(viii) Colour	To match standard	BS 3900/D1
(ix) Surface Dry	4 hours max	BS EN ISO 1517
(x) Hard Dry	16 hours max	BS EN 29117
(xi) Overcoating	-	-
(xii) Keeping properties	18 months min	Appendix 1. Clause A4
(xiii) Pot Life	2 hours @ 20°C	-

Item No: 169

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	To pass 800 g at 7 days	BS 3900/E2
(ii) Impact resistance	To pass falling ball test after 7 days A/D & 2 hours at 0°C	BS 3900/E7
(iii) Adhesion	No detachment along scored lines after 24 hours A/D	Appendix 1. Clause A5
(iv) Salt spray	-	-
(v) Sulphur dioxide	-	-
(vi) Artificial weathering	No appreciable chalking loss of gloss, adhesion or embrittlement. BS 3900/F16 test to be carried out after 7 days A/D	BS 3900/F16, 12 weeks followed by test BS 3900/E7

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.i Single coat on burnished tinplate.

7.ii, 7.iii, and 7.iv High Build Quick Drying Blast primer item 111, applied at 50 microns dft plus one coat of MIO HB Quick Drying Undercoat item 112, applied at 100 microns dft, and a final coat or coats of item 169, applied at 100 microns dft on 4mm plate in accordance with Appendix 1, Clause A7.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.v, 6.vii, 6.ix on every batch.
6.iv on first batch for each contract.
7.i and 7.vi on first 3 batches.

11. RECOMMENDATIONS/USE

Recommended as the final coat over 2-pack epoxy systems where a semi-gloss finish is required. May be applied over item nos. 112, 116, 162, 164 or 168.

Suitable for application in shop or at site if registered as VOC compliant.

Item No: 172

1. REGISTERED DESCRIPTION : Zinc Phosphate Acrylated Rubber Undercoat
2. COLOURS : 14 C 35, 18 C 35, and 12 C 33 to BS 4800
3. USE See para 11 for further information : Undercoat in AR system. Dft 40 - 75 µm
4. BUILD AND METHOD OF APPLICATION : HB B or AS
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : 30 to 40%
 - (ii) Pigment : Zinc Phosphate (BS 5193) : 55% min
Other pigments, extenders,
anti-settling agents and
tinting pigments : to 100%
 - (iii) Medium : Chlorine free vinyl or vinyl/acrylic copolymer
together with suitable plasticiser
 - (iv) Volatile : 45% max : Aliphatic and/or Aromatic hydrocarbons

6. PAINT PROPERTIES

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	No specific requirement	-
(iii) Viscosity	3.0 to 8.0 Poise advised	BS 3900/A7
(iv) Tolerance to sagging	<u>130 x 75</u> microns wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	40% min	BS 3900/A10
(vi) Application and appearance	Adequate flow, even eggshell finish, free from defects	Appendix 1. Clause A2
(vii) Opacity	Complete obliteration at min dft	Visual
(viii) Colour	Approximate match to the standard	BS 3900/D1
(ix) Surface dry	4 hours max	BS EN ISO 1517
(x) Hard dry	8 hours max	BS EN 29117
(xi) Overcoating	After 8 hours with self or item 174	Appendix 1. Clause A3
(xii) Keeping properties	18 months min	Appendix 1. Clause A4

Item No: 172

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	-	-
(ii) Impact resistance	7 days A/D + 2 hours at 0°C	
(iii) Adhesion	No detachment along intersection of scored lines at 0°C	Appendix 1. Clause A5
(iv) Salt spray	No corrosion of underlying steel	BS 3900/F4,
Sulphur dioxide	No corrosion of underlying steel	BS EN ISO 3231 (0.2 litre) 15 cycles
(vi) Artificial weathering	No appreciable chalking, embrittlement or loss of adhesion. BS 3900/F16 test to be carried out after 7 days A/D	BS 3900/F16 6 weeks, followed by test BS 3900/E7

8.

9. TEST COATS AND TEST PANELS

7.i Single coat on burnished tinplate.

7.ii, 7.iii and 7.vi Blast cleaned steel plus three 50-60 µm coats of item 172 at 24 hourly intervals on 4mm plate prepared in accordance with Appendix 1, Clause A7.

7.iv and 7.v Single coat 50-60 µm on 18G burnished mild steel plate.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.v, 6.vi, 6.viii and 6.ix on every batch.

7.i, 7.ii and 7.iii on first 3 batches.

11.

For site maintenance of existing A.R. systems.

Item No: 174

1. REGISTERED DESCRIPTION : MIO Acrylated Rubber Undercoat /Finish
2. COLOURS : Black, natural grey and medium grey
00 A 13 and 00 A 09 to BS 4800
3. USE See para 11 for further information : Undercoat or Finish. Dft 50-80 µm
4. BUILD AND METHOD OF APPLICATION : HB B or AS
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : 25% min
 - (ii) Pigment : MIO (BS 3981 and Appendix 2.
Clause 1) : 80% min
Tinting pigments and extenders : to 100%
Aluminium pigment not permitted
 - (iii) Medium : Chlorine free vinyl or vinyl/acrylic copolymer
together with suitable plasticiser
 - (iv) Volatile : 40% max : Aliphatic and/or Aromatic hydrocarbons

6. PAINT PROPERTIES

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	No specific requirement	-
(iii) Viscosity	5.0 to 10.0 Poise advised	BS 3900/A7
(iv) Tolerance to sagging	<u>130 x 80</u> µm wft Data Sheet vs	Appendix 1. Clause A2.i
(v) Volume Solids	40% min	BS 3900/A10
(vi) Application and appearance	Adequate flow, even finish, free from defects	Appendix 1. Clause A2
(vii) Opacity	Complete obliteration at min dft	Visual
(viii) Colour	Approximate match to the standard	BS 3900/D1
(ix) Surface dry	4 hours max	BS EN ISO 1517
(x) Hard dry	8 hours max	BS EN 29117
(xi) Overcoating	After 8 hours with self, or item 176	Appendix 1. Clause A3
(xii) Keeping properties	18 months min	Appendix 1. Clause A4

Item No: 174

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	-	-
(ii) Impact resistance	To pass falling ball test after 7 days A/D + 2 hours at 0°C	BS 3900/E7
(iii) Adhesion	No detachment along intersection of scored lines after 7 days A/D + 2 hours at 0°C	Appendix 1. Clause A5
(iv) Salt spray	-	-
(v) Sulphur dioxide	-	-
(vi) Artificial weathering	No appreciable chalking, embrittlement or loss of adhesion. BS 3900/F16 test to be carried out after 7 days A/D	BS 3900/F16 12 weeks, followed by test BS 3900/E7

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.ii and 7.iii One coat of item 174 applied at 50-60 microns dft over blast primer item 110 on 4mm plate prepared in accordance with Appendix 1, Clause A7.

