GIS/PA10:2022

Gas Industry Standard

Specification for

Maintenance Painting at Works and Site for Above Ground Pipeline and Plant Installations

Contents

Foreword

Gas Industry Standards (GIS) are revised, when necessary, by the issue of new editions. Users should ensure that they are in possession of the latest edition. Contractors and other users external to Gas Transporters should direct their requests for copies of a GIS to the department or group responsible for the initial issue of their contract documentation.

Comments and queries regarding the technical content of this document should be directed in the first instance to the contract department of the Gas Transporter responsible for the initial issue of their contract documentation.

This standard calls for the use of procedures that may be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

Compliance with this engineering document does not confer immunity from prosecution for breach of statutory or other legal obligations.

Mandatory and non-mandatory requirements

For the purposes of a GIS the following auxiliary verbs have the meanings indicated:

can indicates a physical possibility;

may indicates an option that is not mandatory;

shall indicates a GIS requirement;

should indicates best practice and is the preferred option. If an alternative method is used then a suitable and sufficient risk assessment needs to be completed to show that the alternative method delivers the same, or better, level of protection.

Disclaimer

This engineering document is provided for use by Gas Transporters and such of their contractors as are obliged by the terms of their contracts to comply with this engineering document. Where this engineering document is used by any other party, it is the responsibility of that party to ensure that the engineering document is correctly applied.

Brief history

First published as BG/PS/PA/10: Parts 1 and 2 and Supplements CS1 to CS17 inclusive	June 1987
Revision published as PA10	August 1995
Editorial update to reflect demerger	June 2001
Editorial update to reflect merger	November 2002
Revised and reissued to reflect the withdrawal of IGE/SR5	February 2003
Revised and reissued to include water jetting standards, suite of inspection and report forms, procedure for evaluating gas holder painting projects, updated practices and new ISO standards and added to DDD	May 2004
Editorial update to comply with GRM	August 2004
Editorial revision to correct clause 6.5.1 from paint must be used …to Paint must not be used	September 2004
Editorial update for National Grid re-branding	October 2005
Full revision of document to reflect updates to ISO standards and industry best practice	September 2018
Reviewed, updated and published as a Gas Industry Standard	January 2022

1. Scope

This Standard outlines the procedures for painting surfaces of all types of above ground ferrous and non-ferrous metal engineering components.

This standard is not suitable for use in the following areas:

- Below ground (buried).
- Offshore installation.
- Internal coatings of pipes.

2. Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

2.1 Statutes and Regulations

1961 Ch. 34 *The Factories Act 1961*

1963 Ch. 41 *The Offices, Shops and Railway Premises Act 1973*

1971 Ch. 40 *Fire Precautions Act 1971*

1974 Ch. 37 *Health and Safety at Work etc. Act 1974*

1978 NI Order 1978 No 1039 (NI 9) Health and safety at Work (Northern Ireland) Order 1978

1981 SI 1981 No 917 *Health and Safety (First Aid) Regulations 1981*

1989 SI 1989 No 2209 *The Construction (HEAD Protection) Regulations 1989*

1989 SI 1989 No 1790 *The Noise at Work Regulations 1989*

1990 SR 1990 No 424 *The Construction (Head Protection) Regulations (Northern Ireland) 1990*

1990 Ch. 43 *Environmental Protection Act 1990*

1991 SI 1991 No 2839 *The Environmental Protection (Duty of Care) Regulations 1991*

1991 Ch. 40 *Noise and Statutory Nuisance Act 1991*

1991 Ch. 57 *Water Resources Act 1991*

1991 Ch. 56 *Water Industry Act 1991*

1992 SI 1992 No 2966 *Personal Protective Equipment at Work Regulations 1992*

1992 SI 1992 No. 3004 *Workplace (Health, Safety & Welfare) Regulations 1992*

1992 SI 1992 No 2793 *Manual Handling Operations Regulations 1992*

1992 SR 1992 No 535 *The Manual Handling Operations Regulations (Northern Ireland) 1992*

1993 SR 1993 No 20 *Personal Protective Equipment at Work Regulations (Northern Ireland) 1993*

1994 SI 1994 No 1056 *The Waste Management Licensing Regulations 1994*

1995 Ch. 25 *Environment Act 1995*

1996 SI 1996 No 972 *The Special Waste Regulations 1996*

1996 SI 1996 No 1592 *The Construction (Health, Safety & Welfare) Regulations1996*

1997 SI 1997 No 257 *The Special Waste (Scotland) Regulations 1997*

1997 SI 1997 No 1840 *Fire Precautions (Workplace) Regulations1997*

1997 NI Order 1997 No 2778 (NI 19) *The Waste and Contaminated Land (Northern Ireland) Order 1997*

1998 SR 1998 No 289 *The Special Waste (Northern Ireland) Regulations 1998*

1998 SI 1998 No 2306 *Provision and Use of Work Equipment Regulations 1998*

1998 SI 1998 No 2307 *Lifting Operations and Lifting Equipment Regulations 1998*

1998 SI 1998 No 2746 *The Groundwater Regulations 1998*

1999 SR 1999 No 305 *Provision and Use of Work Equipment Regulations (Northern Ireland) 1999*

1999 SR 1999 No 304 *Lifting Operations and Lifting Equipment Regulations (Northern Ireland) 1999*

1999 NI Order 1999 No 662 (NI 6) *The Water (Northern Ireland Order 1999*

1999 Ch. 24 *Pollution Prevention and Control Act 1999*

1999 SI 1999 No 3242 *The Management of Health and Safety at Work Regulations 1999*

2000 SI 2000 No 128 *Pressure Systems Safety Regulations 2000*

2001 SI 2001 No 3148 *The Special Waste (Amendment) (England and Wales) Regulations 2001*

2002 SI 2002 No 2776 *The Dangerous Substances and Explosive Atmospheres Regulations 2002*

2002 SI 2002 No 2676 *The Control of Lead at Work Regulations 2002*

2002 SI 2002 No 2677 *Control of Substances Hazardous to Health (COSHH) Regulations 2002*

2003 SI 2003 No 34 *Control of Substances Hazardous to Health Regulations (Northern Ireland) 2003*

2003 SR 2003 No 35 *Control of Lead at Work Regulations (Northern Ireland) 2003*

2003 SR 2003 No 493 *The Waste Management Licensing Regulations (Northern Ireland) 2003*

2004 SR 2004 No. 222 *Pressure Systems Safety Regulations (Northern Ireland) 2004*

2005 SI 2005 No 883 *The Waste Management Licensing (England and Wales) (Amendment and Related Provisions) Regulations 2005*

2009 SI 2009 No 1567 *Working Time (Amendment) Regulations 2009*

2009 SR 2009 No 254 *Groundwater Regulations (Northern Ireland) 2009*

2011 SSI 2011 No 228. *The Waste Management Licensing (Scotland) Regulations 2011*

2011 Ch. 23 Clean *Neighbourhoods and Environment Act (Northern Ireland) 2011*

2012 SI 2012 No 811. *The Controlled Waste (England and Wales) Regulations 2012*

2012 SI 2012 1715 *The Volatile Organic Compounds in Paints, Varnishes and Vehicle Refinishing Products Regulations 2012.*

2013 SR 2013 No 255. *The Controlled Waste and Duty of Care Regulations (Northern Ireland) 2013*

2013 SI 2013 No. 1471 *Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013*

2013 Act. Asp. 5 *Water Resources (Scotland) Act 2013*

2014 SSI 2014 No 4 *The Environmental Protection (Duty of Care) (Scotland) Regulations 2014*

2015 SI No 21 *The Classification, Labelling and Packaging of Chemicals (Amendments to Secondary Legislation) Regulations 2015*

2015 SI 2015 Ch. 51 *Construction (Design and Management) Regulations 2015*

2015 SI 2015 483 *Control of Major Accident Hazards (COMAH) Regulations 2016*

2015 SR 2015 No 325 *The Control of Major Accident Hazards Regulations (Northern Ireland) 2015*

2016 SR 2016 No 146 *The Construction (Design and Management) Regulations 2016*

2016 SR 2016 No. 49 *The Working Time Regulations (Northern Ireland) 2016*

2.2 British and European standards

ISO 2808: *Paints and varnishes -- Determination of film thickness*

ISO 8501-1: *Preparation of steel substrates before application of paints and related products - Visual assessment of surface cleanliness - Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings*

ISO 8501-3: *Preparation of steel substrates before application of paints and related products - Visual assessment of surface cleanliness - Part 3: Preparation grades of welds, edges and other areas with surface imperfections*

ISO 8501-4: *Preparation of steel substrates before application of paints and related products - Visual assessment of surface cleanliness - Part 4: Initial surface conditions, preparation grades and flash rust grades in connection with water jetting*

ISO 8502-3: *Preparation of steel substrates before application of paints and related products - Tests for the assessment of surface cleanliness - Part 3: Assessment of dust on steel surfaces prepared for painting (pressure-sensitive tape method)*

ISO 8502-4: *Preparation of steel substrates before application of paints and related products - Tests for the assessment of surface cleanliness - Part 4: Guidance on the estimation of the probability of condensation prior to paint application*

ISO 8502-6: *Preparation of steel substrates before application of paints and related products - Tests for the assessment of surface cleanliness - Part 6: Extraction of soluble contaminants for analysis-- The Bresle method*

ISO 8502-9: *Preparation of steel substrates before application of paints and related products - Tests for the assessment of surface cleanliness - Part 9: Field method for the conductometric determination of water-soluble salts*

ISO 8503-4: *Preparation of steel substrates before application of paints and related products - Surface roughness characteristics of blast-cleaned steel substrates - Part 4: Method for the calibration of ISO surface profile comparators and for the determination of surface profile - Stylus instrument procedure*

ISO 8503-5: *Preparation of steel substrates before application of paints and related products - Surface roughness characteristics of blast-cleaned steel substrates - Part 5: Replica tape method for the determination of the surface profile*

ISO 8504-3: *Preparation of steel substrates before application of paints and related products - Surface preparation methods - Part 3: Hand - and power-tool cleaning*

ISO 9001: Quality management

ISO 11124-1: *Preparation of steel substrates before application of paints and related products - Specifications for metallic blast-cleaning abrasives-- Part 1: General introduction and classification*

ISO 11124-2: *Preparation of steel substrates before application of paints and related products Specifications for metallic blast-cleaning abrasives - Part 2: Chilled-iron grit*

ISO 11124-3: *Preparation of steel substrates before application of paints and related products - Specifications for metallic blast-cleaning abrasives - Part 3: High-carbon cast-steel shot and grit*

ISO 11125-1: *Preparation of steel substrates before application of paints and related products - Test methods for metallic blast-cleaning abrasives - Part 1: Sampling*

ISO 11125-2: *Preparation of steel substrates before application of paints and related products - Test methods for metallic blast-cleaning abrasives - Part 2: Determination of particle size distribution*

ISO 11125-3: *Preparation of steel substrates before application of paints and related products - Test methods for metallic blast-cleaning abrasives - Part 3: Determination of hardness*

ISO 11125-4: *Preparation of steel substrates before application of paints and related products - Test methods for metallic blast-cleaning abrasives -- Part 4: Determination of apparent density*

ISO 11125-5: *Preparation of steel substrates before application of paints and related products - Test methods for metallic blast-cleaning abrasives -- Part 5: Determination of percentage defective particles and of microstructure*

ISO 11125-6: *Preparation of steel substrates before application of paints and related products - Test methods for metallic blast-cleaning abrasives -- Part 6: Determination of foreign matter*

ISO 11125-7: *Preparation of steel substrates before application of paints and related products - Test methods for metallic blast-cleaning abrasives -- Part 7: Determination of moisture*

ISO 11126: *Preparation of steel substrates before application of paints and related products - Specification for Non-metallic blast cleaning abrasives.*

ISO 11127-1: *Preparation of steel substrates before application of paints and related products- Test methods for non-metallic blast-cleaning abrasives- Part 1: Sampling*

ISO 11127-2: *Preparation of steel substrates before application of paints and related products - Test methods for non-metallic blast-cleaning abrasives - Part 2: Determination of particle size distribution*

ISO 11127-3: *Preparation of steel substrates before application of paints and related products - Test methods for non-metallic blast-cleaning abrasives - Part 3: Determination of apparent density*

ISO 11127-4: *Preparation of steel substrates before application of paints and related products - Test methods for non-metallic blast-cleaning abrasives- Part 4: Assessment of hardness by a glass slide test*

ISO 11127-5: *Preparation of steel substrates before application of paints and related products - Test methods for non-metallic blast-cleaning abrasives - Part 5: Determination of moisture*

ISO 11127-6: *Preparation of steel substrates before application of paints and related products- Test methods for non-metallic blast-cleaning abrasives- Part 6: Determination of water-soluble contaminants by conductivity measurement*

ISO 11127-7: *Preparation of steel substrates before application of paints and related products - Test methods for non-metallic blast-cleaning abrasives - Part 7: Determination of water-soluble chlorides*

ISO 12944-2: *Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 2: Classification of environments*

ISO 12944-5: *Paints and varnishes -- Corrosion protection of steel structures by protective paint systems - Part 5: Protective paint systems*

ISO 12944-6: *Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 6: Laboratory performance test methods*

ISO 17834: *Thermal spraying - Coatings for protection against corrosion and oxidation at elevated temperatures*

ISO 29601: *Paints and varnishes - Corrosion protection by protective paint systems - Assessment of porosity in a dry film*

2.3 American Society for Testing and Materials

ASTM D4285: *Standard Test Method for Indicating Oil or Water in Compressed Air*

2.4 Gas Industry Standards

GIS/PA9: *Specification for Paint Systems Properties and Performance Requirements*

GIS/CW5: *Specification for Field applied external coatings for buried pipework and systems*

2.5 Gas Transporter Specifications

IDN/PM/P/11: *Management procedure for the inspection, assessment and repair of damaged (non-leaking) steel pipelines above 150 mm nominal diameter and designed to operate at pressures greater than 2 bar*

GDN/PM/SCO/2: *Safe control of operations - Issue of permits to work and forms of authority*

NOTE

Where no date is shown, the latest edition of each standard and specification shall apply.

