

Coating Practices

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Coatings

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ExxonMobil
Development

Outline

- Coating Philosophy
- Corporate Standards (GPs)
 - New Construction
 - Maintenance
- Coating Work Process
- Inspection
- Acceptable Paint Products
- Coating System Codes
- Coating Schedule Matrix
- Miscellaneous Coating Issues
- Pipe Coating
- Thermal Spray Aluminum
- Fluoropolymer Coatings for Fasteners

Coating Philosophy

- World wide use for Upstream capital projects
- Follow our requirements
 - High quality
 - Long life
 - Specific approved vendors
 - Specific approved products
 - Clear workable coating systems with track record
- Understand contractors drivers
 - Modify requirements to achieve best outcome (lessons learned)
 - Specialists approve all deviations
- Preproduction meetings required
 - Assure agreement on Inspection & Test Plan
 - Work with Quality personnel and inspectors
 - Contractor develops work procedure (WCP) for approval
- Production qualifications for pipe coatings and TSA
- Safety and environmental
- Contractor qualification
- Inspection and testing requirements spelled out
- Repair procedures
- Documentation

Paint & Coating Global Practices (~30 GPs)

- Onshore Coating General Requirements*
- Offshore Coating General Requirements *
- Subsea Equipment
 - Corrosion Protection, Insulation
- Pipe Coatings
 - FBE, 3LPE, 3LPP, Concrete Weight, Internal Flow, Neoprene Riser, FBE Field Joint, 3LPE & PP Field Joint, Solid PU Field Joint, PP Multi Layer Insulation, Solid PU, Liquid PU Field Joint
- Structures
 - DDCV Hull, TLP Hull, Tendons, FPSO & FSO Hull New Build
- Maintenance & Repair Of Existing Coatings
- Miscellaneous
 - Fastener
 - TSA
 - Vessel & Tank
 - Fireproofing
 - Linings for Fired Heaters
 - Rubber
 - Galvanizing

Painting General Requirements - Offshore/Onshore

Scope

- This Global Practice (GP) covers the minimum requirements for materials, surface preparation, application, and inspection of external protective coatings for offshore/onshore installations consisting of structures, piping, and equipment. Also included are internal surfaces of specific topside storage tanks, cooling water lines, and integral hull tanks identified in Appendix B.
- This GP is intended for use only on Upstream projects.

References

- Other GPs
- ASTM Standards
- RAL Colors
- ISO Tests
- NACE (offshore only)
- Norsok & NSF
- SSPC

Coating Work Process

- All coating work performed in accordance with procurement documents, GP and Contractor's approved procedures.
- Normally, requires shop primed and field top coated for structural steel and piping
- Process equipment and machinery shop coated (prime and finish)
- Before work commences, a pre-job conference or pre-production meeting conducted to introduce contacts for Contractor and Company and their project management and inspection representatives.
- Manufacturer's Standard Finishes
- Items included in Contractor's Work Scope
 - Prepare surface and apply paint as per GP and procurement documents
 - Prepare and maintain inventory log
 - Repair procedures for each system
 - Waste disposal
- Items Not to be Coated
 - Surfaces such as concrete, glass sight glasses, thermometers, name tags, etc.
- Safety and Environmental
- Documentation

Coating Work Process

- Qualification
 - Written Coating Procedure (WCP)
 - Identification of the structures to be coated and not coated
 - Coating system and finish coat color to be applied
 - Specific coating products to be used for each coat
 - Data sheets and safety data sheets for each product
 - Personal protective equipment to be used
 - Coating material handling and storage and inventory controls
 - Salt contamination control
 - Surface preparation and additional preparation at welds and edges
 - Environmental controls
 - Scaffolding
 - Application, touch-up, and curing
 - Techniques to correct out-of-spec work
 - Inspection
 - Disposal of waste, debris, and unconsumed coating materials.
 - Coating Procedure Test (CPT)
 - Each system to be used, repair, application, curing and inspection
 - Coating Applicator Qualification
 - ACQPA, NORSOK, FROSIO or other international organizations