7.vi Blast cleaned steel plus three coats of item 174 at 50-60 microns per coat applied at 24 hourly intervals on 4mm plate prepared in accordance with Appendix 1, Clause A7.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.v, 6.vi, 6.viii, 6.ix and 6.x on every batch.

6.iv on first batch for each contract.

7.ii and 7.iii on first 3 batches.

11. RECOMMENDATIONS/USE

Applied at site as an intermediate or finish coat over item 172, for maintenance of existing A.R. systems. Must be overcoatable with item 176 without causing pinholes or other blemishes.

Item No: 176

1. REGISTERED DESCRIPTION : Acrylated Rubber Undercoat/Finish
2. COLOURS : Various. Four colours required 00 A 05, 18 B 21, 18 B 25, and 12 B 21 to BS 4800
3. USE See para 11 for further information : Final undercoat or semi-gloss finish. Dft 40-75 µm
4. BUILD AND METHOD OF APPLICATION : HB AS
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (vii) Pigment volume concentration : 15% min
 - (viii) Pigment : RTD (BS 1851), exterior quality extenders and tinting pigments
 - (ix) Medium : Chlorine free vinyl or vinyl/acrylic copolymer together with suitable plasticiser
 - (x) Volatile : 50% max : Aliphatic and/or Aromatic hydrocarbons

6. PAINT PROPERTIES

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	No specific requirement	-
(iii) Viscosity	4.0 to 6.0 Poise advised	BS 3900/A7
(iv) Tolerance to sagging	$\frac{130 \times 75}{\text{Data Sheet vs}}$ µm wft	Appendix 1. Clause A2.i
(v) Volume Solids	35% min	BS 3900/A10
(vi) Application and appearance	Adequate flow, even semi-gloss finish, free from defects	Appendix 1. Clause A2
(vii) Opacity	80% min	BS 3900/D4 Appendix 1. Clause B1
(viii) Colour	To match the standard	BS 3900/D1
(ix) Surface dry	2 hours max	BS EN ISO 1517
(x) Hard dry	8 hours max	BS EN 29117
(xi) Overcoating	After 16 hours with self	Appendix 1. Clause A3
(xii) Keeping properties	18 months min	Appendix 1. Clause A4

Item No: 176

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	-	-
(ii) Impact resistance	To pass falling ball test after 7 days A/D + 2 hours at 0°C	BS 3900/E7
(iii) Adhesion	No detachment along intersection of scored lines after 7 days A/D + 2 hours at 0°C	Appendix 1. Clause A5
(iv) Salt spray	-	-
(v) Sulphur dioxide	-	-
(vi) Artificial weathering	No appreciable chalking, embrittlement or loss of adhesion. BS 3900/F16 test to be carried out after 7 days A/D	BS 3900/F16 12 weeks, followed by test BS 3900/E7

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.ii and 7.iii One coat of item 176 applied at 50-60 µm over blast primer item 110 on 4mm plate prepared in accordance with Appendix 1, Clause A7.

7.vi Blast cleaned steel plus two coats of item 176 applied at 50-60 µm at 24 hourly intervals on 4mm plate prepared in accordance with Appendix 1, Clause A7.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

6.ii, 6.v, 6.vi, 6.viii, 6.ix and 6x on every batch.

6.iv on first batch for each contract.

7.ii and 7.iii on first 3 batches.

11. RECOMMENDATIONS/USE

As a final undercoat and semi-gloss finish in an Acrylated Rubber system, applied at site over MIO Acrylated Rubber or self.

Item No: 200

1. REGISTERED DESCRIPTION : Grease Paint Penetrating Primer
2. COLOUR : Tint contrasting to undercoat, sufficient to show application.
3. USE See para 11 for further information : Penetrating primer for use with item 201
4. METHOD OF APPLICATION : B (AS for internal surfaces of lighting columns and other difficult access situations)
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : N/A
 - (ii) Pigment : As required (see 2 above)
 - (iii) Medium : Calcium soap of oxidised petroleum, hydrocarbon resins and de-watering agent
 - (iv) Volatile : 75% max : Essentially white spirit or SBP solvents. Maximum aromatic of white spirit 25%

6. PAINT PROPERTIES

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	Not less than 32°C	BS 3900/A8
(iii) Viscosity	N/A	-
(iv) Tolerance to sagging	N/A	-
(v) Volume Solids	N/A	-
(vi) Application and appearance	No defects	Visual
(vii) Opacity	N/A	-
(viii) Colour	See 2 above	-
(ix) Surface dry	N/A	-
(x) Hard dry	N/A	-
(xi) Overcoating	Within 4 hours with item 201	-
(xii) Keeping properties	18 months without deterioration	Appendix 1, Clause A4

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	-	-
(ii) Impact resistance	-	-
(iii) Adhesion	-	-
(iv) Salt spray	-	-
(v) Sulphur dioxide	-	-
(vi) Artificial weathering	-	-
(vii) Drying at low temperatures	Overcoatable after 24 hours at 5°C ± 1°C No defects	Visual

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.vii Single coat applied at recommended rate to test panel prepared in accordance with Appendix 1, Clause A7.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

None

11. RECOMMENDATIONS/USE

Unless there are exceptional circumstances, surfaces should always be treated with a coat of penetrating primer before application of grease paint item 201. The primer should be allowed to flow into gaps, eg at joints and at edges of plates. It should be applied generously to rough and pitted surfaces and around bolts, nuts and washers. Although the primer has dewatering properties it should only be applied to dry surfaces and after the specified surface preparation has been completed.

Generally, the penetrating primer should be brush applied. However, for internal surfaces of lighting columns and in other difficult access situations, the primer may be applied by airless spray.