3. Terms and Definitions

For the purposes of this document, the following definitions apply.

3.1 Definitions

3.1.1 Contractor: The person, firm or company with whom a Gas Transporter enters into a contract to which this Standard applies, including the Contractor's personal representatives, successors and permitted assigns.

3.1.2 Functional Performance Specification (FPS): A collation of a number of functional parameters to a Specific Paint Application (SPA). The FPS defines a number of performance qualification requirements based upon these functional parameters.

3.1.3 Paint activity type: High level description for the type of painting activity that is required to be carried out. Based upon but not limited to, painting area, component type, level of current paint breakdown and integrity.

3.1.4 Paint coat: A single film applied as part of a paint component**.**

3.1.5 Painting Contractor: This is the company that applies the paint material to the components to be coated in accordance with the provisions of designated presiding literature e.g. manufacturers data sheet.

3.1.6 Paint Component: General term used to describe a singular part of the total paint system**.**

3.1.7 Paint Manufacturer: This is the original producer of the paint system.

3.1.8 Paint Supplier: This is the supplier of the paint system in a condition suitable for application to the product to be coated.

3.1.9 Paint system: The sum total of the coats of paint(s) or related product(s) applied to the substrate material in a determined order, for example primer, intermediate and topcoats.

3.1.10 Site Engineer: The engineer with responsibility for the local site where painting activities are being carried out.

3.1.11 Specific Paint Application (SPA): Detailed description of a painting scenario that could occur within a paint activity type. The specific paint application details the material and environmental limitations specific to the scenario such that the correct paint can be selected.

3.1.12 Responsible Engineer: The engineer or manager with the overall responsibility for the painting programme and/or the integrity of the network.

3.2 Abbreviations

SPA: Specific Paint Application

APS: Application Procedure Specification

FPS: Functional Paint Specification

TSA: Thermally Sprayed Aluminum

PQR: Paint Qualification Record

WFT: Wet Film Thickness

DFT: Nominal Dry Film Thickness

4. Conformance

4.1 Units of measurement

In this standard, for data expressed in both SI and USC units, a dot (on the line) is used as the decimal separator, and no comma or space is used as the thousands separator, in order to be consistent with other Gas Transporter specifications.

5. Health, Safety and Environment

5.1 Site Safety Requirements

Site safety regulatory requirements with respect to painting operations are given below and Annex A.

All work carried out on the site shall comply with good safe working practices and the specific conditions of a Permit to Work, where issued, on an operational site.

The following list of conditions or activities does not purport to include all requirements for safety but it summarises important warnings included in this standard and presents them for ease of reference:

a) Safe working areas including proper use and erection of scaffolding, ladders, etc.

b) Safety requirements associated with abrasive blast cleaning. Areas with significant corrosion shall have thickness measurements taken to ensure suitability for blast cleaning. Where blast cleaning is deemed to be unsafe, alternative methods shall be agreed with the Gas Transporter.

c) Identification of painting materials, with reference to any associated hazards such as toxicity, flammability, etc.

d) Compliance with fire and Danger Substances and Explosive Atmospheres Regulations (DSEAR) regulations e.g. storing of combustible materials.

e) Safe handling of painting materials and safety precautions on site.

5.2 Environmental Requirements

Environmental protection regulatory requirements with respect to all painting operations are given in Annex A.

All works carried out on the site including storage and disposal of paint and all waste materials shall be in accordance with the current environmental requirements (see Annex A, A.1 and A.3).

The Painting Contractor shall be alert of the possible toxic nature of the deposits and paint debris, and provide appropriate action and certification required for their disposal (see Annex A, clause A.3.1).

6. Painting Contractor Requirements

6.1 General Painting Contractor Conditions

The Painting Contractor should take into consideration the following general conditions:

a) In order that the Painting Contractor is clearly informed of the Gas Transporter's requirements, the contract or paint programme for a particular job shall be drawn up after taking into account the appropriate clauses, Annexes and Specific Paint Applications (SPA(s)) within this standard.

b) All site component parts and sections to be painted shall be as specified by the Gas Transporter with reference to the appropriate SPA(s) in Section 10.

c) The method of surface preparation for each part shall be as specified by the Gas Transporter with reference to the appropriate SPA(s) in Section 10.

d) The painting system to be applied to each site component part(s) and section(s) shall be as specified by the Gas Transporter with reference to the appropriate SPA(s) in Section 10.

e) All painting should be carried out in accordance with a programme of work and Application Painting Specification (APS) (see Section 11) which shall be prepared by the Painting Contractor and agreed by the Responsible Engineer.

f) Paint systems shall be listed as separate items on the contract document and shall be ordered to comply with the qualification requirements detailed within GIS/PA9.

Refer to GIS/PA9 "Paint Systems – Properties and Performance Requirements"

The Painting Contractor shall provide the Gas Transporter with a warranty period for all painting activities undertaken in accordance with this standard. The Painting Contractor shall supply the Gas Transporter with an expected performance period from the as-applied paint system.

The Gas Transporter reserve the right to review this warranty in conjunction with the requirements of this standard, in particular where paint performance as a function of surface preparation, application, inspection and reporting fails to meet expectations.

6.2 Quality Assurance

The Painting Contractor shall maintain a quality assurance system which complies with ISO 9001.

For all painting operations, a team leader shall be designated and be present at all times. The team leader's competency and experience in the necessary activities shall be demonstrated to the Gas Transporter. The team leader shall be SCO registered as a Competent Person for Permit to Work.

A level of coating/paint inspection shall take place as agreed with the Gas Transporter. The designated inspector should be certified to a recognised scheme e.g. NACE, FROSIO, BGAS, ICorr.

Independent inspection does not in any way relieve the Painting Contractor of their responsibilities under the terms or conditions of the contract.

For all paint removal, surface preparation and paint application activities, the Painting Contractor shall prove competency of its personnel to the criteria given in the OPITO Blaster/Painter Competence Assessment Course or a local equivalent e.g. BGAS, CSWIP.

Training, experience and competency records for all operatives involved in painting operations shall be maintained and available upon request.

7. GIS/PA10 Overview

Guidance for selection of paint activity type and paint system through the use of this document is provided in Figure 1.

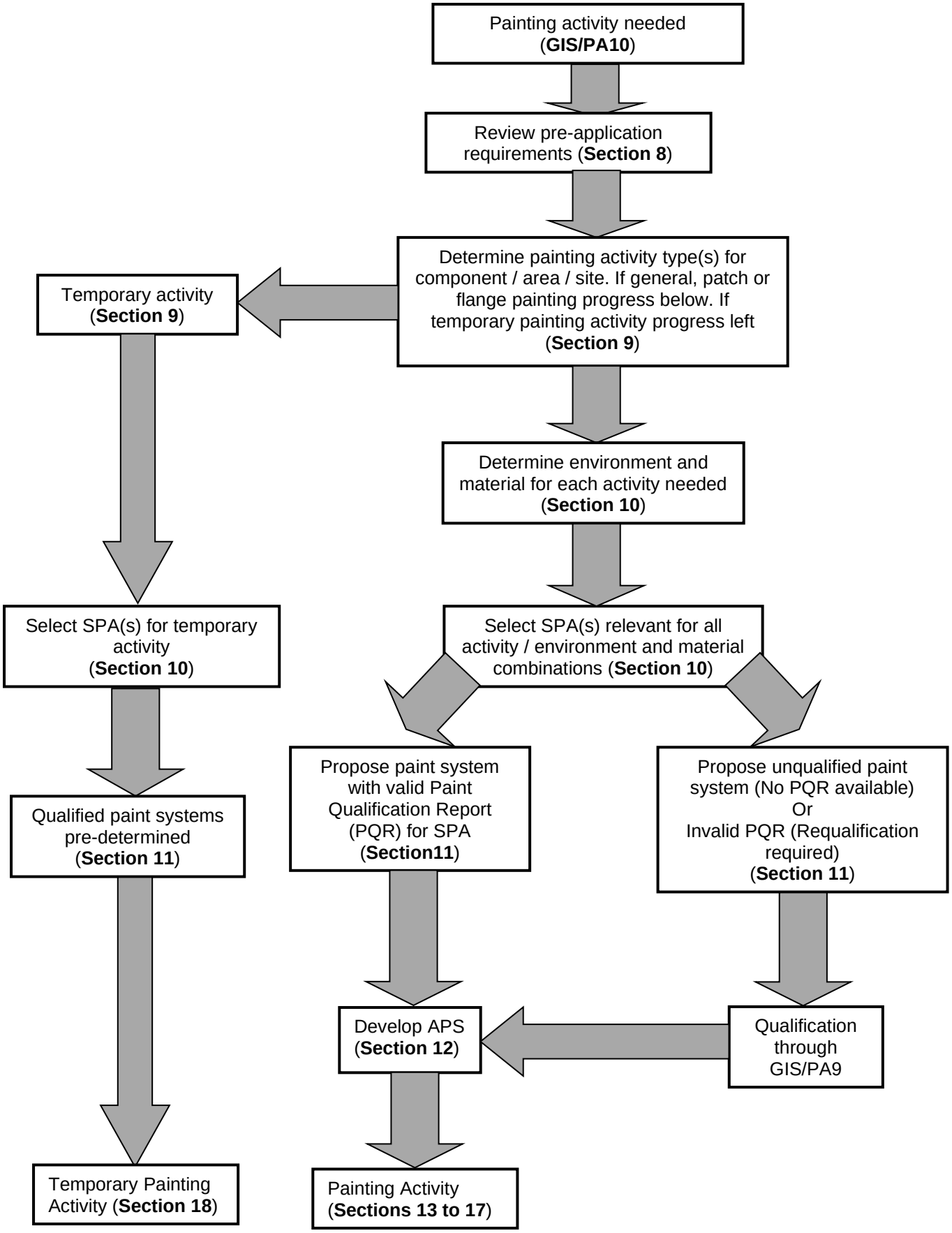


Figure 1: Overview of the use of GIS/PA10

8. Pre-Painting Programme Requirements

8.1 General Information

Each painting job is unique; therefore it is essential to be selective and to specify unequivocally. Poor selection can limit paint system performance.

For all painting projects, the design and selection of a paint system is a very important factor on the cost of painting. Special treatment may be required in certain cases involving modification or amendment of the original design for painting.

If in doubt, the advice of a corrosion engineer and/or paint technologist should be obtained at the earliest stage possible; this will assist in using this standard.

The extent and methods of painting should be based on a survey or inspection data of the item or plant carried out by the Responsible Engineer or Site Engineer. This would determine the following aspects:

a) The existing paint system.

b) The extent of breakdown and corrosion.

c) The in-service environmental conditions.

d) The nature and extent of any surface contamination.

8.2 Local Site Regulations

Relevant local site regulations and other site specific considerations should be detailed in writing by the Site Engineer.

9. Painting Activity Type Selection

This standard covers four (4) types of painting activities:

- General
- Patch
- Temporary
- Flange painting

The type of painting activity is dependent upon a number of factors which are detailed in the sections below.

Following identification of a painting activity type, an SPA can be selected. Each SPA is intended for use for one or more different painting activity types.

Note: It is likely to be the case that more than one painting activity type per painting programme will need to be selected.

9.1 General Painting Activity

The general painting activity type is intended to cover the following scenarios:

- Site painting of large areas or numerous instances of unpainted and/or unsuitably painted surfaces. An unsuitably painted surface is considered as follows:
    - The existing paint system is poorly adhered and/or disbonded from the pipe surface. For judgement of the existing painting condition, the paint shall be considered adhered if it cannot be removed by a non-impacted dull putty knife.
    - Paint system defect(s) and subsequent visible corrosion.
    - The paint system is incompatible with the original pipe surface, paint system or other paint (e.g. previous paint repair)
- Painting of new components at works and with the exception of flanges, the completion of components on site where only a qualified shop primer is applied.
- Refurbishment of components at works or site which require additional engineering or maintenance activities to either repair, inspect and/or access e.g. pipe supports.

Further guidance on selection of general and patch painting is provided in Section 9.5.

9.2 Patch Painting Activity

Patch painting activity is intended to cover site painting of small individual areas or a number of isolated instances of unpainted and/or unsuitably painted surfaces. The area(s) shall be accessible and not require further inspection or integrity assessment.

Further guidance on selection of general and patch painting is provided in Section 9.5.

9.3 Temporary Painting Activity

The temporary painting activity is intended to cover scenarios where the integrity of the component has been established but would require additional future planning and site activity for component repair, component inspection and/or component access. Examples of such components are:

- Vessel and pipe supports
- Pit wall transitions
- Small bore pipework

No period is defined as temporary within this standard. The applicable service life of the painting shall be defined by the Responsible Engineer in line with inspection and maintenance requirements.

9.4 Flange Painting Activity

The flange painting activity is intended to cover the following painting activities with regards to flange and bolting arrangements:

- Completion of new flange and bolting arrangements.
- Refurbishment of current flange and bolting arrangements.

9.5 General and Patch Painting Selection Guidance

The difference between general and patch painting activities are the type and number of defects on a site or component. Both of these aspects have an effect on the type of surface preparation and application required.

Figure 2 (Items A to F) provides engineering guidance on the determining the paint condition and extent of paint failure. The guidance is based upon a section of flanged pipework, but can be applied to any component described in the appropriate Gas Transporter procedure. Table 1 provides information of the type of repair required based upon the conditions given in Figure 2.