Coating Work Process

- Materials (paint products) per GP
 - Same manufacture for single piece of equipment
 - Used within shelf life
 - Compliance with manufactures storage requirements
- Abrasives
 - Capable of producing specified profile without contaminating surface
 - Conformance tests per SSPC AB
- Thinners supplied by paint manufacturer
- Touch up materials supplied by same manufacturer
- Handle coated surface per manufactures published times
- All paint application and curing within manufacturer guidelines
- Surface preparation – critical for proper quality per GP
 - Sharp edges – 2 mm radius & immersed edges 3 mm radius
 - Welds – smooth, no sharp edges, spatter
 - Immersed welds per NACE RP0178
- Galvanized surfaces – detergent prior to blast
- Coating application, mixing, thinning, Inter coat – per manufacturer
 - Dry Film Thickness, color, stripe coats – per GP
 - Stainless steel – no low melting point metals

Coating Work Process

- Inspection and testing
 - Contractor shall control quality to meet GP requirements
 - Inspectors qualified NSF NS 476, NACE or other approved certification
 - Contractor shall not initiate work until ITP activities prove acceptability
 - Inspection in ITP are hold points
 - Contractor shall supply test instruments with proper calibrations
 - Inspection documented on Company data sheet or approved equivalent
 - Upon work completion subject to final inspection and sign off
 - Remedial work
 - Atmospheric, immersion, hot dipped galvanizing
 - Details in approved WCP

Inspection & Test Plan

| Test Type | Method | Frequency | Acceptance Criteria | Consequence |
|---|--|---|---|--|
| Environmental Conditions | Ambient and steel temperature Relative humidity Dew point spread | Before start of each shift + min twice per shift | In accordance with specified requirements | No blasting or coating |
| Testing & Certification of Abrasive Materials | SSPC AB 1 | Each 15,000 kg, or manufacturing batch, whichever is less | Qualification & conformance testing per Section 5 of SSPC AB 1 | No blasting or coating |
| | SSPC AB 3 | | Qualification (i.e. "preliminary acceptance") testing per Section 4 of SSPC AB 3 & conformance testing per Sections 4.1.1, 4.2.2 & 4.2.3 of SSPC AB 3 | |
| Compressed Air Quality | <u>ASTM D 4285</u> | Before start of each shift or change in compressed air source & @ 4 hr intervals thereafter | Per the Standard (No visible contamination) | Service, clean and replace hoses, filters, KO pots, after coolers. Pressure wash with cleanser and reblast contaminated surfaces |

Inspection & Test Plan

| Test Type | Method | Frequency | Acceptance Criteria | Consequence |
|---|--|---|---|---|
| Visual Examination | Visually, for sharp edges, weld spatter, slivers, rust grade, etc. | 100% of all surfaces | No defects, refer to specified requirements | Defects to be repaired |
| Surface Cleanliness a) Visual b) For dust | (a) SSPC VIS 1 or ISO 8501 | (a) 100% visual of all surfaces | (a) In accordance with specified requirements | (a) Re-blasting |
| | (b) ISO 8502-3 | (b) Spot checks, but not less than 1 per 10m ² . Specific location to be determined by Company inspector | (b) Max quantity and size rating 2 | (b) Re-cleaning and retesting until acceptable |
| Soluble Salts | Extraction: ISO 8502-6 (Bresle) Assessment: ISO 8502-9 (Conductometric) Or Extraction: SSPC GUIDE 15, Section 4.6 (Elcometer 130 SC 400) Assessment: SSPC GUIDE 15, Section 5.3 (Conductometric) | (a) Immersion surfaces (includes underwater insulation): 6 samples/2000 m ² of fabrication Specific location to be determined by Company inspector (1) | (a) Average Conductivity corresponding to $\leq 20 \text{ mg/m}^2$ ($2 \mu\text{g/cm}^2$) and Max conductivity corresponding to $\leq 30 \text{ mg/m}^2$ water soluble salt's). | Steam or clean water washing and retesting until entire 2000 m ² test area is acceptable |
| | (b) Atmospheric Surfaces: 4 samples/2000 m ² of fabrication Specific location to be determined by Company Inspector (1) | (b) Average conductivity corresponding to $\leq 30 \text{ mg/m}^2$ and max conductivity corresponding to $\leq 40 \text{ mg/m}^2$ water soluble salt's). | | |