Item No: 201

1. REGISTERED DESCRIPTION : Grease Paint Undercoat/Finish
2. COLOURS : Black, yellow and one other contrasting colour (see para 11 - 'NOTE')
3. USE See para 11 for further information : Undercoat and Finish over penetrating primer. Dft 150-175 μm
4. BUILD AND METHOD OF APPLICATION : HB B or AS
5. OUTLINE COMPOSITION (5ii, iii and iv by weight)
 - (i) Pigment volume concentration : To suit colour - max 20%
 - (ii) Pigment : RTD or other exterior quality and tinting pigments : 100%
 - (iii) Medium : Calcium soap of oxidised petroleum wax. Max 10% resin (as 100% resin)/rosin resinsates and plasticisers
 - (iv) Volatile : 45% max : Essentially white spirit or SBP solvents. Maximum aromatic of white spirit 25% (White spirit 180°C max end point)

6. PAINT PROPERTIES

Paint Property	Requirement	Test
(i) Density	No specific requirement	BS 3900 : Part A19
(ii) Flashpoint	Not less than 32°C	BS 3900/A8
(iii) Viscosity	-	-
(iv) Tolerance to sagging	No sagging at 60°C	Appendix 1. Clause A1
(v) Volume Solids	45% min	BS 3900/A10
(vi) Application and appearance	No defects	Visual
(vii) Opacity	Complete obliteration at min film thickness	Visual
(viii) Colour	Approximate match to the standard	BS 3900/D1
(ix) Surface dry	Satisfactory within 24 hrs	BS EN ISO 1517
(x) Firm dry	No imprint after 14 days	Appendix 1. Clause A6
(xi) Overcoating	Within 24 hours with self	Appendix 1. Clause A3
(xii) Keeping properties	18 months without deterioration	Visual

Item No: 201

7. PHYSICAL AND ARTIFICIAL ENVIRONMENT PERFORMANCE TEST REQUIREMENTS

Property	Requirement	Test
(i) Scratch resistance	-	-
(ii) Impact resistance	-	-
(iii) Adhesion	-	-
(iv) Salt spray	No blistering, detachment of coating or corrosion of underlying steel	BS 3900/F4 1500 hours
(v) Sulphur dioxide	No blistering, detachment of coating or corrosion of underlying steel	BS EN ISO 3231 15 cycles (1.0 litre)
(vi) Artificial weathering	No surface defects or loss of adhesion	BS 3900/F16 2000 hours
(vii) Drying at low temperatures	1st undercoat overcoatable after 24 hours at 5°C ± 1°C No defects	Visual

8. ADDITIONAL TESTS

None

9. TEST COATS AND TEST PANELS

7.iv, 7.v, 7.vi and 7.vii Single coat at 40-60 microns dft applied to 150 x 100 burnished steel panels.

Unless otherwise stated, all test panels shall be prepared in accordance with BS EN ISO 1514.

10. TESTS ON RETAINED SAMPLES TO BE CARRIED OUT BY THE MANUFACTURER

None

11. RECOMMENDATIONS/USE

Grease paints are used in cases where orthodox paint systems would be ineffective because satisfactory surface preparation would be difficult to achieve or would be uneconomical.

A grease paint system consists of a coat of penetrating primer item 200 and two coats of grease paint item 201. The penetrating primer improves adhesion of the system to the surface, usually prepared by abrading to bare steel. It also penetrates into crevices and retards further corrosion. Grease paints are suitable for the protection of the inside of box girders where blast cleaning will not generally be practicable. They can also be used for the protection of galvanizing which has begun to rust through. Grease paints have been used successfully on older bridges for terminal maintenance, for footbridges as an economical holding system, weighbridges and for temporary structures. Care should be taken not to over apply grease paint to avoid 'pooling' on horizontal surfaces. Paint manufacturers must state in the Data Sheet the type of solvents used to enable the Contractor to comply with Health and Safety requirements regarding the exposure limits to operatives when working in confined spaces eg. inside box girders. Solvents in grease paint evaporate at a slower rate than in conventional paints and will also vary depending on temperature and ventilation. It should therefore be ensured that the insides of box girders are adequately ventilated during and after painting and that Health and Safety requirements regarding Lower Explosive Limit (LEL) are complied with.

NOTE: Aluminium colour should not be used as a finish in a severe SO₂ environment.

Appendix 1

5.0 ADDITIONAL, SUBSTITUTE AND SUPPLEMENTARY TEST CLAUSES TO BS 3900 'METHODS OF TEST FOR PAINTS'

5.1 INTRODUCTION

Methods to be used for the testing of paints are to be in accordance with BS 3900 and/or in accordance with test clauses in this Appendix as indicated in the relevant Item Sheet.

In cases where appendix test clauses and BS 3900 clauses overlap, the Appendix test clauses shall take precedence.

Appendix test clauses are revised from time to time and the latest amendments must be used. These amendments will take into account European specifications and standards (CEN and CENELEC), revisions to BS 3900, and International Standards (ISO) where appropriate.

5.2 DEFINITIONS

- i. 'Additional Test Clauses'. These cover test methods and requirements not previously covered by BS 3900. Reference may be made to BS 3900 where useful purpose is served.
- ii. 'Substitute Test Clauses'. These are provided where it is necessary to replace a single BS 3900 clause or group of BS 3900 clauses entirely, the BS 3900 clause(s) being superseded.
- iii. 'Supplementary Test Clauses'. These provide modifications to or expand Parts of BS 3900 or single BS 3900 clauses.

5.3 ADDITIONAL TEST CLAUSES TO BS 3900

A1 TOLERANCE TO SAGGING - TEST FOR GREASE PAINTS

1. Apparatus

- 1.1 Masking tape, 25mm wide.
- 1.2 Mild steel panel 300 x 300mm burnished in accordance with BS EN ISO 1514 (BS 3900 : Part A3)
- 1.3 Oven capable of maintaining $60^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 24 hours.

2. Procedure

- 2.1 Apply the tape in the form of a St Andrew's Cross to a degreased burnished 300 X 300mm mild steel panel.
- 2.2 Apply the paint to the taped panel by the appropriate method to give a dry film thickness of 1.3 x upper dry film thickness stated in para 3 of the item sheet.
- 2.3 Immediately after application, remove the tape and stand the panel in a vertical position for a period of 24 hours at a room temperature of $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$.
- 2.4 At the end of this period, examine the film for signs of sagging into the cross area.

- 2.5 If no sagging has occurred, place the panel in a vertical position in an oven maintained at $60^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for a further 24 hours.
- 2.6 At the end of this period, remove the panel from the oven and again examine the film for signs of sagging into the cross area.

3. Reporting

The sample is considered to have passed the test should no sagging be observed at 2.4 or 2.6. Report sample as pass or fail.

A2 APPLICATION AND APPEARANCE

i. Airless spray grade

A single coat of paint shall be applied using the size and pressures recommended in the paint manufacturer's data sheet to a 300 x 300mm or larger, burnished steel panel.