Refer to the appropriate Gas Transporter procedure for the inspection of Pipework and Components

For items A to D, the existing paint shall be adherent and defect free for a minimum of 20 cm^2 around the singular area or cluster of areas of poor paint condition, up to a sound feathered edge. Areas of poor paint condition within this distance are considered to be interacting and the singular area or cluster area for repair should be increased until a minimum adhering length of 20 cm^2 can be achieved. Figure 3 provides guidance in determining painting area interaction.

The condition shall be evaluated either on a component basis or predetermined area as agreed with the Site Engineer. If required, further advice shall be sought from the Responsible Engineer.

Note: The provided dimensions are for guidance only. The intention is for items A – F to provide a reference to establish the most appropriate SPA for the painting activity. As per Section 11, the APS shall be submitted before painting work commences and the surface preparation technique shall be agreed with the Responsible Engineer.

Table 1 – Details of paint condition type (Figure 2), description of paint condition and type of painting activity required

Paint Condition	Description	Type of Painting Activity
A	Single area containing paint system defect(s). Defect(s) total area no greater than 20 cm^2.	Patch Painting
B	Multiple areas of single paint system defect(s). Areas sporadic over spool. For each defect(s) total area no greater than 20 cm^2.	
C	Cluster of interacting single paint system defect(s). Total combined area of all defects no greater than 100 cm^2	Patch Painting
D	Multiple (< 3) areas of clusters sporadically over spool.	
E	Paint system condition of the majority of the spool has deteriorated and is not considered to be as design. The existing paint requires complete removal	General Painting
F		

Figure 2: Guidance of determining the paint system condition of a spool based upon defects present

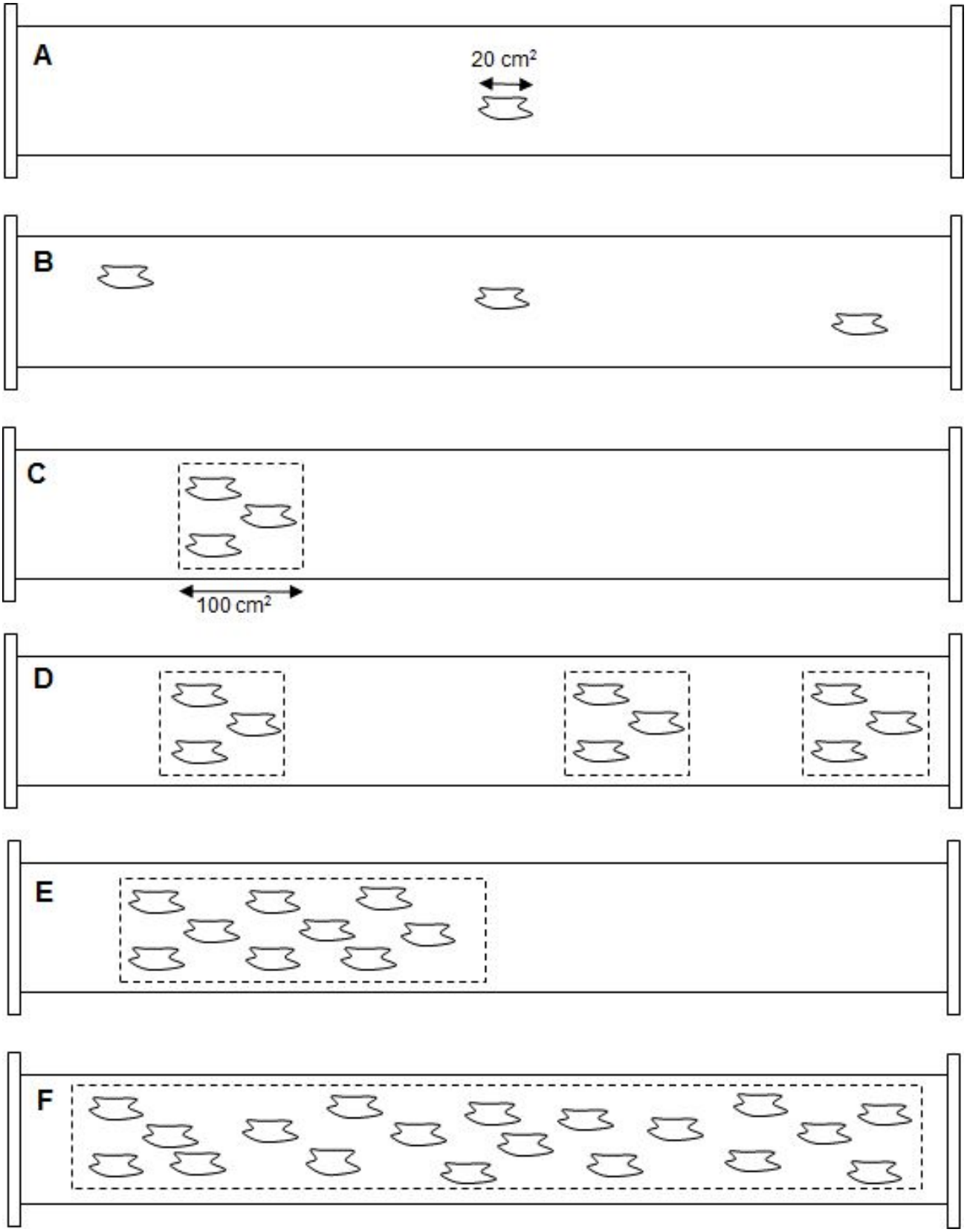
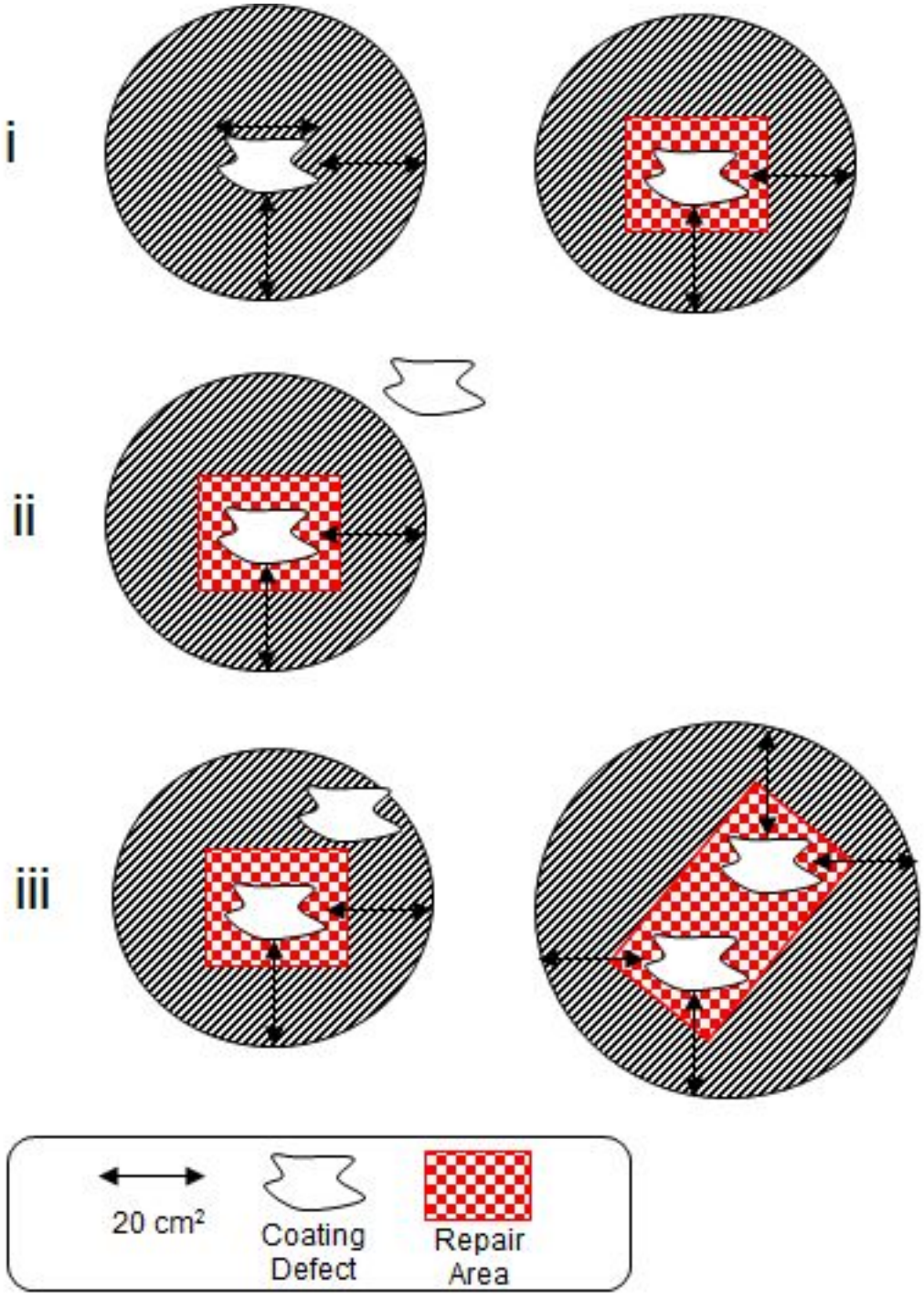


Figure 3: Guidance on determining interaction between paint system defects and establishing repair area



(i) Paint system defect within 20 cm^2 of well adhered paint

(ii) two paint defects, not interacting

(iii) Two paint system defects that are interacting

10. Specific Paint Applications

10.1 General

The intention of an SPA is to ensure simple paint selection for a specific application or component common to a site.

An SPA shall be selected for each painting activity type determined within the painting programme.

This standard considers the SPAs summarised within Table 4. Further detail on the use of each SPA is given within the following sub-sections.

- SPA: Specific Paint Application
- Activity Type: The type of activity the SPA is designed for. Activities are defined within Section 9.
- Description: The generic description for each paint type.
- Material: The specific material (surface) the paint is designed to be applied to. These are as detailed in Table 2.
- Environment: The specific environment the paint is to be applied within. The environments are as defined within ISO 12944-2. For information a summary of the environment types is given in Table 3.
- Temp. Range: The specific temperature of the component(s) the paint is to be applied to.
- Paint Qualify: The requirements for the selected paint to be qualified through GIS/PA9.

Summary sheets for each SPA are detailed within Annex C. The sheets are provided to aid project planning and writing of the APS (Section 11) which further details on applicable components provided. Further requirements with regards to surface preparation, application and inspection related to all SPAs are detailed from Section 11 to Section 13.

Table 2: Summary of material types

Description	Material Types
Metallic (Ferrous)	Ferrous materials (e.g. carbon steel, iron)
Metallic (Non-Ferrous)	Stainless Steel (e.g. Type 304, Type 316, Duplex, Super Duplex) Aluminium
Metallic (All)	All of the above, with the exception of a galvanised surface
Metallic (Galvanised)	Any metallic surface with a previously galvanised surface
Non-Metallic (Polymeric)	Glass Reinforced Plastics (GRP), Pre-painted cladding (Plastisol Cladding)

Table 3: Summary of environmental conditions

ISO 12944-2 Environment	Outdoor Description	Indoor Description
C1	N/A	Heated buildings with clean atmospheres.
C2	Atmospheres with low level of pollution. Mostly rural areas. Unheated buildings where condensation may occur.	Unheated buildings where condensation may occur.
C3	Urban and industrial atmospheres, moderate Sulphur dioxide pollution. Coastal areas with low salinity.	Production room with high humidity and some air pollution.
C4	Industrial areas and coastal areas with moderate salinity.	Chemical plants, swimming pools, coastal ship- and boatyards.
C5	Industrial areas with high humidity and aggressive atmosphere. Coastal areas with high salinity.	Buildings or areas with almost permanent condensation and with high pollution.

10.2 SPA-1 (General Painting, Ferrous Materials)

General painting activities to ferrous materials only. The SPA is intended for use on all ferrous components and structural items. Surface preparation should be to ISO 8501-1 SA 2.5; other surface preparation finishes may be acceptable where the manufacturer can guarantee the necessary performance requirements and the paint system is qualified accordingly. An alternative surface cleanliness level (and potential change of paint system) shall be agreed with the Gas Transporter.

The SPA is suitable for use up to a coastal atmosphere (ISO 12944, C4) and within an operating temperature range of up to 100°C. Please note; if the circumstance is such that the SPA is to operate at a constant high temperature of 70 to 100°C, then consideration to the use of an appropriate SPA 6 coating shall be considered; consultation with the Gas Transporter is required. The component or area shall operate in nominally dry conditions i.e. condensing or wet conditions are operationally avoidable. The applied paint shall be demonstrated to meet the requirements of GIS/PA9, FPS-1.

The SPA excludes patch painting or temporary painting activities, non-ferrous and non-metallic surfaces, flange and bolting arrangements. An SPA-1 coating can be approved for SPA-2 if the qualification process includes the surface preparation to ISO8501-1 ST3 and a separate SPA-2 PQR produced. A SPA-1 coating can be approved for use as an SPA-3 if the qualification process is cross-referenced to FPS-3 and a separate PQR produced.

The SPA shall not be used on a component(s) internal surface.

10.3 SPA-2 (Patch Painting, Ferrous Materials)

Patch painting activities to ferrous materials only. The SPA is intended for use on all ferrous components and structural items. Surface preparation should be to ISO 8501-1 ST3; other surface preparation finishes may be acceptable where the manufacturer can guarantee the necessary performance requirements and the paint system is qualified accordingly. An alternative surface cleanliness level (and potential change of paint system) shall be agreed with the Gas Transporter.

The paint is suitable for use up to a coastal atmosphere (ISO 12944, C4) and within an operating temperature range of up to 100°C. The applied paint shall be demonstrated to meet the requirements of GIS/PA9, FPS-2.

The SPA excludes general painting activities, non-ferrous and non-metallic surfaces, flange and bolting arrangements.