Inspection & Test Plan

| Test Type | Method | Frequency | Acceptance Criteria | Consequence |
|--------------------------|--|--|--|--|
| Extent of Intercoat Cure | Perform solvent rub test to ensure: | Perform 3 tests per 500 m ² of surface to be coated | | |
| | (a) Inorganic zinc is fully cured per ASTM D 4752 and | | (a) Average resistance rating not less than 4 | (a) Inadequately cured IZ: Take action to enhance level of cure (e.g., water misting). If ineffective, remove and reapply inadequately cured IZ. |
| | (b) Epoxy for immersion, splash zone exposure, or under insulation is recoatable per ASTM D 5402 . Unless otherwise instructed, in writing, by the Coating Manufacturer, perform 50 double rubs using MEK. | | (b) Discoloration must be visible on the rub cloth, or... Thumbnail indentation at the center of the rub path must be possible, or Reduction in gloss must be visually discernable | (b) Over cured Epoxy: Sweep blast using reduced nozzle pressure and fine abrasive |
| Roughness | Per ASTM D 4417 or ISO 8503 | Each component, or once per 10 m ² | As specified | Re-blasting, using coarser or harder abrasive and/or more nozzle pressure. |

Inspection & Test Plan

| Test Type | Method | Frequency | Acceptance Criteria | Consequence |
|---|---|--|--|---|
| Compatibility (With Vendor Standard Coating) | Apply test patch and test per ASTM D 3359 , Method A or ASTM D 6677 . Patch may be as small as 200 cm ² . Apply 1st coat of overcoat system only | One for each component coated with Vendor standard, except one in 25 for identical components. | As established by the Coating Manufacturer of the overcoats) | Remove incompatible coating before applying specified system ("L"). Use liquid stripper or SSPC SP 11 |
| Visual Examination of Coating | Visual to confirm absence of contamination, solvent pinholes/popping, sagging, or other surface defects | 100% of surface after each coat. | According to specified requirements | Repair of defects |
| Film Thickness | SSPC PA 2—calibrate on smooth surface | Per SSPC PA 2 | SSPC PA 2 and Table A-1 of this GP. | Repair, additional coats, or recoating as appropriate. |
| Adhesion | ISO 4624 or ASTM D 4541 using a self-aligning device, and performed when system are fully cured | Spot checks | Min 5 MPa for epoxy; Min 3 MPa for Zinc primed systems | Coating to be rejected |
| Holiday Detection | NACE RP0188-Sect. 3 or ASTM D 5162 -Method A | Tank surfaces accessible w/o scaffolding plus surfaces that will be in the splash zone. | No holidays | Repair and retesting. |

Acceptable Paint Products - Onshore

| Generic Product Identifier | DFT μm Min/Max (ea coat) | Carboline | Hempel | International | Jotun | Sherwin Williams | Sigma |
|--------------------------------|-------------------------------------|-------------------|--------------------|------------------------------|----------------------------------|--------------------|------------------------|
| Zinc Rich Epoxy | 60–110 | Carbozinc 859 | 17380 | Interzinc 52 | Barrier 90 | Zinc Clad IV | SigmaZinc 109 |
| Epoxy Primer | 70–120 | Carboguard 888 | 15570 | Intergard 251 or 400 | Jotacote Universa or Penguard HB | Copoxy Shop Primer | SigmaPrime 200 |
| NSF Epoxy | 150–250 | Carboguard 891 | 85671 | Interseal 670HS (Buff/White) | Tankguard 412 | Tank Clad HS | SigmaGuard CSF 585 |
| 3B Epoxy | 130–165 | Carbomastic 18 NT | 17630/3 or 47741/3 | Intershield 300 | Jotacote Universal | SeaGuard 6000 | SigmaPrime 200 |
| Temperature Resistant Epoxy | 75–125 | Thermaline 450 | 85671 | Intertherm 228 | Tankguard Storage | Epo-Phen | Sigma Phenguard 930 |
| HB Epoxy | 130–200 | Carboguard 888 | 45880/1 or 45080/3 | Intergard 475HS | Penguard Midcoat | Macropoxy 646 | SigmaCover 435 |
| Urethane | 40–75 | 134 or 134 HG | 55210 or 55910 | Interthane 990 or 990HS | Hardtop AS or Hardtop XP | Acrolon 218 HS | SigmaDur 550 |
| Epoxy Mastic | 100–200 | Carbomastic 15 | 45880/1 | Interseal 670HS | Primastic Universal | Macropoxy 646 | SigmaCover 630 (Alum.) |
| Silicone | 20–35 | 4700 or 4700 VOC | 5691 | Intertherm 50 | Solvalitt | Kem Hi Temp 1200 | SigmaTherm 450 |
| Coal Tar Epoxy (or equivalent) | 150–250 | Bitumastic 300M | 15130 or 35670 | Interzone 954 | Jotaguard 85 or Jotaguard FD | Tar Guard | SigmaCover 300 |