The paint shall be applied to give the wet film thickness stated in para 6.iv of the item sheet or, where the wft is not given, the maximum dry film thickness stated in para 3.

The film shall be allowed to dry for 24 hours in a vertical position at a temperature of $23^{\circ} \pm 2^{\circ}\text{C}$ and shall be free from cracking, cratering, pinholing, rivelling, sagging, bittiness, cissing or other surface defects.

ii. Brushing grade

A single coat of paint shall be applied to a 300 x 300mm, or larger, burnished steel panel to give the wet film thickness stated in para 6.iv of the item sheet or, where the wft is not given, the maximum dry film thickness stated in para 3.

The film shall be allowed to dry for 24 hours in a vertical position at a temperature of $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and shall be free from cracking, cratering, rivelling, sagging, bittiness, cissing or other surface defects.

A3 OVERCOATING

A single coat of paint shall be applied to a 300 x 300mm, or larger, burnished steel panel to give the wet film thickness stated in para 6.iv of the item sheet or, where the wft is not given, the maximum dry film thickness stated in para 3.

After air drying at $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for the period of time stated in para 6.xi of the item sheet the paint shall be overcoated with the next coat in the system. The second coat of paint shall be applied at the wet film thickness stated in para 6.iv or, where the wft is not stated, the maximum dry film thickness stated in para 3 of the item sheet for that paint.

Any wrinkling, rivelling or other surface defect caused by overcoating the first coat of paint with the second, shall be reported.

A4 KEEPING PROPERTIES

When stored in its original sealed container in a paint store at temperatures within a range of 5°C to 27°C the paint shall retain the original properties for the minimum time stated in para 6.xii of the item sheet from the date of despatch from the manufacturer. The paint shall not show hard settling, objectionable skinning or tendency to gel when tested in accordance with BS EN ISO 1513 (BS 3900 : Part A2). Any light settlement shall be readily dispersed by hand stirring.

A5 ADHESION X CUT TEST

1. Introduction

An X-cut is made in the film to the substrate, pressure-sensitive tape is applied over the cut and then removed. The adhesion of the film is assessed in accordance with the 0 to 5 scale described in para 4.1.

2. Apparatus and Materials

- 2.1 Cutting tool - Sharp razor blade, scalpel, stanley knife or other cutting device. It is of particular importance that the cutting edges be in good condition.
- 2.2 Cutting guide - Steel or other hard metal straight edge to ensure straight cuts.
- 2.3 Tape - 25mm wide semi-transparent pressure-sensitive tape. The tape should comply with BS 3924, Pressure Sensitive Adhesive Tape for Electrical Purposes, Class 34/105 - Cellulose acetate.
- 2.4 Pencil rubber eraser.
- 2.5 Illumination - A light source is helpful in determining whether the cuts have been made through the film to the substrate.

3. Procedure

- 3.1 Select an area free from blemishes and minor surface imperfections. Ensure that the surface is clean and dry. Extremes in temperature or relative humidity may affect the adhesion of the tape or the coating.
- 3.2 Make two cuts in the film each about 40mm long that intersect near their middle with a smaller angle of between 30° and 45°. When making the incisions, use the straight edge and cut through the coating to the substrate in one steady motion.
- 3.3 Inspect the incisions for reflection of light from the metal substrate to establish that the coating film has been penetrated. If the substrate has not been reached make another X cut in a different location. Do not attempt to deepen a previous cut as this may affect adhesion along the incision.
- 3.4 Remove two complete laps of the pressure-sensitive tape from the roll and discard. Remove an additional length at a steady (ie not jerked) rate and cut a piece about 75mm long.
- 3.5 Place the centre of the tape at the intersection of the cuts with the tape running in the same direction as the smaller angles. Smooth the tape into place by finger and then rub firmly with the eraser on the end of a pencil. The colour under the transparent tape is a useful indication of when good contact has been made.
- 3.6 After not less than 60 seconds and not more than 5 minutes of application, remove the tape by seizing the free end and pulling it off rapidly back upon itself at as close to an angle of 180° as possible.
- 3.7 Repeat the test in two other locations on each test panel.

3.8 After making several cuts examine the cutting edge and, if necessary, remove any flat spots or wire-edge by abrading lightly on a fine oil stone before using again. Discard cutting tools which develop nicks or other defects which are likely to tear the film.

4. Reporting

4.1 Inspect the X-cut area for removal of coating from the substrate or previous coating and report adhesion according to the following scale:

- 5 No peeling or removal
- 4 Trace peeling or removal along incisions
- 3 Jagged removal along incisions up to 1.5mm on either side
- 2 Jagged removal along most of incisions up to 3.5mm on either side
- 1 Removal from most of the area of the X under the tape
- 0 Removal beyond the area of the X

4.2 Report the number of tests and their mean and range.

A6 FIRM DRY TEST FOR GREASE PAINTS

1. Introduction

This test method describes a procedure for determining the firmness of a dry film of grease paint, paint manual item numbers 201.

2. Apparatus

- 2.1 Cotton drill (fully shrunk), fabric reference CD1 to BS 1771: Part 2.
- 2.2 A weight of $300\text{g} \pm 1\text{g}$.
- 2.3 A circular piece of cork 30mm in diameter and approximately 10mm thick.
- 2.4 Timing device.

3. Preparation and coating of panels

Tinplate panels 150mm x 100mm complying and prepared in accordance with BS EN ISO 1514 (BS 3900 : Part A3) shall be coated with a single coat of the material under test at a dry film thickness of 150 μm .

4. Conditioning period

The panels prepared in accordance with para 3 shall be allowed to stand in an atmosphere maintained at $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and relative humidity of $50\% \pm 5\%$ with free circulation of air and without exposure to sunlight for a period of 14 days prior to test.

5. Procedure

The following procedure shall be carried out on two areas of the panel using a fresh piece of drill each time.

At the end of the conditioning period place a 50 mm square of the cotton drill (2.1), twill surface down, onto the surface of the dry film. Place the cork (2.3) on top of the drill, weight (2.2) on top of the cork. Allow the weight to act for a period of 5 minutes. At the end of this period remove the weight, cork and drill from the panel and examine the surface for imprinting of the twill pattern.

6. Reporting

The material shall be considered to have passed the test if no imprint of the twill pattern is visible with normal vision.