10.4 SPA-3 (Indoor Painting)

General painting and patch painting activities to ferrous components located indoors only. Surface preparation should be to ISO 8501-1 SA 2.5; other surface preparation finishes may be acceptable where the manufacturer can guarantee the necessary performance requirements and the paint system is qualified accordingly. An alternative surface cleanliness level (and potential change of paint system) shall be agreed with the Gas Transporter. The selected paint system shall have been demonstrated to meet the qualification requirements of GIS/PA9, FPS-3.

The SPA is suitable for an indoor environment (ISO 12944, C1 environment) and shall only be used if the paint system is only exposed to fully dry indoor conditions (securely enclosed area protect from outdoor elements) during its fabrication and operational life; including any storage of the component. Applies to an operating temperature range of up to 100°C.

The applied paint shall be demonstrated to meet the requirements of GIS/PA9, FPS-3. The SPA excludes non-ferrous, non-metallic surfaces and any component or area exposed to an outdoor environment during its fabrication and operational life.

10.5 SPA-4 (Non-ferrous Painting)

General painting and patch painting activities to the non-ferrous materials (e.g. stainless steel, aluminum). Surface preparation should be to ISO 8501-1 SA 1(sweep blasting); other surface preparation finishes may be acceptable where the manufacturer can guarantee the necessary performance requirements and the paint system is qualified accordingly. An alternative surface cleanliness level (and potential change of paint system) shall be agreed with the Gas Transporter. The applied paint shall be demonstrated to meet the requirements of GIS/PA9, FPS-4.

The paint is suitable for use up to a coastal atmosphere (ISO 12944, C4) and within an operating temperature range of up to 100°C.

The SPA excludes temporary activities, ferrous and non-metallic surfaces, flange and bolting arrangements. The SPA shall not be used on a components internal surface.

10.6 SPA-5 (Non-metallic Painting)

General painting and patch painting activities to non-metallic materials (e.g. glass reinforced plastics (GRP)). Surface preparation should be to ISO 8501-1 SA 1(sweep blasting); other surface preparation finishes may be acceptable where the manufacturer can guarantee the necessary performance requirements and the paint system is qualified accordingly. An alternative surface cleanliness level (and potential change of paint system) shall be agreed with the Gas Transporter. The applied paint shall be demonstrated to meet the requirements of GIS/PA9, FPS-4.

The paint is suitable for use up to a coastal atmosphere (ISO 12944, C4) and within an operating temperature range of up to 100°C.

The SPA excludes temporary activities, metallic surfaces and flange and bolting arrangements. This SPA also excludes the application (or repair) of pipeline coatings. Any coating of a pipeline shall be carried out to the requirements of GIS/CW5.

10.7 SPA-6 (High Temperature, 100°C to 340°C)

General painting and patch painting activities to ferrous components which are likely to operate in the region of 100 °C to 340°C. Surface preparation should be to ISO 8501-1 SA 2.5; other surface preparation finishes may be acceptable where the manufacturer can guarantee the necessary performance requirements and the paint system is qualified accordingly. An alternative surface cleanliness level (and potential change of paint system) shall be agreed with the Gas Transporter. The applied paint shall be demonstrated to meet the requirements of GIS/PA9, FPS-5.

The paint is suitable for use up to a coastal atmosphere (ISO 12944, C4).

The SPA excludes temporary activities, non-ferrous and non-metallic surfaces.

10.8 SPA-7 (High Temperature, 340°C to 500°C)

This SPA applies to the general and patch painting of surfaces which are likely to operate between 340°C and 500°C. The applied paint shall be demonstrated to meet the requirements of GIS/PA9, FPS-6.

Surface cleanliness will be dependent upon paint system.

- For liquid applied paints a minimum surface cleanliness of ISO 8501-1 SA 2.5 shall be met.
- For Thermally Sprayed Aluminium (TSA), the requirements of ISO 17834 shall be met.

The applied paint system or TSA system shall be qualified through GIS/PA9, FPS-6.

The paint is suitable for use up to a coastal atmosphere (ISO 12944, C4)

The SPA excludes temporary activities, non-ferrous and non-metallic surfaces.

10.9 SPA-8 (Temporary Paint)

The SPA is for the simple and quick application of a barrier paint (e.g. epoxy putty) or chemical treatment paint (e.g. includes a corrosion inhibitor active ingredient) to a ferrous component. The intention of the paint is not for long-term performance but to inhibit corrosion at areas where further painting activities would be required but cannot be enacted in the short term.

This SPA is for ferrous components only and an operating temperature of up to 100°C. The paint system is suitable for use up to a coastal atmosphere (ISO 12944, C4).

The applied paint shall be demonstrated to meet the requirements of GIS/PA9, FPS-7.

10.10 SPA-9 (Outer Flange Joint and Bolting)

This SPA relates directly to the flange painting activity and is intended to only cover painting activities to a flange setup. The SPA is for the application of specialised flange painting systems which can be applied and subsequently easily removed to allow for inspection (e.g. encapsulation technology).

The paint system is suitable for use up to a coastal atmosphere (ISO 12944, C4) and an operating temperature range of up to 100°C.

The applied paint shall be demonstrated to meet the requirements of GIS/PA9, FPS-8.

10.11 SPA-10 (Galvanised Surface)

This SPA applies to the general and patch painting activity of the non-ferrous surfaces specified below:

- New galvanised surfaces.
- Weathered galvanised surfaces.
- Previously painted galvanised surfaces.

Sweep blast to ISO 8501-1 SA1 or hand tool abrade followed by cleaning with alkaline detergent and potable water wash. The paint system is suitable for use up to a coastal atmosphere (ISO 12944, C4) and an operating temperature range of up to 100°C.

The applied paint shall be demonstrated to meet the requirements of GIS/PA9, FPS-4.

Note: Special conditions will be required to be met when over-coating certain high volume solid Zinc based paint systems. Where there is uncertainty in the selection of SPA-10, the Gas Transporter shall be consulted.

10.12 SPA-11 (Condensing / Wet Surface)

General and patch paint activities for ferrous surfaces on which the presence of condensation during painting cannot be operationally prevented. Brush application only.

The applied paint shall be demonstrated to meet the requirements of GIS/PA9, FPS-9.

10.13 SPA-12 (Riser)

General and patch painting of a pipeline riser. In this instance, a riser is the section of pipeline between the partially exposed pipe (as defined in GIS/CW5) and the first pipeline joint above ground.

Risers shall be coated (inclusive of coating selection) in accordance with the requirements of GIS/CW5.

10.14 Summary of SPAs

Table 4: Summary of SPAs

SPA	Activity Type	Description	Material	Environment	Temp Range	Paint Quality Type
SPA-1	General	General Painting (Ferrous)	Metallic (Ferrous)	All (up to C4)	-15°C to 100°C	GIS/PA9 FPS 1
SPA-2	Patch	Patch Painting (Ferrous)	Metallic (Ferrous)	All (up to C4)	-15°C to 120°C	GIS/PA9 FPS 2
SPA-3	General and Patch	Indoor Painting	Metallic (Ferrous)	Indoor (C1 only)	-15°C to 120°C	GIS/PA9 FPS 3
SPA-4	General and Patch	Non-Ferrous Painting	Metallic (Non- Ferrous)	All (up to C4)	-15°C to 120°C	GIS/PA9 FPS 4
SPA-5	General and Patch	Non-Metallic	Non-metallic (e.g. polymers)	All (up to C4)	-15°C to 120°C	GIS/PA9 FPS 4
SPA-6	General and Patch	High Temperature (100°C to 340°C)	Metallic (Ferrous)	All (up to C4)	120 °C to 340°C	GIS/PA9 FPS 5
SPA-7	General and Patch	High Temperature (340°C to 500°C)	Metallic (Ferrous)	All (up to C4)	340°C to 500°C	GIS/PA9 FPS 6
SPA-8	Temporary	Temporary Paint	Metallic (Ferrous)	All (up to C4)	-15°C to 120°C	GIS/PA9 FPS 7
SPA-9	Flange	Outer Flange Joint (and Bolting)	Metallic (All)	All (up to C4)	-15°C to 120°C	GIS/PA9 FPS 8
SPA-10	General and Patch	Galvanized Surface	Metallic (Galvanised)	All (up to C4)	-15°C to 120°C	GIS/PA9 FPS 4
SPA-11	General and Patch	Condensing / Wet Surface	Metallic (Ferrous)	All (up to C4)	-15°C to 120°C	GIS/PA9 FPS 9
SPA-12	General and Patch	Risers	GIS/CW5	GIS/CW5	GIS/CW5	Qualify to GIS/CW5

11. Paint System Selection

Following the identification of the relevant SPA(s) for the painting activity type, a qualified paint system can be selected or a non-qualified paint system can be proposed.

Where a non-qualified paint system is proposed, qualification through GIS/PA9 shall be undertaken.

Each SPA links to a Functional Performance Specification (FPS) detailed in GIS/PA9. This FPS details the qualification requirements for the paint system.

Following qualification, a paint system shall have a Paint Qualification Record (PQR) and an attached qualified manufacturer's data sheet. These shall be used in the development of the Application Procedure Specification (APS).

A flow diagram detailing the qualification route is detailed in Figure 4.

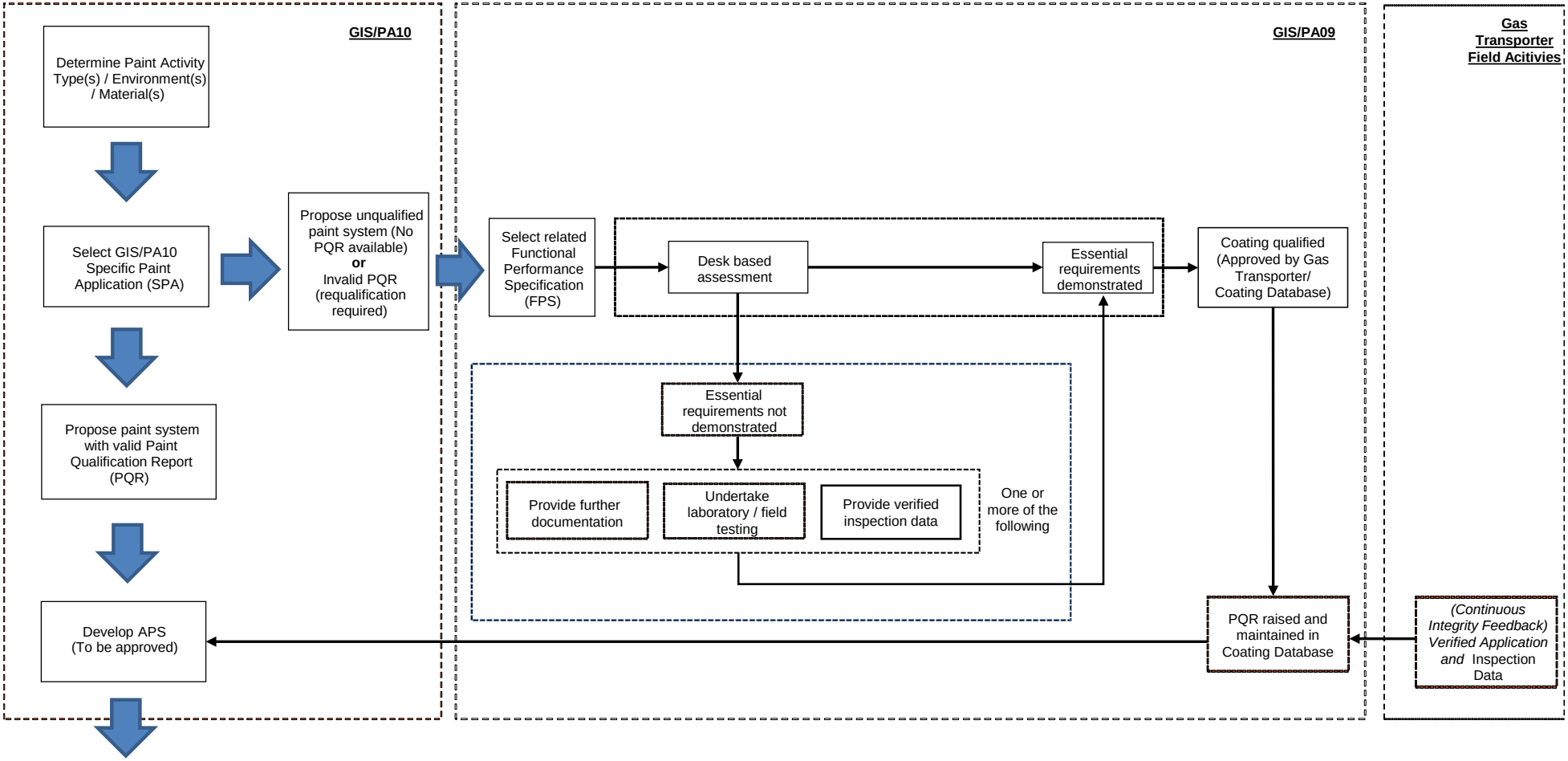


Figure 4: Flow diagram showing paint selection route for GIS/PA10 and this standards link with qualification document GIS/PA9

12. Application Painting Specification (APS)

Following identification of a painting activity type, relevant SPAs and paint system, an APS shall be developed. An APS shall be developed for all painting activities. The APS shall contain the following:

- Painting Activity Type(s).
- SPA(s) to be used.
- Qualified Paint Systems to be used.
- Identification of all equipment.
- Step by step information of the process (paint removal, cleaning, blasting, painting and inspection).
- Surface cleanliness, Surface profile, and Wet Film Thickness (WFT) and Nominal Dry Film Thickness (DFT) requirements as detailed within the qualified manufacturer's data sheet (as part of the paint system PQR).
- The time expected per operation (e.g. surface preparation) on site.
- Details of qualified paint materials including information provided on manufacturers data sheet.
- Health and Safety (HSE) Information.
- Example of painting application report.
- Paint repair procedure.