Coating System Codes

| System Code | A (Not Used Onshore) | B | C (Not Used Onshore) | D | E | F |
|-------------|-------------------------|------------------------------|-------------------------|--------------------------|-------------------|----------------|
| Prep | SP 10 | SP 10 | SP 10 | SP 5 | SP 10** | SP 10 |
| Coat 1 | Zinc Rich Epoxy | Zinc Rich Epoxy | Inorganic Zinc | Thermal Spray Aluminum * | Inorganic Zinc | Inorganic Zinc |
| Coat 2 | 3B Epoxy | HB Epoxy | 3B Epoxy | Silicone | Silicone | HB Epoxy |
| Coat 3 | HB Epoxy | | HB Epoxy | | | Urethane |
| Coat 4 | Urethane | | Urethane | | | |
| System Code | G | H | I | J | K | L |
| Prep | SP 10 | † | SP 5 | SP 10** | SP 5 | SP 10 |
| Coat 1 | Coal Tar Epoxy | Epoxy Primer or Epoxy Mastic | Temp. Resistant Epoxy | Inorganic Zinc | 100% Solids Epoxy | Epoxy Mastic |
| Coat 2 | Coal Tar Epoxy*** | Urethane | Temp. Resistant Epoxy | | 100% Solids Epoxy | Epoxy Mastic |
| Coat 3 | | | | | | Urethane |

Coating System Codes

| System Code | M | N | O | P | Q (Not Used Onshore) | R (Not Used Onshore) |
|-------------|-----------------|-----------------|---------------------------|---------------------------|---------------------------|----------------------------------|
| Prep | SP 10 | SP 10 | SP 10 (Remove all PCP) | SP 10 (Remove all PCP) | SP 10 (Remove all PCP) | SP10 (Remove all PCP) |
| Coat 1 | Zinc Rich Epoxy | Zinc Rich Epoxy | 3B Epoxy | 3B Epoxy | Epoxy Glass Flake | 3B Epoxy |
| Coat 2 | HB Epoxy | HB Epoxy | 3B Epoxy | 3B Epoxy | Epoxy Glass Flake | 3B Epoxy |
| Coat 3 | Urethane | HB Epoxy | Pre-Blended Nonskid | Broadcast Nonskid | | 3B Epoxy |
| Coat 4 | | Urethane | | | | Broadcast or Pre-Blended Nonskid |

Coating System Codes

| System Code | S (Not Used Onshore) | T | U | V | W | Z (Not Used) |
|-------------|-------------------------|-----------|----------|----------------|-------------------|-----------------|
| Prep | | SP 5 | SP 5 | SP 10 | SP 10 | No Coating |
| Coat 1 | Epoxy Mastic | NSF Epoxy | 3B Epoxy | Inorganic Zinc | Shop Epoxy Primer | |
| Coat 2 | Pre-Blended Nonskid | NSF Epoxy | 3B Epoxy | HB Epoxy | Epoxy Phenolic | |
| Coat 3 | | | 3B Epoxy | HB Epoxy | Epoxy Phenolic | |
| Coat 4 | | | | Urethane | Urethane ††† | |