A7 SURFACE PREPARATION OF 4MM STEEL TEST PANELS BY BLAST CLEANING

Surface profile:

The surface profile to be achieved by blast cleaning shall be 'Medium (G)' or 'Medium (S)', as appropriate in accordance with the limits set by the Surface Profile Comparator for the Assessment of Abrasive Blast Cleaned Surfaces, conforming to the latest issue of BS EN ISO 8503-1 and measured in accordance with the comparator procedure given in the latest issue of BS EN ISO 8503-2. Chilled cast iron grit abrasive complying with BS EN ISO 11124-3 or steel shot of not less than 40 Hardness Rockwell C and complying with the size requirements of BS EN ISO 11124-4 shall be used. Particle size of abrasive shall not exceed G17 for chilled cast iron grit for angular profiles, or S330 round steel shot where a shotblasted profile is acceptable. The blast cleaned surface shall be free of sharp spikes of parent material ie 'rogue peaks' formed by the impact of abrasive particles and which project above the blast cleaned profile.

Standard of blast cleaning:

There shall be a blast cleaning pattern overall. The surface profile shall be free of mill scale, rust and foreign matter when viewed through a x10 illuminated magnifying glass. The surface profile shall also be free from rogue peaks and embedded abrasive particles when viewed at a similar magnification and tested with a probe.

The quality of blast standard achieved shall be in accordance with BS 7079: Pt. A1 (ISO 8501-1) and shall be to a visual assessment of Sa3 for surface cleanliness.

Chemical cleanliness:

Prior to abrasive blast cleaning, surfaces shall be suitably degreased and rinsed with fresh water to remove surface contaminants, then allowed to dry. The blast cleaned surface shall be free of contamination detrimental to the protective coating(s).

5.4 SUBSTITUTE TEST CLAUSES TO BS 3900

B1 BS 3900 PART D4, CLAUSES 4 AND 6

Clause 4 - Equipment and materials

- 4.1 Substrate - Rectangular sheets approximately 100mm x 200mm of good quality plasticised plain transparent cellulose film of substance 60g per square metre.
- 4.2 White spirit conforming to BS 245.

- 4.3 Steel shims - approximately 255 mm long by 25.4 mm wide and $0.0508 \text{ mm} \pm 0.001 \text{ mm}$ thick.
- 4.4 Scraper blade - 75 mm long with one or both edges tapered to an angle of 60° and finally rounded off to a radius of 0.254 mm.
- 4.5 Film spreading device - a suitable device for holding the steel shims securely in the correct position upon the cellulose sheet thereby facilitating the operation of drawing out the paint by means of the scraper blade.
- 4.6 Magnesium carbonate standard - The plane surface of a block of compressed magnesium carbonate.
- 4.7 Black and white test panels - Approximately 75 mm square black and white glass plates selected to have individual photoelectric reflectances of $5\% \pm 1\%$ and $88\% \pm 1\%$ respectively and to differ in photoelectric reflectance by $83\% \pm 1\%$ per cent.

Clause 6 - Procedure

6.1 Preparation of the film

Wet the upper surface of the glass base plate with white spirit. Squeeze a cellulose sheet into intimate contact with the surface of the plate. Take care to remove air bubbles and any surface irregularities.

Insert the glass plate into its hardwood carrier and lay the two shims upon the cellulose sheet, one shim along and parallel to each long side so as to form a shallow channel about 63 mm wide between the shims. Place the shim-retaining frame in position. If further films are to be drawn out, positioning of the shims will be greatly facilitated if the ends of the two shims are now fastened in the clamp.

Place a suitable quantity (about 2 ml) of the paint under test on the cellulose sheet at the end of the near clamp. Distribute the paint uniformly by drawing the steel scraper blade once along the shims at a steady rate of about 50 mm a second. During this operation, hold the steel scraper plate within the shim-retaining frame and perpendicular to the glass plate.

Remove the cellulose sheet carefully from its glass support and set it aside in a horizontal position, paint side upwards, to dry for 24 hours in a dust-free atmosphere.

6.2 Calibration of the black and white test plates

Place the photoelectric reflectometer gently upon the magnesium carbonate standard and adjust the meter to read 100%. Transfer the reflectometer to the black and white test plates in turn and record the observed meter readings as the respective photoelectric reflectances of the plates. Take the mean of several readings with checks back on the magnesium carbonate standard to ensure that there is no drift in the output of the photoelectric cell.

6.3 Conditioning of test films

Keep the test films at $23^\circ\text{C} \pm 2^\circ\text{C}$ and $50\% \pm 5\%$ RH for the period specified in 6.x of the item sheet.

5.5 SUPPLEMENTARY TEST CLAUSES TO BS 3900

Not used.

6.0 MATERIALS REQUIREMENTS

6.1 Supplementary Clause to BS 3981 : 1976 - Iron Oxide Pigment for Paints

The sample of MIO shall have a thin flake content greater than 50% and a maximum 15% residue on a 63 micron sieve. Thin flakes are defined as having a thickness such as that they appear translucent when viewed with an optical microscope using a magnification of x200 with transmitted light ie with a light source behind the sample under examination.

The form (structure, shape and size) of a representative sample of MIO shall be such as to comply with the following requirements:

- i. When a bulk test portion of the MIO is viewed under an electron microscope using a magnification of x250, the structure shall be lamellar, not granular or amorphous

and/or
- ii. When particles of the MIO are viewed under an optical microscope using a magnification of x200 and transmitted light, they shall be seen to consist of sharply defined angular ruby red crystals with clearly defined fracture planes.

Note: photographs illustrating typical lamellar, granular or amorphous structure and characteristics of MIO pigment are available to paint manufacturers on request to QSCE Division.

7.0 GENERAL NOTES SECTION

7.1 Notes on Relative Humidity

1. In general, conditions are considered satisfactory for painting in late spring, summer and early autumn, when the rising sun should result in an earlier increase in ambient air and surface temperatures, thus drying up any surface moisture and maintaining a low RH during working hours. Steel temperatures, which have not dropped much overnight, rise and stay up during working hours. Where steel is exposed to direct sun the surface temperature can rise well above air temperature.
2. As winter approaches the sun rises later, and sets earlier, its rays are more indirect; RH, which may reach 100% at night, remains high in the morning and surfaces tend not to dry off until well into the working day. Air temperatures are lower and RH rises earlier towards the end of the day. Only a few hours, if any, can be worked and there is a much greater risk of sudden condensation occurring. Painting is therefore generally less practicable from October to April.
3. However, contract programmes are often such that painting has to be carried out in late autumn to early spring. Maximum advantage has to be taken of any time when it is safe to paint - this may apply in summer as well.
4. Specification for Highway Works requires that paint shall not be applied:
 - i. When the ambient temperature falls below 5°C or the relative humidity rises above 80 per cent in an enclosed workshop or 90 per cent at site.