Preparation of all documentation relating to the APS shall be carried out by the designated Competent Person (Section 6.2).

The APS shall only be developed using a valid PQR and its attached qualified manufacturer's data sheet.

The Painting Contractor shall submit an APS to the Site Engineer for approval prior to the start of painting on site. If required, guidance shall be sought from the Responsible Engineer.

12.1 Reporting

A report shall be produced for all coating removal, surface preparation and coating application work. Reports shall record, but may not be limited to, the items in Table 5.

Table 5: Guidance on typical parameters to be included in a painting report

Description	Material Types
General	Details of Painting Contractor and Responsible Persons
General	Location of repair
General	Date and time of each stage
Materials	Equipment and Techniques used
Materials	Materials receipt condition
Materials	Information on paint systems to be applied
Materials	Percentage of thinner added to the paint(if applicable)
Environmental Conditions	Weather and Ambient Conditions
Surface Preparation	Condition of surface before preparation
Surface Preparation	Tools and methods used to prepare surface
Surface Preparation	Condition after preparation
Paint Application	Paint application technique
Paint Application	Mixing and testing prior to application
Inspection and Testing	Type of instruments. Date of Calibration
Inspection and Testing	Compliance to standard or specification
Inspection and Testing	Defective coatings / holidays

All reports shall be clearly written and all information shall be legible.

Reports shall be signed by the responsible inspector. The inspector shall include their coating/paint inspector title, inspector number and date/time.

Where a coating/paint inspector has not visited the site, the reports shall be signed by the Competent Person, their supervisor and the Site Engineer. The Competent Person and their supervisor shall include their title, date/time and a list of qualifications.

13. Painting Activities

13.1 General Information

No painting activity should take place until the integrity of the asset has been confirmed by the Responsible Engineer or Site Engineer. Full details of the intended paint removal method and surface preparation should be provided to ensure that a thorough assessment can be made.

All painting should be subject to inspection and any deviation from the requirements of this standard shall be managed in accordance with the appropriate Gas Transporter procedures.

The Painting Contractor may be required to prepare and paint test areas to demonstrate that a correct quality of surface preparation with a satisfactory film thickness and finish to the paint film is obtained.

The equipment and techniques used for the accepted surface preparation and application of paint to the test areas shall be representative of those to be used for the main painting work.

It is of particular importance that reference is made to Annex A and that all relevant requirements are carried out. In all cases, the operation shall be carried out in compliance with the current environmental requirements (see Annex A).

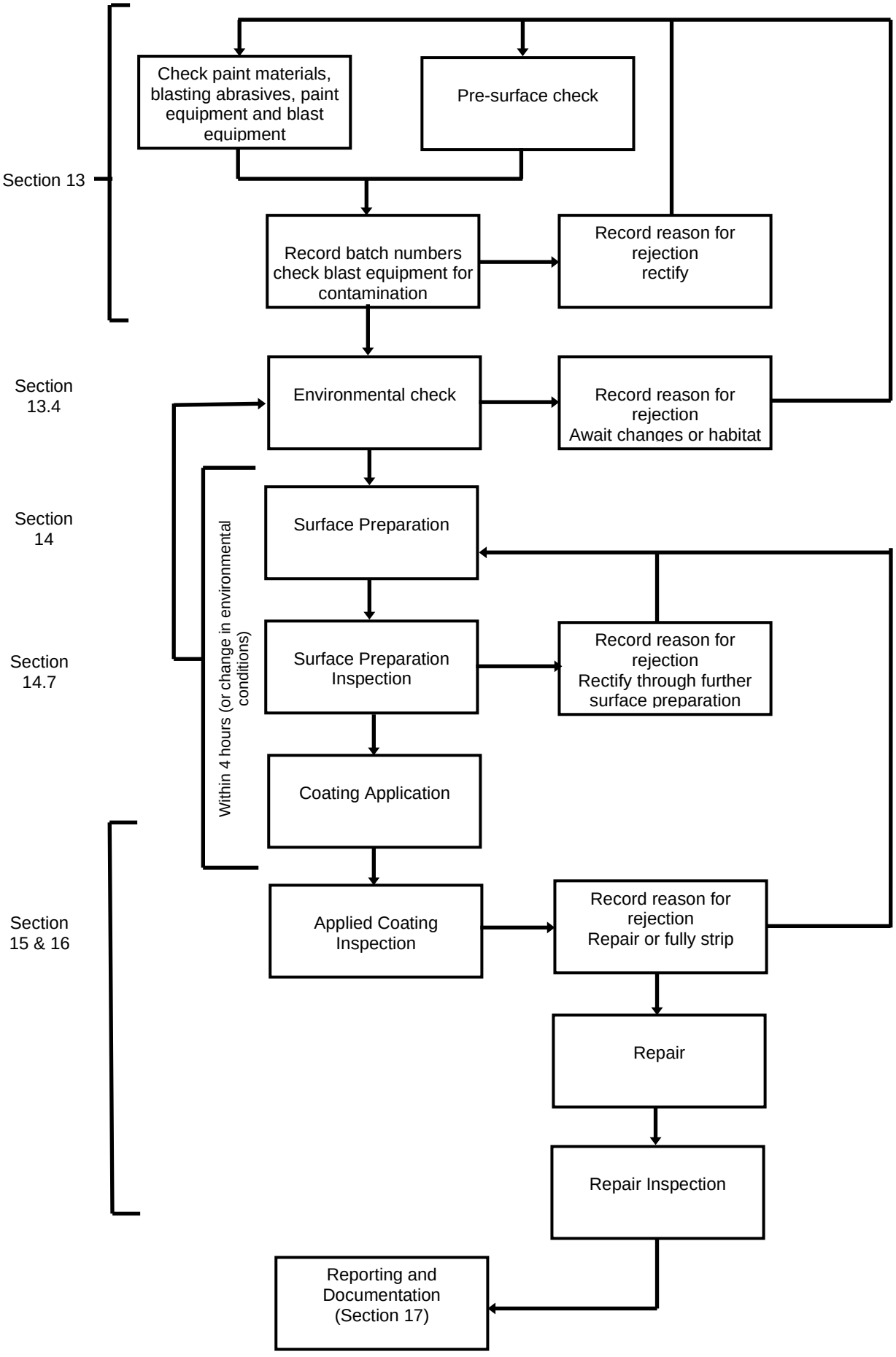
When cleaning, surface preparation, or painting operations are being carried out on site, the Painting Contractor shall ensure that adequate protection is given to surrounding areas and adjacent structures to avoid spotting, over-spray, or contamination produced by these operations.

The Painting Contractor shall be responsible for the removal of all paint and corrosion products, spent abrasive, empty containers, brushes, tissues, etc., from the site and shall ensure that the disposal of waste products complies with the appropriate statutory requirements.

A flow chart showing the stages of painting activities is shown in Figure 5.

All surface preparation and application shall be carried out to the requirements of the qualified manufacturer's data sheet. The following sections provide additional surface preparation and application requirements which shall be adhered to where absent from the qualified manufacturers data sheet.

Figure 5: Flow chart for painting activities



13.2 Pre-surface Preparation and Painting Activities

A visual inspection of the painting component or area shall be undertaken before painting activities. Where applicable, the surface should be smoothed i.e. sharp edges, burrs and excess weld removed, before any painting activities. Methods for smoothing shall be accordance with IDN/PM/P/11 under a hot works permit, as appropriate.

The absence of lead based paint shall be confirmed before any painting activities requiring the removal of the original paint. If lead based paint is present, a suitable surface preparation requirement shall be required.

All algae and mould growth should be treated with a biocidal agent and left for a minimum of 24 hours. It should then be removed by scrubbing with stiff bristle brushes and clean water or by use of high pressure water washing.

All necessary HSE and environmental requirements (e.g. protective equipment) shall be in use where biocidal agents are used.

Prior to any cleaning, surface preparation or painting, the Painting Contractor shall protect and mask equipment and areas in need of protection. Care should be taken with the use of masking materials to prevent possible malfunction of the plant.

Typical items to be masked are fire protection equipment, weld end preparations, atmosphere sensing heads, spray heads, vents on control equipment, flame traps, lubrication points and nameplates.

Areas with excessive corrosion shall have thickness measurements taken to ensure that the method of surface preparation will not cause an unsafe situation.

The Painting Contractor shall be responsible for removing all masking materials.

Special care shall be taken to ensure that paints containing metallic zinc (zinc-rich paints) are not allowed to contaminate stainless steel as this can cause embrittlement.

These paints shall not be applied within 75 mm of any weld end preparation to avoid vaporisation of the zinc during welding.

13.3 Materials

All paint systems should be provided by the Painting Contractor.

Unless otherwise specified, all paint systems used on any one contract shall be supplied by one manufacturer only. All paints shall be ordered against GIS/PA9 which shall be quoted on all relevant documentation.

Paint systems are obtainable in both brushing and spraying grades. When ordering paints, the grade required shall be specified and labelled in accordance with GISP/PA9.

All paint systems shall be stored under cover and in conditions recommended by the paint manufacturer and in accordance with the appropriate fire regulations. On operational sites, the storage method and area shall be approved by the Site Engineer.

13.4 Environmental Conditions

Unless detailed as acceptable on the PQR, or accepted by the Gas Transporter, no surface preparation or paint application shall take place outside the environmental conditions defined in Table 6. Environmental conditions shall remain within the parameters for the entire painting operation.

Paint systems should normally be applied when the relative humidity in the work zone is less than 85% and when the air and metal temperatures are at least 3 °C above the dew point. Measurement of relative humidity and dew point should be carried out using a calibrated environmental gauge.

Guidance on the estimation of the probability of condensation (dew-point) can be found in ISO 8502-4.

In addition to the environmental conditions defined in Table 6, painting activities shall not be carried out when:

- There is the likelihood of a change of weather conditions during, or within 2 hours of painting.
- There is a deposition of moisture (e.g. Rain, condensation, frost etc.) on the pipe surface.
- The available light is less than 500 lux.

If necessary, temporary encapsulation, heaters and/or dehumidification equipment shall be deployed to ensure that environmental conditions remain within the above envelope.

When using a SPA-11 system, where the presence of condensation during painting cannot be operationally prevented, the deposition/presence of moisture is acceptable.

Table 6: Environmental condition limits

Parameter	Min. Value	Max. value
Pipe Surface Temperature	5 °C	As per SPA
Air Temperature	5 °C	As per SPA
Air temperature – (minus) dew point temperature	3 °C	-
Steel temperature – (minus) dew point temperature	3 °C	-
Relative Humidity	-	85%

14. Surface Preparation

14.1 General Surface Preparation Requirements

Further to the requirements given in Section 10.3, when conditions in the working zone are such that the metal surfaces are moist or damp, final surface preparation shall not normally be carried out. The exception to this is the where SPA-11 (Condensing / Wet Surface) is intended to be used.

The operation of any surface preparation or cleaning method shall not be allowed to contaminate wet paint films.

Equipment used on site for surface preparation shall be of the type which does not cause sparks.

Electrically operated tools should not normally be permitted on site.

Power tools operated by compressed air shall have oil and vapour traps fitted to the compressed air lines. Compressed air shall be checked with a blotter test (ASTM D4285) prior to any use.

Before surface preparation operations commence, all contaminants including oil or grease and water soluble salts on the working surfaces, shall be removed by washing with an appropriate solvent.

All surfaces should normally be thoroughly dry before painting commences.

Where cleaning and swabbing of steel and paint film surfaces are required, disposable lint-free swabs should be used.

There may be special considerations for some materials (e.g. cast iron, non-ferrous, non-metallics). The Gas Transporter and/or the coating manufacturer may be required to be contacted in these cases if surface preparation or an acceptable finish cannot be achieved.

14.2 Abrasive Blasting

Safety requirements associated with abrasive blast cleaning shall comply with current regulations.

Suitable abrasives for use in dry abrasive blasting are specified in ISO 11124. Examples of suitable abrasives are:

- Chilled iron grit.
- Steel and malleable iron grit or shot.
- Non-metallic abrasive (aluminium oxide, copper slag, garnet).

Prior to execution of painting works the selected abrasive type shall be qualified to the requirements of this standard.

All metallic blast cleaning abrasives shall meet the requirements of ISO 11124 and shall be tested in accordance with test methods specified in ISO 11125 Parts 1-7.

All non-metallic blast cleaning abrasives shall meet the requirements of ISO 11126 and shall be tested in accordance with test methods specified in ISO 11127 Parts 1-7.

Non-metallic abrasives shall be of a silica free type. Air for blasting shall be clean, dry and oil free. Other blasting media may be used with the agreement of the Site Engineer.

Abrasive used in an open blast system should be of the expendable type. The re-use of expendable abrasive shall not be permitted. A closed blasting system (e.g. vacuum blasting) may also be used.

For painting activities of new components, where closed vacuum blasting systems may be used, the re-use of abrasives may be permitted provided that such systems efficiently clean and monitor the size of the abrasive. The re-used abrasives shall be tested for salt content using a suitable ASTM D4940 test kit twice per shift to ensure no contamination.

Wet blast systems or enclosed recovery blast systems, shall be used for the removal of lead based paint.

All necessary HSE requirements (e.g. protective equipment) shall be used in the removal of lead based paints.

Following wet blasting, dry blasting should be carried out to remove any subsequent flash rusting.

All traces of corrosion, chemical contamination or existing paint should be removed from the surface.

All surfaces prepared by blast cleaning shall comply with the requirements of ISO 8501 as specified; immediately prior to painting. The degree of cleanliness shall be in accordance with the APS.

The type of abrasive used should be capable of providing a blast cleaned profile (peak-to-trough height) as defined by the APS.