Coating Schedule Matrix

Onshore Steel Structures, Piping, and Equipment

| Items | | System Code | Finish Coat Color (Note 1) | Remarks |
|-------|---|-------------|---|---|
| 1.0 | Structural Steel | | | Note 7 |
| 1.1 | Flare and Radio Towers to 110°C | M or F | Orange & White bands per Local Aviation Authority | Notes 2, 6 |
| | | (N or V) | | (Note 10) |
| 1.2 | Flare Tower above 110°C | D | Aviation Hazard ID per Local Aviation Authority | Notes 2, 15 |
| 1.3 | Beneath Cementitious Fireproofing | | | Note 6 |
| 1.3.1 | Structural Steel | B | No Color Requirement | Note 2 |
| 1.3.2 | Galvanized Steel | H | No Color Requirement | |
| 1.4 | Beneath Intumescent Fireproofing | See Remarks | | Notes 3, 6 |
| 1.5 | Crane Structure | M or F | Yellow, RAL 1004 | Note 6 |
| | | (N or V) | | (Note 10) |
| 1.6 | Columns, beams, girders, trusses, channels, or other structural members | | Galvanizing only | Per ASTM A 123/A 123M Note 6 |
| 1.7 | Floor Plate, top surface | O or P | ExxonMobil Gray, RAL 7038 | For P, see Note 14 |
| 1.8 | Escape Walkways | O or P | Yellow, RAL 1004 | For P, see Note 14 |

Coating Schedule Matrix

Offshore Steel Structures, Piping, and Equipment

| Items | System Code | Finish Coat Color (Note 1) | Remarks |
|------------|--|---|---|
| 1.0 | Structural Steel–Topside Surfaces Above Splash Zone | | Note 7 |
| 1.1 | A or C | Aviation Hazard ID per Local Aviation Authority | Notes 3 & 6 |
| 1.2 | D | Aviation Hazard ID per Local Aviation Authority | Notes 3 & 15 |
| 1.3 | R | Yellow, RAL 1004–with Black, RAL 9017, and White, RAL 9002 Urethane markings. See GP 25-01-13 . | See Note 14 for broadcast type non-skid |
| 1.4 | A or C | Yellow, RAL 1004 | Note 6 |
| 1.5 | A or C | ExxonMobil Gray, RAL 7038 | Notes 2, 3, 6 |
| 1.6 | O or P | ExxonMobil Gray, RAL 7038 | For P, see Note 14 |
| 1.8 | Q | ExxonMobil Gray, RAL 7038 | |
| 1.9 | H | ExxonMobil Gray, RAL 7038 | Notes 2, 6 |
| 1.11 | S | ExxonMobil Gray, RAL 7038 | |

Coating Schedule Matrix

Onshore Steel Structures, Piping, and Equipment

| 3.0 | Fabricated Piping & Supports; External Surfaces (shop primed and yard topcoated after assembly and testing) except as noted | | | |
|--------|---|----------|---|----------------|
| 3.1 | Carbon Steel | | | Note 7 |
| 3.1.1 | Supports & Saddles | M or F | ExxonMobil Gray, RAL 7038 | Note 2 |
| | | (N or V) | | (Note 10) |
| 3.1.2 | Uninsulated, to 110°C | M or F | ExxonMobil Gray, RAL 7038 See Remarks (8) | Note 2, 8 |
| | | (N or V) | | (Note 10) |
| 3.1.4 | Well Heads to 110°C | M or F | ExxonMobil Black, RAL 9017 See Remarks (8) | Notes 2, 8 |
| | | (N or V) | | (Note 10) |
| 3.1.5 | Well Heads above 110°C | D or I | For I, Manufacturer's Standard Black†. See Remarks (8) | Notes 2, 8, 15 |
| 3.1.6 | Uninsulated, 110°C to 200°C | D or I | For I, Manufacturer's Standard Gray†. See Remarks (8) | Notes 8, 15 |
| 3.1.7 | Uninsulated, 200°C to 400°C | D or E | For E, Manufacturer's Standard Aluminum† See Remarks (8) | Notes 8, 15 |
| 3.1.8 | Insulated, to +200°C | D or I | No Color Requirement | Note 15 |
| 3.1.9 | Insulated, 200°C to 400°C | J | No Color Requirement | |
| 3.1.10 | Insulated, Cyclic Service | D | No Color Requirement | Note 15 |
| 3.1.11 | Below Ground Piping | G | No Color Requirement | Note 17 |
| 3.1.14 | Pipe for Materials Handling Systems Uninsulated, Insulated 90°C to 200°C | D or I | For I Manufacturer's Standard Gray†. See Remarks (8) | Notes 8, 15 |