Note: Two pack chemically cured paints shall not be applied when the steel or ambient temperatures are below those advised by the paint manufacturer, nor shall such paints be applied when the temperature is likely to fall below the advised temperatures during the curing period.

- ii. During rain, snow, fog or mist or in a dust laden atmosphere.
 - iii. When the amount of moisture likely to be deposited on the surface by condensation or rain before or after painting, may have a harmful effect on the paint.
 - iv. When wind borne dust may have a harmful effect on the paint.
5. The temperature requirement in 4.i and the condition described in 4.ii are fairly straightforward. The curing of certain paints such as two pack epoxies and polyurethanes will be adversely affected by low temperature. For other paints, the main effects will be difficulty in application and unduly protracted drying times. The 90% RH level at site is arbitrary and should take requirement 4.iii. into account. It is well known that instances will occur where, although the RH is well below 90%, condensation conditions as in 4.iii will preclude painting. Providing that requirement 4.iii can be met for a useful period, the contractor can be allowed to paint. Supervision however must include careful and accurate monitoring and appraisal of conditions.
6. Condensation is brought about by a drop in air temperature to the 'dew point' or below. A drop in air temperature can be caused by general atmospheric conditions eg position of sun (time of day), clouds. Also air can be cooled by coming into contact with a colder steel surface, and this is important to note.

7. RH of air is defined as its moisture content at a given temperature, expressed as a percentage of the maximum which can be held at that temperature. The warmer the air the more moisture can be held and vice versa. As air cools, therefore, RH increases until it reaches 100%. This temperature is called the 'dew point', and is the temperature below which condensation will occur. If the difference between the surface temperature and dew point is below or will fall below the required and/or agreed minimum, the probability of condensation should be considered as being high. If the difference is above and will remain above the required and/or agreed minimum, the probability of condensation should be considered as being low. Tables giving dew points for air at various temperatures and RHs are available.
8. Although 90% RH is considered a maximum for site painting when measured at the ambient temperature, the temperature of the air in contact with the colder steel may be considerably lower. For example, a drop of 5°C for air at an ambient temperature of 20°C with an RH of 75% would bring about condensation. Tables giving critical RH values for various air and surface temperatures are also available and these tables may be used as an alternative to dew point tables.
9. Hence in the October-April period and even on some days in the summer it is necessary to be able to measure quickly and accurately, the air temperature, the steel temperature and to evaluate the RH and dew point or critical RH so that a decision for starting and stopping painting can be made.
10. For painting to start, the temperature should be 5°C or above and the surface must be dry, and where the RH is high, the surface temperature should be rising and at least 3°C (say) above the dew point, or alternatively the critical RH should be rising and be at least 5% (say) above the actual RH. Even if the actual RH is relatively low, start of painting may be delayed due to the surface temperature lagging behind the air temperature. The delay will be less in areas exposed to the sun but in shaded areas in winter months, particularly for larger masses of steel, surface temperatures may remain too low throughout the day for painting to start.
11. Conversely, painting should stop when the temperature is below 5°C or when a falling surface temperature is approaching within 3°C (say) of dew point or when the critical RH falls to within 5% of actual, thus indicating that condensation is imminent. Painting should also stop when RH is rising and is approaching 90%. It can be seen that when steel, and particularly large masses of steel, have been chilled through by consecutive cold temperatures at night, both starting and stopping times can be affected. In the early day surface temperatures lag behind rising air temperatures and as the sun's heat fades later, rapid cooling will take place.
12. It will be clear therefore that in addition to checking the air temperature and RH, it is equally necessary to compare the surface temperature with the dew point or to use critical RH tables when supervising painting. An appreciation of the effect of likely weather conditions, of type and height of steelwork above the ground are also important. Types of paint and method of application have also to be considered.
13. During the favourable months of the year, a normal thermometer, a wet bulb thermometer or a whirling hygrometer and a thermometer for measuring steel temperatures, will be adequate. In the unfavourable months or in unstable conditions, more accurate and more modern instruments should be used. A portable battery operated instrument is available which can give instant RH readings, however this requires to be calibrated at regular intervals as advised by the manufacturer. A portable battery operated instrument is particularly useful when checking RH at different points under a bridge. Instruments using a thermo-couple are also obtainable for more accurate measurement of surface temperature.

7.2 Checking Paint Film Thicknesses In A Paint System

1. In paragraph 5 of the notes for “Calculating Paint Quantities and Costs” in the manual of paints, it is shown that extra paint is required above the theoretical minimum quantity in order to cater for unevenness of application. This is because it is not possible to apply shop or site paint coats on structural steelwork at a precise wet film thickness necessary to give the specified minimum dry film thickness uniformly overall. It follows therefore, that in many places the minimum for each coat will be exceeded to achieve overall the minimum dry film thickness.

During the general application of a multi-coat system in areas not requiring stripe coats, it is unlikely that areas of minimum thickness of any one coat will coincide with the minimum thickness of, say, more than one of the other coats. Hence it is reasonable to assume that the progressive total thickness will exceed the theoretical sum of the mdft of the coats applied at that stage. The amount of this excess is accepted as being at least 15%.

On completion, for example, of a five coat system, where coats have a specified minimum of 3 @ 40, and 2 @ 50 microns respectively, it will be seen that a total of at least 250 microns can be obtained. It is reasonable therefore to specify a minimum total dft of 250 microns for such a system. For inland environments, except for over galvanizing, the systems for new works start at 250 microns minimum total dft, increasing to 300 microns for marine environments. It is easy to see for instance that if 300 microns is required, then the theoretical total for minimum thicknesses of the coats making up the system should be at least 260 microns, viz $260 + 15\% = 300$.