All surface defects, such as surface laminations or inclusions, shall be referred to the Site Engineer before any dressing is undertaken. Dressing shall be undertaken in accordance with the requirements of IDN/PM/P/11.

Refer to IDN/PM/P/11 “Management Procedure for inspection, assessment and repair of damaged (non-leaking) steel pipelines above 150 mm nominal diameter and designed to operate at pressures greater than 2 bar”

Where dressing has been necessary, these areas should be re-blasted to remove all rust and to provide an adequate paint key.

14.3 Water Jetting

High pressure and ultra-high pressure water jetting can be usefully employed for removal of paint, scale and corrosion products. Since high pressures are involved, care shall be taken to ensure that appropriate safety measures are taken and that equipment is not damaged.

Previously painted areas should be prepared to ISO 8501-4 minimum quality Wa1. Where paint breakdown and corrosion has occurred, the surface should be prepared to a minimum quality Wa2.

Areas prepared by water jetting should not be allowed to flash rust beyond ISO 8501-4 rust grade 'L' prior to painting. Only surface tolerant primers shall be specified for application over this type of wet surface.

This method of surface preparation provides a surface of equivalent cleanliness which is considerably inferior to Sa 2.5 and may reduce the expected life of the paint system. As such it shall only be used if qualified by the manufacturer, with the written approval of the GT and where there is a suitable reason to justify its use e.g. environmental or safety concerns.

14.4 Hand Tool / Power Tool

This section considers the preparation of surfaces (preparation of a paint key) with hand or power tools. Hand Tool / Power tool surface preparation may only be used;

- Where stipulated as a suitable surface preparation technique within the SPA.
- Blast cleaning is considered to be unsuitable and with the prior approval of the Site Engineer.
- Permission is sought from the Site Engineer.

Where dressing is required i.e. removal or repair of a surface defect, this shall be in accordance with the requirements of IDN/PM/P/11.

Hand Tool cleaning shall be conducted to ISO 8504-3 / SSPC-SP2 / NACE St 2.

Power Tool cleaning shall be conducted to ISO 8504-3 / SSPC-SP3 / NACE St 3.

These methods of surface preparation provide a surface of equivalent cleanliness which is considerably inferior to Sa 2.5 and may reduce the expected life of the paint system. As these methods generally achieve lower standards, additional care should be taken to ensure an agreed standard of surface preparation is reached.

Ferrous impact tools should not normally be used. In some areas, manual scraping may be adopted and may be followed by further surface preparation, such as wire brushing. The scrapers should be of the type having a carbide tip.

Needle guns shall have needles of small cross-section. Care shall be exercised when using a needle gun to ensure that the profile of the surface does not exceed 100 µm and that no sharp-edged craters are left on the metal surface. All rogue peaks shall be removed.

The use of abrasive discs may be permitted in certain circumstances but only carried out with the prior approval and under the control of the Site Engineer. Particular care shall be taken when using these methods on pressure containing parts, because of the danger of creating notches.

A burnished surface should be avoided following power tool cleaning.

14.5 Cleaning Down

The standard of surface cleanliness shall be such that all dust, chemical contaminants, oil and moisture are removed prior to paint application.

For existing sound paint surfaces, all grease and surface contamination shall be removed.

All surfaces, after completion of the surface preparation and immediately prior to painting, should be cleaned by air blasting using clean, dry, oil-free air or vacuum cleaned to ensure that all traces of abrasive and corrosion products are removed.

Where drying of steel and paint film surfaces are required, new lint-free cloths should be used.

14.6 Metallic Spray Surface Preparation

All metallic spray surface preparation, inclusive of thermally spray aluminium, shall be undertaken to the requirements of ISO 17834.

14.7 Surface Preparation Inspection

The surface preparation shall be capable of producing the surface conditions defined in the manufacturer's data sheet.

Table 7 details the inspection requirements for all paint activities with the exception of temporary painting. For temporary painting only visual inspection is required. All inspection activities are detailed in Annex B.

Table 7: Surface preparation inspection requirements

Test Type	Method	Frequency	Acceptance Criteria	Consequence
Environmental conditions	Ambient and steel temperature. Relative humidity. Dew point.	Before start of each shift + minimum once per shift	In accordance with specified requirements	No blasting or painting
Visual examination	Visual for sharp edges, weld platter, corrosion product, loose paint (8501-3)	100% of all surfaces	No defects	Defects require dressing
Cleanliness	ISO 8501-1	100% visual of all surfaces	In accordance with specified requirements	Re-cleaning and retesting until acceptable
Dust	ISO 8502-3	Spot checks (Start of shift minimum)	Maximum quantity and size rating 2	Re-cleaning (dry air) and retesting until acceptable
Salt test	ISO 8502-6 and ISO 8502-9	Spot checks (Start of shift minimum)	Maximum conductivity to 20 mg/m^2	Repeated washing with potable water and retesting until acceptable. Sweep blast if necessary
Surface Profile	ISO 8503-4 (Stylus), ISO 8503-5 (Replica Tape). Electronic profile gauge	Start of shift and then once per hour	As specified in APS	Re-blasting

15. Paint Application

15.1 General Paint Application Requirements

All paint shall be applied in such a manner as to ensure a firmly adherent film, free from misses, tears, runs, sags, etc.

The target Dry Film Thickness (DFT) stated on the qualified manufacturers data sheet shall be achieved. For the purposes of this standard, the target range shall be considered the Nominal Dry Film Thickness (DFT).

Stripe painting may be necessary to achieve the required DFT at edges and to ensure coverage of weld profiles.

Paint should not normally be applied when conditions in the working zone are such that the prepared surface is likely to become moist or damp during the painting operation. When this condition prevails, and cannot be overcome by altering the normal operating conditions (e.g. regulator stream selection) painting should be carried out in accordance with SPA-4 in Section 6.

After completion of the specified cleaning process, metal surfaces should be painted as specified in the appropriate SPA in Section 6 (by brushing or spraying).

Prepared surfaces shall be painted within four (4) hours of surface preparation.

Painting equipment used should be of a type complying with the paint manufacturer’s recommendations. For the application of liquid systems, airless spray shall be the preferred method of application.

The airless spraying equipment shall be used as recommended by the equipment supplied e.g. use of the correct spray tips.

Application by roller shall only be used where agreed with the Gas Transporter.

Spot checks (e.g. comb gauge) shall be carried out during paint application to ensure the correct Wet Film Thickness (WTF) is being achieved. WFT checks shall be carried out to ISO 2808, Method 7B.

15.2 Metallic Spray Application

All metallic spray application, inclusive of thermally spray aluminium, shall be undertaken to the requirements of ISO 17834.

15.3 Material Preparation

Paint shall not be used beyond the manufacturer's stated shelf life.

All paints should be prepared adjacent to the location where the painting work is to be carried out.

The condition of the paint shall be checked before preparation begins and any unsatisfactory materials shall be discarded.

All paints shall be thoroughly prepared by mechanically mixing to ensure that no sediment is left. For 5-litre containers or less, hand mixing can be considered. In all cases, the manufacturer's instructions shall be followed.

Some paint systems have a limited pot life. This information can be obtained from the manufacturer and also be stated on the container. Paints of this type shall not be used after the stated pot life. New material shall not be added to any of the old material left in the pot.

15.4 Applied Paint Inspection

The final paint system shall be free from significant visible imperfections.

Nominal Dry Film Thickness (DFT) shall be measured in accordance with ISO 2808, Method 6. The DFT gauge should be calibrated using the prepared surface.

No measured values shall be below the minimum DFT defined in the Manufacturers data sheet for each coat. Variation in measured values over the maximum DFT is acceptable. The maximum thickness of each coat shall not exceed the criteria for DFT as defined in ISO 12944-6.

Holiday detection shall be carried out following general and patch painting activities. The exception to this is if geometry and access are such that holiday detection is not possible. Components or areas where holiday detection cannot be carried out shall be highlighted on the APS.

Any holidays shall be repaired in accordance with Section 16.

Areas with inadequate paint thickness shall be re-prepared (cleaned, abraded) and additional compatible coats applied until the required DFT is achieved.

A summary of the applied painting inspection requirements are detailed in Table 8. For temporary painting activities only visual inspection is required to be reported. All inspection activities are detailed in Annex B.

Table 8: Detailing of all inspection requirements for all painting activities

Test Type	Method	Frequency	Acceptance Criteria	Consequence
Visual examination of paint	Visual to determine curing, contamination, solvent retention, pinholes / popping, sagging and surface defects	100% of surface after each coat	According to specified requirements	Repair of defects
Holiday detection	ISO 29601	As per Application Procedure Specification	No holidays	Repair and retesting
Film thickness	ISO 2808	ISO 2808, As per Application Procedure Specification	ISO 2808 and as per painting procedure	Repair, additional coats, or repainting as appropriate

16. Repair of Applied Paint

Defects in the finished coating caused by the application process shall be identified and repaired.

The defect area shall not exceed 20 cm^2 and the total number of defects to be repaired shall not exceed 1 m^2.

In the course of painting operations, all painted areas should be thoroughly dried before being over painted.

Any contamination of the paint film should be dealt with as specified in Table 9 before further coats of paint are applied.

All repairs shall be detailed within the final documentation

Table 9: Details of treatments for specific types of surface contamination during repair

Type of contamination	Treatment
Loose paint particles, rust, debris and other atmospheric contamination or salt deposition	Wash down using soft nylon brushes and clean water Dry thoroughly
Oil or Grease	Brush and wash with appropriate solvent then scrub with a 2% solution of detergent in clean water Wash with clean water and dry thoroughly
Foreign materials (e.g. shot or grit) embedded in the paint film	Re-prepare the affected areas and re-apply the complete painting system

17. Reporting and Documentation

Detailed records of the surface preparation and paint system applied should be kept together with the results of the inspection and testing carried out.
The information is to be recorded in the daily inspection and the weekly summary sheets, and the close out reports.

The information collected should include, as a minimum, the parameters shown on the inspection forms included in Annex B of this document. These forms should be available for inspection at any time during the contract, and a full set made available to the Gas Transporter at the end of the contract.

18. Temporary Painting

No temporary painting activity should take place until the integrity of the component has been confirmed by the Responsible Engineer or Site Engineer. Full details of the intended surface preparation and paint system application type should be provided to ensure that a thorough assessment can be made.

Where a temporary painting activity is required, only a specific SPA for the activity type shall be selected. Only SPAs specific to temporary painting are applicable to this section.

Temporary painting activities can be carried out without the preparation of an APS. However, no temporary painting activity shall be undertaken without prior approval from the Gas Transporter.

The type of surface preparation allowed shall be determined by the Responsible Engineer or Site Engineer. Where the surface preparation requirements of the qualified manufacturers data sheet cannot be met approval shall be sought from the Gas Transporter for alternative surface preparation techniques.

Temporary painting shall only be carried out with a qualified paint system specified and provided by the Gas Transporter. No proposal of paint systems is permitted.

For temporary painting activities, only visual inspection is required to be reported. The painting activity shall be witnessed by the either Responsible Engineer, Site Engineer or designated Competent Person.

Annex - A Safety

A.1 General

Personnel shall comply with all relevant regulations when cleaning, painting and disposal procedures are being carried out (see Statutes and Regulations, Section 2.1).

Attention is drawn to the safety section of paint manufacturer's data sheets, to Personal Protective Equipment (PPE), COSHH, environmental and temporary works requirements.

A.2 Safety Precautions on Site

A.2.1 All site work is normally subject to a Permit to Work system, (see GDN/PM/SCO/2). The Painting Contractor shall comply with the requirements of this system at all times. No work will be allowed to take place until a Permit to Work or Form of Authority has been issued.

A representative shall be nominated by the Painting Contractor to act on his behalf; his duties shall include obtaining Permits to Work or Forms of Authority. This representative shall agree with the Site Engineer at the beginning of each day, or by alternative arrangement, the extent of the work to be undertaken and the precautions needed. Once agreed, this program should not be modified unless further permission is obtained. The Painting Contractor's nominated representative shall be responsible for ensuring that the Permit to Work is always appropriate to the work being undertaken.

A.2.2 Delay in the provision of Permits to Work will be avoided if prior warning is given to the Site Engineer.

A.2.3 The requirements of CDM shall be followed.

A.2.4 All pressurised equipment, associated nozzles, etc., and electrically or pneumatically operated power tool equipment shall be earthed. 'No Smoking' regulations shall be observed, and the Gas Transporter reserves the right to demand the removal from site of any person who disregards this instruction.

A.2.5 The Painting Contractor shall not operate any Gas Transporter valves or plant on site.

A.2.6 The Painting Contractor shall note that certain areas on the installation are deemed 'hazardous'. When working in such areas, the use of non-spark tools for cleaning purposes and flameproof equipment is required.

A.2.7 Where sheeting is used (e.g. for protection against accidental paint spillage), it is essential that the material be non-flammable. Tarpaulin sheets shall not be permitted on the site.

A.2.8 During the work, the site shall be kept in an orderly manner and no materials or plant shall be placed in any buildings or positions where they could present a hazard to persons passing by on their normal duties.

A.2.9 In general, only diesel engine vehicles are allowed on site subject to approval of the Site Engineer. Vehicles so admitted shall keep to the designated roadways, outside of hazardous areas.

A.2.10 If doubt exists regarding the demarcation of hazardous areas, working areas, or the requirement of any Permit to Work, the Site Engineer shall provide an interpretation.

A.2.11 The Painting Contractor shall acquaint themselves with all installation safety and security restrictions.

A.2.12 In the event of an accident on site, the Painting Contractor shall notify the Site Engineer and details shall be entered in the installation's Accident Record Book and reported via IMS. This does not relieve the Painting Contractor of his own responsibilities in respect to GIS/PA10.

A.2.13 The method of work and the equipment used by the Painting Contractor may be inspected

by the Gas Transporter, or their representative, at any time without prior notice. No inspection in any way relieves the Painting Contractor of any responsibility, under the Health and Safety at Work etc. Act 1974, or otherwise, in the method of work or use of equipment.