Coating Schedule Matrix

Onshore Steel Structures, Piping, and Equipment

| | | | | |
|-------|--|----------|---|----------------------------|
| 4.0 | Vessels and Heat Exchangers; External Surfaces (shop primed and topcoated after assembly and testing) | | | |
| 4.1 | Carbon Steel | | | Notes 7, 23 |
| 4.1.1 | Uninsulated, to 110°C, Including Supports & Skirts | M or F | ExxonMobil Gray, RAL 7038 See Remarks (8) | Notes 2, 4, 8 (Note 10) |
| | | (N or V) | | |
| 4.1.2 | Uninsulated, 110°C to 200°C | D or I | For I, Manufacturer's Standard Gray† See Remarks (8) | Notes 2, 4, 8, 15 |
| 4.1.3 | Uninsulated, 200°C to 400°C | D or E | For E, Manufacturer's Standard Aluminum† See Remarks (8) | Notes 2, 4, 8, 15 |
| 4.1.4 | Insulated | D | No Color Requirement | Notes 4, 15 |
| 4.2 | Stainless Steel | | | Notes 4, 7, 10, 16 |
| 4.2.1 | Uninsulated: Austenitic to 65°C, Duplex to 110 °C, Super Duplex to 120 °C and Super Austenitic to 130 °C | I | Manufacturer's Standard Gray†. See Remarks (8) | Notes 2, 8 |
| 4.2.2 | Insulated: Austenitic to 65°C, Duplex to 110 °C, Super Duplex to 120 °C, and Super Austenitic to 130 °C | I | No Color Requirements | |

Coating Schedule Matrix

Offshore Onshore Steel Structures, Piping, and Equipment

| | | | |
|-------|--|--------|---|
| 4.0 | Fabricated Piping & Supports: External Surfaces (shop primed and yard topcoated after assembly and testing) | | |
| 4.1 | Carbon Steel | | |
| 4.1.2 | Uninsulated, to 110°C | A or C | ExxonMobil Gray, RAL 7038 See Remarks |
| 4.1.4 | Wellheads to 110°C | A or C | ExxonMobil Black, RAL 9017 See Remarks |
| 4.1.5 | Uninsulated, 110°C to 200°C | D or I | For I, Coating Manufacturer's Standard Gray† See Remarks (8) |
| 4.1.6 | Well Heads to 200°C | D or I | For I, Coating Manufacturer's Standard Black† See Remarks (8) |
| 4.1.7 | Uninsulated, 200°C to 400°C | D or E | For E, Coating Manufacturer's Standard Aluminum† See Remarks |

| | | | |
|-------|--|---|--|
| 4.2 | Stainless Steel | | |
| 4.2.1 | Uninsulated: Austenitic to 65°C, Duplex to 110°C, Super Duplex to 120°C, and Super Austenitic to 130°C | I | Coating Manufacturer's Standard Gray† See Remarks |
| 4.2.2 | Insulated: Austenitic to 65°C, Duplex to 110°C, Super Duplex to 120°C, and Supper Austenitic to 130°C | I | No Color Requirements. |