When deciding on the number of coats for any system, the total of their minimum thicknesses should be therefore, at least $1/1.15 = 87\%$ of the required total for the system. This is the preferred method of calculation. If, for example, 275 microns is required then the mdfts of the coats must add up to at least 87% of 275 microns, that is at least 239, say 240 microns. For an Oleo-resinous system this could be obtained by:

Item 15	50 microns
Item 15	50 microns
Item 58	60 microns
Item 74	40 microns
Item 72	40 microns
Calculated sum	= 240 microns

2. There are four main problems in measuring paint film thicknesses:
 - i. Instruments calibrated for example, with a 50 micron plastic shim on blast cleaned steel, become progressively less accurate when a number of coats have been applied on similarly prepared steel surfaces, giving a reading less than actual. Instruments should be calibrated on smooth steel using plastic shims of a suitable thickness above and below the calculated total thickness of the coating system to be measured. Measurements taken for coating systems applied to blast cleaned steel should have a correction factor subtracted from the measured readings, which will depend upon the degree of roughness of the blast profile.

The correction factors are:

10 microns for fine profile

25 microns for medium profile

40 microns for coarse and extra coarse profiles,

where the profile roughness is as defined in BS EN ISO 8503-1.

- ii. In the case of non-convertible coatings, eg Acrylated Rubber, it may well not be possible to measure finally the total dry film thickness of the fully hard dry system before the end of shop or site work. The system may appear hard dry but in fact can retain solvent for a number of months. The Contractor should have the expertise to ensure that the Data Sheets he obtained from his paint supplier give correct volume solids figures so that the required wet film thickness minimum can be checked reasonably accurately for each coat. During the build up of systems consisting of non-convertible paint coats, a piece of adhesive tape can be used to mask off a small area of the previous coat to prevent softening back and thus allow the wet film thickness of the next coat to be checked. The applicator can also be asked to demonstrate by spraying on a plain surface, that he can judge by technique and appearance that he is applying the required wet film thickness. In addition to spot checks, a check on the rate paint is being used and, by calculation, verification that at least the average film thickness for each coat is being achieved should be carried out. The Inspector must then bear in mind i. above, viz that the readings on his paint thickness gauge may be less than the actual thickness; and that the total measured, within say, a week of completion, may well shrink later by between 10% and 20%. He can warn the Contractor at the outset that the minimum must exist at the end of the maintenance period, that is at the end of the contract. Measurement of dry film thicknesses is easier to monitor with 2-pack epoxy and polyurethane coatings, which cure by chemical cross-linking, hardening more rapidly, and leading to reduced delayed shrinkage effects.

The Supervisor should note that the volume solids, although given in the data sheets, is not quoted in the Form BE/P2 System Sheet. It is therefore the Contractor who is responsible for ascertaining the accuracy of the volume solids in order to apply the correct wet film thickness of paint.

- iii. After the application of two or more coats of a multi-coat system on a steel substrate, it is only possible to check the dry film thickness of an individual coat by cutting into the system. The total dry film thickness of the applied coats can and should be, checked as the work progresses. If for example, in the case of an Oleo-resinous system consisting of a blast primer, four undercoats and a gloss finish with a minimum total dft of 300 microns the first three undercoats, say, each with specified dft of 50 μm , have been applied and, although the wet film thickness of the third coat was adequate, it was found that the total so far was 150 μm , then the last undercoat and finish would have to provide $300 - 150 = 150 \mu\text{m}$ which would mean a minimum dft for each of 75 μm , excessive even for silicone alkyd paints. Although complying with the minimum requirement of 50 μm each for the first three undercoats, a competent Contractor should be well aware that he should have reached $150 + 15\% = 170 \mu\text{m}$ minimum, and thus with two further Airless spray coats of say 55 μm and 60 μm he will be able to achieve the required 300 μm without difficulty. Therefore, that by the time the 3rd or the 4th coat of a system is reached, it should be checked that the Contractor is obtaining approximately 15% above the sum of the specified minimum thicknesses for the coats applied so far. It is important to realise that although a minimum dft may be specified for a particular coat based on the 87% rule, it is only a minimum and not a specified thickness as such. A Contractor may decide for instance to increase the mdft of an undercoat by 25 μm if he is 'running low' in order to avoid having to apply an extra coat of expensive silicone alkyd later on.
- iv. In the case of paint applied over a metal coating it is not possible, using a magnetic gauge, to verify with any accuracy the dry film thickness of an individual paint coat. It is equally difficult to check the progressive total dry film thickness with any certainty except by cutting into the system; nevertheless the Inspector has still to ensure adequate paint thickness. More frequent and particularly careful checks on wet film thicknesses will therefore be necessary.

It is worth repeating that the mdft for any particular coat is only a minimum for that coat at any point and may be exceeded if necessary, the Contractor having to apply an aggregate thickness to comply with the total mdft specified.

7.3 Calculating Paint Quantities And Costs

1. The minimum dry film thickness (mdft) of a coat of paint is the specification requirement from which the amount of paint to be ordered and cost of paint are calculated.
2. The quantity of paint required for painting a known area to a specific minimum dry film thickness is a function of a number of criteria:
 - i) The volume solids of the paint.
 - ii) The degree of roughness for the surface to which the paint is to be applied. The roughness is mainly created by the blast cleaning process, and in particular by the particle size of the abrasive used in the operation. The coarser the abrasive, the greater the 'peak to valley' height produced, and the larger is the quantity of paint required to fill the profile before measurable dry film thicknesses over the peaks is achieved.
 - iii) The amount of over-application and uneven application of paint, overspray wastage, and wastage due to losses in containers, equipment, and spillage etc.
 - iv) The shape, configuration and complexity of the structure to be painted.
3. The volume solids of a paint is the ratio of solid components remaining after evaporation of solvent, expressed as a percentage of the volume of the wet film.

Calculation of the theoretical quantity of paint required to cover a known area on a smooth plane surface is based upon the following relationship:

1 litre of paint at 100% volume solids will cover an area of 1 square metre to a thickness of 1mm (1000 microns).

The theoretical spreading rate for a particular product is calculated from the volume solids of that product using the following equation:

$$\text{Theoretical spreading rate (metres}^2\text{/litre)} = \frac{\text{Volume solids} \times 10}{\text{Required dft (microns)}}$$

The volume solids should be determined using BS 3900 Part A10.

Other methods of determining and expressing volume solids are sometimes quoted by paint suppliers. Some of these alternatives lead to a higher value of volume solids and hence a more optimistic theoretical spreading rate, which may not be achieved in practice.

4. Factors indicated in 2(ii) and 2(iii) affect the actual spreading rate, which is derived from the theoretical rate. Extra paint must be allowed for, to take these factors into account. The most significant of these factors is normally the peak to valley height of the blast profile (2(ii)). For a blast profile of 60 microns it is necessary to apply an extra quantity of paint equivalent to a dft of approximately half the peak to valley height ie an extra 30 microns of dft before measurable thickness occurs. In a specified 50 micron primer coat, this would result in an increase of 30/50 or 60% over the theoretical quantity required over a smooth surface. A blast profile with a peak to valley height of 100 microns would result in 100% increase over the theoretical quantity for the same primer coat. The effect of blast profile on subsequent undercoats and final coats will be much less significant.