A.2.14 Aluminium based light metal equipment such as ladders and scaffolding shall not be used in potentially hazardous areas as these cause sparking when struck against a steel surface.

A.2.15 Until approval has been given by the Site Engineer, fixed access equipment should be left in position and any movable equipment required to enable works to be carried out (ladders, towers, etc.) should remain on site and be readily available for use.

A.3 Environmental Requirements

A.3.1 Environmental protection

A.3.1.1 All waste materials resulting from surface preparation and painting operations covered in this standard shall be properly disposed of in accordance with the requirements of the Environmental Protection Act - EPA - (Duty of Care) 1990.

A.3.1.2 When surface preparation and painting operations covered in this standard are carried out in the vicinity of rivers, lakes or other water courses, special precautions may be necessary to prevent the possibility of pollution.

Care shall be taken to ensure operations are carried out in accordance with the requirements of the Water Resources Act 1991.

A.4 Statutory Regulations

A.4.1 All Operations covered in this standard are subject to the Health and Safety at Work etc. Act 1974 and other relevant legislations, such as the European Union (EU).

A.4.2 Due regard shall be taken in respect of the legislation regarding the use and care of protective clothing and other safety aids.

A.4.3 It is an obligation that the Gas Transporter shall ensure that all personnel involved in the activities covered in this standard be made fully aware of the relevant safety aspects, including the dangers of toxic materials.

A.4.4 All activities concerning these substances shall have been subjected to an assessment under the Control of Substances Hazardous to Health (COSHH) Regulations 2002.

A.4.5 Containers and any associated packaging shall, where appropriate, be marked in accordance with the CLP Regulation (2015).

Annex - B Surface Preparation Inspection Requirements

Table 10: Surface preparation inspection requirements

Test Type	Method	Frequency	Acceptance Criteria	Consequence
Environmental conditions	Ambient and steel temperature. Relative humidity. Dew point.	Before start of each shift + minimum once per shift	In accordance with specified requirements	No blasting or painting
Visual examination	Visual for sharp edges, weld platter, corrosion product, loose paint (8501-3)	100% of all surfaces	No defects	Defects require dressing
Cleanliness	ISO 8501-1	100% visual of all surfaces	In accordance with specified requirements	Re-cleaning and retesting until acceptable
Dust	ISO 8502-3	Spot checks (Start of shift minimum)	Maximum quantity and size rating 2	Re-cleaning (dry air) and retesting until acceptable
Salt test	ISO 8502-6 and ISO 8502-9	Spot checks (Start of shift minimum)	Maximum conductivity to 20 mg/m^2	Repeated washing with potable water and retesting until acceptable. Sweep blast if necessary
Surface Profile	ISO 8503-4 (Stylus), ISO 8503- 5 (Replica Tape). Electronic profile gauge.	Start of shift and then once per hour.	As specified in APS.	Re-blasting
Visual Examination of coating	Visual to determine curing, contamination, solvent retention, pinholes / popping, sagging and surface defects	100% of surface after each coat	According to specified requirements	Repair of defects
Holiday detection	ISO 29601	As per Application Procedure Specification	No holidays	Repair and retesting
Film thickness	ISO 2808	ISO 2808, As per Application Procedure Specification	ISO 2808 and as per painting procedure	Repair, additional coats, or recoating as appropriate

Annex - C Specific Paint Applications

C.1 SPA-1 (General Painting, Ferrous Materials)

Type of Painting Activity	Paint Material	Applicable Surface
General Painting	Qualified to GIS/PA9, FPS-1.	Metallic (Ferrous)

Applicability.
Painting of Metallic (Carbon Steel / Iron) surfaces within defined environment and operating conditions. Example components include, but not limited to: Pipework, Valves and Regulators, Ancillary Equipment, Water Bath Heaters, Shell and Tube Exchangers, Gas Condition Equipment, IP Filters, Bellows, Orifice Carriers and Meters, Pig Launcher, Pipe supports (only where access to the pipe 6 o'clock position and support is available), Structural Steel.

Exclusions
Any small area repair of pre-existing damage, internal coating of a component, permanently condensing or wet conditions, Hand / power tool preparation, flange and bolting arrangements, galvanised surfaces

Suitable Environment	Operating Conditions
All (C1 to C4)	-15°C to 100°C

Environment Requirements					
Surface Temperature vs. Environment	> 3°C above dew point	**Surface Temperature**	> 5°C	**Relative Humidity**	< 85%

Surface Preparation Requirements					
Surface preparation technique	Grit Blast only	**Surface Cleanliness**	ISO 8501-1 SA 2.5; min. as qualified (PQR) or by agreement	**Soluble Salt Content**	< 20 µg / cm^2
Abrasive Type	ISO 11124, ISO 11126	**Surface Condition**	Dry and free of dust. No oil and grease	**Surface Profile**	PQR/Manufacturer's data sheet

Application Requirements					
Application technique	Spray, Brush (Stripe coat)	**Wet Film Thickness**	PQR/Manufacturers Data Sheet	**Nominal Dry Film Thickness**	PQR/Manufacturers Data Sheet

Inspection Sampling Requirements					
Dew point (Steel Temp – Dew point)	Once per two hours or start of shift, whichever is sooner.	**Surface Temperature**	Per component	**Relative Humidity**	Once per two hours or start of shift, whichever is sooner
Surface Cleanliness (ISO 8501-1)	ISO 8501-1	**Blast Air (ASTM D4285)**	Blotter test Start of shift	**Soluble Salt Content**	< 20 mg/m^2
Surface Profile	Start of shift and then once per hour	**Wet Film Thickness**	Spot checks	**Dust (ISO 8502-3)**	Spot checks
DFT	Sampling as per ISO 2808	**Visual Inspection of cured paint**	No defects	**Holiday detection**	No defects

C.2 SPA-2 (Patch Painting, Ferrous Materials)

Type of Painting Activity	Paint Material	Applicable Surface
Patch Painting only	Qualified to GIS/PA9, FPS-2	Metallic (Ferrous)

Applicable Components
External patch painting of small areas of pipework, Valves and Regulators, Ancillary Equipment, Water Bath Heaters, Shell and Tube Exchangers, Gas Condition Equipment, IP Filters, Bellows, Orifice Carriers and Meters, Pig Launcher, Structural Steel.

Exclusions
General painting activities, non-ferrous and non-metallic surfaces, flange and bolting arrangements, galvanised surfaces.

Environment	Operating Conditions
All (C1 to C4)	-15°C to 100°C

Environment Requirements					
Surface Temperature vs. Environment	> 3°C above dew point	**Surface Temperature**	> 5°C	**Relative Humidity**	< 85%

Surface Preparation Requirements					
Surface preparation technique	Hand tool only	**Surface Cleanliness**	ISO 8501-1, ST3; min. as qualified (PQR) or by agreement	**Soluble Salt Content**	< 20 µg / cm^2
Abrasive Type	N/A	**Surface Condition**	Dry and free of dust. No oil and grease	**Surface Profile**	PQR/Manufacturers Data Sheet

Application Requirements					
Application technique	Spray, Brush	**Wet Film Thickness**	PQR/Manufacturers Data Sheet	**Nominal Dry Film Thickness**	PQR/Manufacturers Data Sheet

Inspection Sampling Requirements					
Dew point (Steel Temp – Dew point)	Once per two hours or start of shift, whichever is sooner	**Surface Temperature**	Per component	**Relative Humidity**	Once per two hours or start of shift, whichever is sooner
Surface Cleanliness (ISO 8501-1)	ISO 8501-1	**Blast Air (ASTM D4285)**	Blotter test. Start of shift	**Soluble Salt Content**	< 20 mg/m^2
Surface Profile	Start of shift and then once per hour	**Wet Film Thickness**	Spot checks	**Dust (ISO 8502-3)**	Spot checks
DFT	Sampling as per ISO 2808	**Visual Inspection of cured paint**	No defects	**Holiday detection**	No defects

C.3 SPA-3 (Indoor Painting)

Type of Painting Activity	Paint Material	Applicable Surface
General and Patch Painting	Qualified to GIS/PA9, FPS-3	Metallic (Ferrous)

Applicable Components
Ferrous components located indoors only.

Exclusions
Outdoor environment. Any small area repair of pre-existing damage, internal coating of a component, permanently condensing or wet conditions, repair or maintenance of single flange and bolting

Environment	Operating Conditions
C1 only	-15°C to 100°C

Surface Preparation Requirements					
Surface preparation technique	Sweep Blast / Cleaning (Aluminium)	**Surface Cleanliness**	ISO 8501-1 SA 2.5; min. as qualified (PQR) or by agreement	**Soluble Salt Content**	< 20 µg / cm^2
Abrasive Type	ISO 11124, ISO 11126	**Surface Condition**	Dry and free of dust. No oil and grease	**Surface Profile**	PQR/Manufacturers Data Sheet

Application Requirements					
Application technique	Spray, Brush	**Wet Film Thickness**	PQR/Manufacturers Data Sheet	**Nominal Dry Film Thickness**	PQR/Manufacturers Data Sheet

Inspection Sampling Requirements					
Dew point (Steel Temp – Dew point)	Once per two hours or start of shift, whichever is sooner	**Surface Temperature**	Per component.	**Relative Humidity**	Once per two hours or start of shift, whichever is sooner
Surface Cleanliness (ISO 8501-1)	ISO 8501-1	**Blast Air (ASTM D4285)**	Blotter test. Start of shift	**Soluble Salt Content**	< 20 mg/m^2
Surface Profile	Start of shift and then once per hour	**Wet Film Thickness**	Spot checks	**Dust (ISO 8502-3)**	Spot checks
DFT	Sampling as per ISO 2808	**Visual Inspection of cured paint**	No defects	**Holiday detection**	No defects

C.4 SPA- 4 (Non-Ferrous painting

Type of Painting Activity	Paint Material	Applicable Surface
General and Patch Painting	Qualified to GISPA9, FPS-4	Metallic (Non-Ferrous)

Applicable Components
Aluminium surfaces, stainless steel

Exclusions
Internal coating of a component, permanently condensing or wet conditions, repair or maintenance of single flange and bolting.

Environment Requirements					
Surface Temperature vs. Environment	> 3°C above dew point	**Surface Temperature**	> 5°C	**Relative Humidity**	< 85%

Surface Preparation Requirements					
Surface preparation technique	Sweep blast / Hand Prep	**Surface Cleanliness**	ISO 8501-1 SA 1(sweep blasting); min. as qualified (PQR) or by agreement	**Soluble Salt Content**	< 20 µg / cm^2
Abrasive Type	ISO 11124, ISO 11126	**Surface Condition**	Dry and free of dust. No oil and grease	**Surface Profile**	PQR/Manufacturers Data Sheet

Application Requirements					
Application technique	Spray, Brush	**Wet Film Thickness**	PQR/Manufacturers Data Sheet	**Nominal Dry Film Thickness**	PQR/Manufacturers Data Sheet

Inspection Sampling Requirements					
Dew point (Steel Temp – Dew point)	Once per two hours or start of shift, whichever is sooner	**Surface Temperature**	Per component.	**Relative Humidity**	Once per two hours or start of shift, whichever is sooner
Surface Cleanliness (ISO 8501-1)	ISO 8501-1	**Blast Air (ASTM D4285)**	Blotter test. Start of shift	**Soluble Salt Content**	< 20 mg/m^2
Surface Profile	Start of shift and then once per hour	**Wet Film Thickness**	Spot checks	**Dust (ISO 8502-3)**	Spot checks
DFT	Sampling as per ISO 2808	**Visual Inspection of cured paint**	No defects	**Holiday detection**	No defects

C.5 SPA – 5 (Non-metallic Painting

Type of Painting Activity	Paint Material	Applicable Surface
General and Patch Painting	Qualified to GIS/PA9, FPS-4	Non-metallic (e.g. polymers)

Applicable Components
General painting and patch painting activities to non-metallic materials. Pre-painted cladding ('Plastisol' cladding or equivalent), glass reinforced plastics (GRP), fusion bonded epoxy (FBE), multi component liquids (MCL), concrete.

Exclusions
Metallic components

Environment	Operating Conditions
All (Up to C4)	-15°C to 100°C

Environment Requirements					
Surface Temperature vs. Environment	> 3°C above dew point	**Surface Temperature**	> 5°C	**Relative Humidity**	< 85%

Surface Preparation Requirements					
Surface preparation technique	Sweep blast, Hand prep	**Surface Cleanliness**	ISO 8501-1 SA 1(sweep blasting); min. as qualified (PQR) or by agreement	**Soluble Salt Content**	N/A
Abrasive Type	ISO 11124, ISO 11126	**Surface Condition**	Dry and free of dust. No oil and grease	**Surface Profile**	PQR/Manufacturers Data Sheet (St 2)

Application Requirements					
Application technique	Spray, Brush	**Wet Film Thickness**	PQR/Manufacturers Data Sheet	**Nominal Dry Film Thickness**	PQR/Manufacturers Data Sheet

Inspection Sampling Requirements					
Dew point (Steel Temp – Dew point)	Once per two hours or start of shift, whichever is sooner.	**Surface Temperature**	Once per hour	**Relative Humidity**	Once per two hours or start of shift, whichever is sooner
Surface Cleanliness (ISO 8501-1)	N/A	**Blast Air (ASTM D4285)**	Blotter test. Start of shift	**Soluble Salt Content**	< 20 mg/m^2
Surface Profile	Start of shift and then once per hour	**Wet Film Thickness**	Spot checks	**Dust (ISO 8502-3)**	Spot checks
DFT	Sampling as per ISO 2808	**Visual Inspection of cured paint**	No defects	**Holiday detection**	No defects

C.6 SPA- 6 (High Temperature, 100^{O}C to 340^{O}C)

Type of Painting Activity	Paint Material	Applicable Surface
General and Patch Painting	Qualified to GIS/PA9, FPS-5	Metallic (Ferrous)

Applicable Components
Ferrous components which are likely to operate in the region of 100 °C to 340°C. Pipework, Valves and Regulators, Ancillary Equipment, Water Bath Heaters (External), Shell and Tube Exchangers (External), Gas Condition Equipment (External), Flange joints

Exclusions
Any components outside temperature range, internal coating of a component, permanently condensing or wet conditions.