Coating Schedule Matrix

Onshore Steel Structures, Piping, and Equipment

| | | | | |
|-------|---|----------|--|-------------------|
| 8.0 | Tanks | | | Note 21 |
| 8.1 | Carbon Steel External Surfaces | | | Note 7 |
| 8.1.1 | Uninsulated: Nonvolatile Products | M or F | ExxonMobil Gray, RAL 7038 See Remarks (8) | Notes 2, 8, 9, 20 |
| | | (N or V) | | (Note 10) |
| 8.1.2 | Uninsulated: Volatile Products | M or F | ExxonMobil White, RAL 9002 See Remarks (8) | Notes 2, 8, 9, 20 |
| | | (N or V) | | (Note 10) |
| 8.1.3 | Insulated, to 200°C | I or D | For I Manufacturer's Standard Gray† | Note 15 |
| 8.1.4 | Insulated, 200°C to 400°C | J | No Color Requirement | |
| 8.1.5 | Insulated-Cyclic Service | D | No Color Requirement | Note 15 |
| 8.1.7 | For Materials Handling Systems: Uninsulated & Insulated 90°C to 200 °C | D or I | For I –uninsulated, Manufacturer's Standard Alum† No color requirement for all other | Note 15 |
| 8.2 | Stainless Steel External Surfaces | | | Notes 7, 11, 16 |
| 8.2.1 | Uninsulated Austenitic to 65°C, Duplex to 110°C, Super Duplex to 120°C, and Super Austenitic to 130°C | I | Manufacturer's Standard Gray† See Remarks (8) | Notes 2, 8, 9, 20 |
| 8.2.2 | Insulated: Austenitic to 65 °C, Duplex to 110°C, Super Duplex to 120 °C and Super Austenitic to 130°C | I | No color requirement | |

ExxonMobil

Development

Coating Schedule/Matrix for Offshore / Onshore Steel Structures, Piping, and Equipment

- Structural Steel
- In-Water/Over-Water Structures / Splash / Submerged
- Fabricated Piping & Supports; External Surfaces
- Vessels and Heat Exchangers; External Surfaces
- Pumps, Compressors, and Rotating Equipment; External Surfaces
- Electric Motors and Equipment
- Instrument and Control Panels
- Tanks
- Furnaces, Stacks, Breaching, Ducts, and Boilers; External Surfaces (Carbon Steel)
- Skid-mounted Equipment
- Living Modules
- Subsea Equipment

Miscellaneous Issues

- Coatings not used to protect from chloride stress corrosion cracking
- Linings not used to protect from internal corrosion
- Flow coatings used in gas pipelines
- Anti fouling used on FPSO / FSO hulls
- Minimize use of glass flake coatings (lesson learned)
- Color unification between merged companies
- Monitor technology to upgrade practices
 - Fluorescence coatings
 - Use of TSA increasing
- Incorporate lessons learned to upgrade / improve GPs
- Develop new GPs as needed

Pipe Coatings – Various GPs

Scope

- Global Practice (GP) covers the selection of external coatings for onshore and offshore carbon steel pipelines. This GP shall be used in conjunction with the specific GP that covers the selected pipe coating and field joint coating.

References

- Other GPs
- ASTM
- NACE
- ISO
- API
- AFNOR
- CSA

Specifics

- FBE, 3LPE, 3LPP, Internal Flow, Neoprene Riser, Field Joints
- Only approved products, thickness and systems
- PPM & PQT required
- Detailed ITP

Thermal Arc Spray Metallic Coating

Scope

- This Global Practice (GP) covers the requirements for the preparation and application of thermally arc sprayed metallic coatings.

References

- Other GPs
- ASTM
- AWS
- NACE
- SSPC
- Norsok

Specifics

- Surface preparation: 75 - 125 μ (3-5 mils)
- Aluminum thickness: 200 – 350 μ (8-14 mils)
- Thin sealer only: silicone 50 μ (2 mils)
- Qualification and production testing
- Adhesion minimum 6.9 MPa (1000 psi) unless automatic application
- Bend test

Fluoropolymer Coatings for Fasteners

Scope

•Fasteners coated in accordance with this Global Practice (GP) are intended for use in assembly of piping flanges and include studs, bolts, nuts, and washers for systems operating at temperatures below 180°C (350°F). This GP is not intended for use with subsea equipment or for fasteners that may experience operating temperatures in excess of 180°C (350°F).

References

- ASTM
- ASME
- API
- SSPC

Specifics

- Two approved coating systems with specific products: onshore & offshore
- Basecoat, which provides the corrosion resistance
- Fluoropolymer topcoat, which is intended to reduce torque-up friction
- Qualification by performance based on salt spray
- Fastener suppliers help develop GP