The skill of the applicator and the awareness of the Inspector checking the work play an important part in determining the extent of losses from over-application. By exercising careful control of paint fluid pressure and by the constant use of wet film thickness gauges to monitor paint application, excessive wastage can be avoided.

The responsibilities of the Contractor with respect to the application of paint are clearly stated in the Manual of Contract Documents for Highway Works - Volume 1, Specification for Highway Works, Clause 1914, paragraph 7.

Estimated percentages of extra paint to allow for factors 2(iii) and 2(iv) will vary significantly. At best they can be as low as 20%, but can also be as high as 60%, for complex geometric structures such as lattice girders.

5. Calculation of Paint Costs

Comparisons of price between different brands of paint, which may have different volume solids content should be based upon the following steps:

Step 1 Determine the theoretical spreading rate for the required dry film thickness, as follows

$$\text{Theoretical spreading rate (m}^2\text{/litre)} = \frac{\text{Volume solids x 10}}{\text{Required dft (microns)}}$$

Step 2 Divide the price per litre by the theoretical spreading rate to arrive at a cost/square metre

$$\text{Cost per square metre} = \frac{\text{Price/litre}}{\text{Theoretical spreading rate}}$$

Step 3 Theoretical overall cost = (Cost per square metre) x (total area)

Step 4 Practical overall cost = (Theoretical overall cost) x (factors considered in paragraph 4)

7.4 Specific Gravity Tolerances

For new works and maintenance painting contracts, the Supervisor is required to check the specific gravity of paints before despatching 5 litre 'A' samples and 500 ml 'B' samples to the testing authority for testing. When the specific gravity of paint samples is appreciably incorrect, then the paints should be rejected in the works or at site, testing of samples by the testing authority being unnecessary.

Painting inspectors will, in most cases, have the experience to know when to reject a paint which has an appreciably high or low specific gravity. For example, the Inspector will know that a $\pm 3\%$ difference on the specific gravity of, say, an MIO phenolic paint is not as critical as a $\pm 3\%$ difference on, say, a Silicone Alkyd Finish

The following specific gravity tolerances are a useful guide for the Supervisor in deciding whether or not samples should be despatched to the testing authority for testing.

Paints with a specific gravity up to 1.4: + or - 3%

Paints with a specific gravity greater than 1.4: + or - 4%

Requirements for checking the specific gravity of paints for new works contracts are described in Clause 1910 of the Notes for Guidance on the Specification for Highway Works.

The method of test to be used for determination of specific gravity is in accordance with BS 3900/A19 (ISO 2811-1).

8.0 REFERENCES

Standards Referred to in the Manual

BS EN ISO 8503-1	Specification for surface profile comparators for the assessment of abrasively blast cleaned surfaces. (BS 7079: Part C1)
BS 245	Specification for mineral solvents (white spirit and related hydrocarbon solvents) for paints and other purposes.
BS 282	Specifications for lead chromes and zinc chromes for paints.
BS 1771: Pt 2	Fabrics for uniforms and workwear. Specification for fabrics made from cellulosic fibres, synthetic fibres & blends.
BS 1851 (ISO 591)	Specification for titanium dioxide pigments for paints.
BS 2000: Pt 58	Determination of softening point of bitumen (Ring and Ball method).
BS 2015	Glossary of paint and related terms.
BS EN 971-1	Glossary of paint terms.
BS 7079: Pt E3 (BS EN ISO 11124-3)	Preparation of steel substrates before application of paints and related products - Specifications for metallic blast-cleaning abrasives. High carbon cast-steel shot and grit
BS 7079: Pt E4 (BS EN ISO 11124-4)	Preparation of steel substrates before application of paints and related products - Specifications for metallic blast cleaning abrasives. Low carbon cast-steel shot.
BS EN ISO 1513	Examination and preparation of samples for testing.
BS EN ISO 1514	Standard panels for paint testing.
BS 3900: Part A7	Determination of the viscosity of paint at a high rate of shear.
BS 3900: Part A8 (ISO 1516)	Test for flash/no flash (closed cup equilibrium method).
BS 3900: Part A10 (ISO 3233)	Determination of volume of dry coating (non-volatile matter) obtain from a given volume of liquid coating.
BS 3900: Part A19 (ISO 2811-1)	Determination of density by the pycnometer method.
BS EN ISO 1517	Surface-drying test (ballotini method).
BS EN 29117	Determination of through-dry state and through-dry time.
BS 3900: Part D1 (ISO 3668)	Visual comparison of the colour of paints.
BS 3900: Part D4 (ISO 2814)	Comparison of contrast ratio (hiding power) of paints of the same type and colour.

BS 3900: Part D5	Measurement of specular gloss of non-metallic paint films at 20 degrees, 60 degrees and 85 degrees
BS 3900: Part E2 (ISO 1518)	Scratch test.
BS 3900: Part E6 (BS EN ISO 2409)	Cross cut test
BS 3900: Part E7	Resistance to impact (falling ball test).
BS 3900: Part F16 (ISO 11507).	Resistance to artificial weathering (UV Radiation and Water).
BS 3900: Part F4	Resistance to continuous salt spray.
BS EN ISO 3231	Determination of resistance to humid atmospheres containing sulphur dioxide.
BS 3924	Specification for pressure sensitive adhesive tapes for electrical insulating purposes.
BS 3981 (ISO 1248)	Specification. Iron oxide pigments for paints.
BS 4800	Schedule of paint colours for building purposes.
BS 5193 (ISO 6745)	Specification for zinc phosphate pigments for paints.
BS 7079 : Part A1 (ISO 8501-1)	Specification for rust grades and preparation grades of uncoated steel substrates and of steel substrates after removal of previous coatings.
BS 7079 : Part C2 (BS EN ISO 8503-2)	Method for the grading of surface profile of abrasive blast-cleaned steel. Comparator procedure.
DEF STAN No 80-15	Paint, pre-treatment primer (etching primer).

1. British Standards are published by the British Standards Institution.
2. DEF STAN's are published by the Ministry of Defence, Directorate of Standardization, Stan 1, Kentigern House, 65 Brown Street, Glasgow, G2 8EX.