Environment	Operating Conditions
All (C1 to C4)	100 °C to 340°C

Environment Requirements					
Surface Temperature vs. Environment	> 3°C above dew point	**Surface Temperature**	> 5°C	**Relative Humidity**	< 85%

Surface Preparation Requirements					
Surface preparation technique	Abrasive Blast only	**Surface Cleanliness**	ISO 8501-1 SA 2.5; min. as qualified (PQR) or by agreement	**Soluble Salt Content**	< 20 µg / cm^2
Abrasive Type	ISO 11124, ISO 11126	**Surface Condition**	Dry and free of dust. No oil and grease.	**Surface Profile**	PQR/Manufacturers Data Sheet

Application Requirements					
Application technique	Thermal Spray, Spray	**Wet Film Thickness**	PQR/Manufacturers Data Sheet	**Nominal Dry Film Thickness**	PQR/Manufacturers Data Sheet

Inspection Sampling Requirements					
Dew point (Steel Temp – Dew point)	Once per two hours or start of shift, whichever is sooner	**Surface Temperature**	Once per hour	**Relative Humidity**	Once per two hours or start of shift, whichever is sooner
Surface Cleanliness (ISO 8501-1)	ISO 8501-1	**Blast Air (ASTM D4285)**	Blotter test. Start of shift	**Soluble Salt Content**	< 20 mg/m^2
Surface Profile	Start of shift and then once per hour	**Wet Film Thickness**	Spot checks	**Dust (ISO 8502-3)**	Spot checks
DFT	Sampling as per ISO 2808	**Visual Inspection of cured paint**	No defects	**Holiday detection**	No defects

C.7 SPA – 7 (High Temperature, 340^{O}C to 500^{O}C)

Type of Painting Activity	Paint Material	Applicable Surface
General and Patch Painting	Qualified to GIS/PA9, FPS-6	Metallic (Ferrous)

Applicable Components
Pipework, Valves and Regulators, Ancillary Equipment, Water Bath Heaters (External), Shell and Tube Exchangers (External), Gas Condition Equipment (External), Flanges and Bolting (as part of pipework scope). Flange joints

Exclusions
Any components outside temperature range, internal coating of a component, permanently condensing or wet conditions.

Environment	Operating Conditions
All (C1 to C4)	340°C to 500°C

Environment Requirements					
Surface Temperature vs. Environment	> 3°C above dew point	**Surface Temperature**	> 5°C	**Relative Humidity**	< 85%

Surface Preparation Requirements					
Surface preparation technique	Abrasive Blast only	**Surface Cleanliness**	ISO 8501-1 SA 2.5; min. as qualified (PQR) or by agreement	**Soluble Salt Content**	< 20 µg / cm^2
Abrasive Type	ISO 11124, ISO 11126	**Surface Condition**	Dry and free of dust. No oil and grease.	**Surface Profile**	PQR/Manufacturers Data Sheet

Application Requirements					
Application technique	Thermal Spray, Spay	**Wet Film Thickness**	PQR/Manufacturers Data Sheet	**Nominal Dry Film Thickness**	PQR/Manufacturers Data Sheet

Inspection Sampling Requirements					
Dew point (Steel Temp – Dew point)	Once per two hours or start of shift, whichever is sooner	**Surface Temperature**	Once per hour.	**Relative Humidity**	Once per two hours or start of shift, whichever is sooner
Surface Cleanliness (ISO 8501-1)	ISO 8501-1	**Blast Air (ASTM D4285)**	Blotter test. Start of shift	**Soluble Salt Content**	< 20 mg/m^2
Surface Profile	Start of shift and then once per hour	**Wet Film Thickness**	Spot checks	**Dust (ISO 8502-3)**	Spot checks
DFT	Sampling as per ISO 2808	**Visual Inspection of cured paint**	No defects	**Holiday detection**	No defects

C.8 SPA – 8 (Temporary Paint)

Type of Painting Activity	Paint Material	Applicable Surface
Temporary painting	Qualified to GIS/PA9, FPS-7	Metallic (Ferrous)

Applicable Components
Simple and quick application of a barrier paint (e.g. epoxy putty) or chemical treatment paint (e.g. includes a corrosion inhibitor active ingredient) to a ferrous component

Exclusions
Use of SPA to be approved by the Gas Transporter

Environment	Operating Conditions
All (C1 to C4)	-15°C to 100°C

Environment Requirements					
Surface Temperature vs. Environment	> 3°C above dew point	**Surface Temperature**	> 5°C	**Relative Humidity**	< 85%

Surface Preparation Requirements					
Surface preparation technique	Hand Prep	**Surface Cleanliness**	As qualified (PQR)	**Soluble Salt Content**	N/A
Abrasive Type	N/A	**Surface Condition**	Dry and free of dust. No oil and grease	**Surface Profile**	N/A

Application Requirements					
Application technique	Thermal Spray, Spay	**Wet Film Thickness**	N/A	**Nominal Dry Film Thickness**	N/A

Inspection Sampling Requirements					
Dew point (Steel Temp – Dew point)	Start of shift	**Surface Temperature**	Start of shift	**Relative Humidity**	Start of shift
Surface Cleanliness (ISO 8501-1)	N/A	**Blast Air (ASTM D4285)**	N/A	**Soluble Salt Content**	N/A
Surface Profile	N/A	**Wet Film Thickness**	N/A	**Dust (ISO 8502-3)**	N/A
DFT	N/A	**Visual Inspection of cured paint**	Coating covers area. No defects	**Holiday detection**	N/A

C.9 SPA-9 (Outer Flange Joint and Bolting)

Type of Painting Activity	Paint Material	Applicable Surface
Flange Painting	Qualified to GIS/PA9, FPS-8	Metallic (All)

Applicable Components
Flanges Joints and bolting arrangements. Up to 2D from flange weld. Application of specialised flange painting systems which can be applied and subsequently easily removed to allow for inspection (e.g. encapsulation technology)

Exclusions
No exclusions (flange and bolting arrangements only)

Environment	Operating Conditions
All (C1 to C4)	-15°C to 100°C

Environment Requirements					
Surface Temperature vs. Environment	> 3°C above dew point	**Surface Temperature**	> 5°C	**Relative Humidity**	< 85%

Surface Preparation Requirements					
Surface preparation technique	Abrasive Blast / Hand Prep	**Surface Cleanliness**	As qualified (PQR)	**Soluble Salt Content**	< 20 µg / cm^2
Abrasive Type	ISO 11124, ISO 11126	**Surface Condition**	Dry and free of dust. No oil and grease	**Surface Profile**	PQR/Manufacturers Data Sheet

Application Requirements					
Application technique	Spray, Hand applied	**Wet Film Thickness**	PQR/Manufacturers Data Sheet	**Nominal Dry Film Thickness**	PQR/Manufacturers Data Sheet

Inspection Sampling Requirements					
Dew point (Steel Temp – Dew point)	Once per two hours or start of shift, whichever is sooner	**Surface Temperature**	Once per hour.	**Relative Humidity**	Once per two hours or start of shift, whichever is sooner
Surface Cleanliness (ISO 8501-1)	ISO 8501-1	**Blast Air (ASTM D4285)**	Blotter test. Start of shift	**Soluble Salt Content**	< 20 mg/m^2
Surface Profile	Start of shift and then once per hour	**Wet Film Thickness**	Spot checks	**Dust (ISO 8502-3)**	Spot checks
DFT	Check applicability. Sampling as per ISO 2808	**Visual Inspection of cured paint**	No defects	**Holiday detection**	Check applicability

C.10 SPA -10 (Galvanised Surface)

Type of Painting Activity	Paint Material	Applicable Surface
General and Patch Painting	Qualified to GIS/PA9, FPS-4	Metallic (Galvanised)

Applicable Components
New galvanised surfaces, weathered galvanised surfaces previously painted galvanised surfaces

Exclusions
Non-galvanised surfaces. Flange and bolting arrangements.

Environment	Operating Conditions
All (C1 to C4)	-15°C to 120°C

Environment Requirements					
Surface Temperature vs. Environment	> 3°C above dew point	**Surface Temperature**	> 5°C	**Relative Humidity**	< 85%

Surface Preparation Requirements					
Surface preparation technique	Abrasive Blast / Hand Prep / Wash	**Surface Cleanliness**	ISO 8501-1 SA 1; min. as qualified (PQR) or by agreement	**Soluble Salt Content**	< 20 µg / cm^2
Abrasive Type	ISO 11124, ISO 11126	**Surface Condition**	Dry and free of dust. No oil and grease	**Surface Profile**	PQR/Manufacturers Data Sheet

Application Requirements					
Application technique	Spray / Brush	**Wet Film Thickness**	PQR/Manufacturers Data Sheet	**Nominal Dry Film Thickness**	PQR/Manufacturers Data Sheet

Inspection Sampling Requirements					
Dew point (Steel Temp – Dew point)	Once per two hours or start of shift, whichever is sooner	**Surface Temperature**	Once per hour.	**Relative Humidity**	Once per two hours or start of shift, whichever is sooner
Surface Cleanliness (ISO 8501-1)	ISO 8501-1	**Blast Air (ASTM D4285)**	Blotter test. Start of shift	**Soluble Salt Content**	< 20 mg/m^2
Surface Profile	Start of shift and then once per hour	**Wet Film Thickness**	Spot checks	**Dust (ISO 8502-3)**	Spot checks
DFT	Sampling as per ISO 2808	**Visual Inspection of cured paint**	No defects	**Holiday detection**	No defects

C.11 SPA -11 (Condensing / Wet Surfaces)

Type of Painting Activity	Paint Material	Applicable Surface
General and Patch painting	Qualified to GIS/PA9, FPS-9	Metallic (All)

Applicable Components
General and patch paint activities for ferrous surfaces on which the presence of condensation during painting cannot be operationally prevented

Exclusions
Operating and environmental conditions which can be controlled to inhibit condensing / wet conditions *e.g.* rain (habitat)

Environment	Operating Conditions
All (C1 to C4)	-15°C to 100°C

Environment Requirements					
Surface Temperature vs. Environment	> 3°C above dew point	**Surface Temperature**	> 5°C	**Relative Humidity**	< 85%

Surface Preparation Requirements					
Surface preparation technique	Abrasive Blast / Hand Prep	**Surface Cleanliness**	As qualified (PQR)	**Soluble Salt Content**	< 20 µg / cm^2
Abrasive Type	ISO 11124, ISO 11126	**Surface Condition**	Dry and free of dust. No oil and grease	**Surface Profile**	PQR/Manufacturers Data Sheet

Application Requirements					
Application technique	Brush only	**Wet Film Thickness**	PQR/Manufacturers Data Sheet	**Nominal Dry Film Thickness**	PQR/Manufacturers Data Sheet

Inspection Sampling Requirements					
Dew point (Steel Temp – Dew point)	Once per two hours or start of shift, whichever is sooner	**Surface Temperature**	Once per hour.	**Relative Humidity**	Once per two hours or start of shift, whichever is sooner
Surface Cleanliness (ISO 8501-1)	ISO 8501-1	**Blast Air (ASTM D4285)**	Blotter test. Start of shift	**Soluble Salt Content**	< 20 mg/m^2
Surface Profile	Start of shift and then once per hour	**Wet Film Thickness**	Spot checks	**Dust (ISO 8502-3)**	Spot checks
DFT	Sampling as per ISO 2808	**Visual Inspection of cured paint**	No defects	**Holiday detection**	No defects

C.12 SPA-121 (Risers)

Type of Coating	Coating Material	Applicable Surface
General and Patch painting	Selected and Qualified in accordance with GIS/CW5	GIS/CW5

Applicable Components
General and patch painting of a pipeline riser. In this instance a riser is the section of pipeline between the partial exposed pipe (as defined in GIS/CW5) and the first pipeline joint above ground

Exclusions
GIS/CW5

Environment	Operating Conditions
As per GIS/CW5	As per GIS/CW5

Environment Requirements					
Surface Temperature vs. Environment	As per GIS/CW5	**Surface Temperature**	As per GIS/CW5	**Relative Humidity**	As per GIS/CW5

Surface Preparation Requirements					
Surface preparation technique	As per GIS/CW5	**Surface Cleanliness**	As per GIS/CW5	**Soluble Salt Content**	As per GIS/CW5
Abrasive Type	As per GIS/CW5	**Surface Condition**	As per GIS/CW5	**Surface Profile**	As per GIS/CW5

Application Requirements					
Application technique	As per GIS/CW5	**Wet Film Thickness**	As per GIS/CW5	**Nominal Dry Film Thickness**	As per GIS/CW5

Inspection Sampling Requirements					
Dew point (Steel Temp – Dew point)	As per GIS/CW5	**Surface Temperature**	As per GIS/CW5	**Relative Humidity**	As per GIS/CW5
Surface Cleanliness (ISO 8501-1)	As per GIS/CW5	**Blast Air (ASTM D4285)**	As per GIS/CW5	**Soluble Salt Content**	As per GIS/CW5
Surface Profile	As per GIS/CW5	**Wet Film Thickness**	As per GIS/CW5	**Dust (ISO 8502-3)**	As per GIS/CW5
DFT	As per GIS/CW5	**Visual Inspection of cured paint**	As per GIS/CW5	**Holiday detection**	As per GIS/CW5