QC/QA CLEANING AND PAINTING EXISTING STEEL STRUCTURES, BARE STEEL

**From Bennington-Mt. Tabor BF BPNT(16)(Re-advertised)
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xx. DESCRIPTION. This work shall consist of the preparation of all designated metal surfaces by the method(s) specified in the Contract Documents. This work also includes the coating of those designated surfaces with the materials specified in the Contract Documents. For this Contract no disassembly of steel mating surfaces is anticipated.

xx. MATERIALS. The Contractor shall provide a three-coat paint system consisting of an organic zinc rich primer, an epoxy intermediate coat, and an aliphatic urethane finish coat, and where specified a grease rustproofing compound meeting the requirements of the following Subsections:

Approved Structural Coating Systems.....708.03
Grease Rustproofing Compound.....708.04

The Contractor shall provide the Engineer with one copy each of all "product data sheets" published by the coating manufacturer for each and every coating applied, thinner, and/or sealer, to be retained with the project records.

Each coat shall be a contrasting color. The finish coat color shall conform to Federal Color Standard 595 as specified in Subsection 708.03.

xx. SUBMITTALS. The Contractor shall submit to the Engineer, in accordance with Subsection 105.03 for Construction Drawings, the following information for completing the work. Complete submittals shall be provided a minimum of 21 days prior to the anticipated start of the work.

(a) Contractor/Personnel Qualifications. Evidence of Contractor qualifications and the names and qualifications/experience/training of the personnel managing and implementing the Quality Control Program and conducting the quality control tests. At a minimum this should include the Quality Control Manager and the Quality Control Inspector.

(b) Quality Control (QC) Program. The QC Program shall identify the following:

(1) Instrumentation that will be used.

(2) Schedule of required measurements and observations.

(3) Procedures for correcting unacceptable work.

(4) Procedures for improving surface preparation and painting quality as a result of quality control findings.

The QC Program shall be signed by the Quality Control Manager.

(c) Inspection Access Plan. The Inspection Access Plan is for use by Contractor QC personnel for ongoing inspections and by the Engineer during Quality Assurance (QA) observations. The plan shall include the design of any necessary scaffolding or staging required for QC/QA inspections. All staging and scaffolding shall be designed by a qualified Licensed Professional Engineer.

(d) Surface Preparation/Painting Plan. The Surface Preparation/Painting Plan shall include the specified methods of surface preparation and type(s) of equipment to be utilized for water washing, hand/power tool cleaning, removal of rust, mill scale, paint or foreign matter, abrasive blast or water jetting, and remediation of chloride. If detergents, additives, or inhibitors are incorporated into the water used for any coating work operations, the plan shall include the names of the materials and Material Safety Data Sheets (MSDS).

The plan shall identify the solvents proposed for solvent cleaning together with MSDS.

The plan shall also include the methods of coating application, including any required strip coats and all equipment to be utilized.

If the Contractor proposes to heat or dehumidify the containment, the methods and equipment proposed for use shall be included in the plan for the Engineer’s consideration.

(e) Paint Manufacturer Certifications and Letters. All required certifications shall be submitted in accordance with Subsection 700.02.

When a penetrating sealer is used, the Contractor shall provide the manufacturer’s Type A Certification of compliance. The certification shall also indicate the compatibility of the sealer with the specified paint system.

When rust inhibitors are used, the Contractor shall provide a Type A Certification from the coating manufacturer indicating that the inhibitor is compatible with, and will not adversely affect the performance of, the coating system.

If the use of a chemical soluble salt remover is proposed by the Contractor, a Type A Certification shall be provided from the coating manufacturer indicating that the material will not adversely affect the performance of the coating system.

The paint manufacturer's application and thinning instructions, MSDS, and product data sheets shall be provided, with specific attention drawn to storage temperatures and the temperatures of the material, surface, and ambient air at the time of application. A letter or written instructions from the coating manufacturer shall be provided indicating the length of time that each coat must be protected from cold or inclement weather (e.g., exposure to rain) during the drying/curing period.

(f) Abrasives. Abrasives to be used for abrasive blast cleaning, including MSDS: For expendable abrasives, the Contractor shall provide certification from the abrasive supplier that the abrasive meets the requirements of SSPC-AB1. For steel grit abrasives, the certification shall indicate that the abrasive meets the requirements of SSPC-AB3.

(g) Protective Coverings. Plan for containing or controlling surface preparation and paint debris (abrasive media, droplets, spills, overspray, etc.): Any tarpaulins or protective coverings proposed for use shall be fire retardant. See CONTAINMENT AND DISPOSAL OF LEAD PAINT CLEANING RESIDUES of Section 900 for submittal requirements involving the containment used to remove lead paint.

(h) Progress Schedule. A Progress Schedule shall be submitted and shall identify all major work items and associated hold points (e.g. installation of rigging/containment, surface preparation, and coating application). The Contractor shall provide updated progress schedules as requested by the Engineer.

When the Engineer accepts the submittals, the Contractor will receive written notification. The Contractor shall not begin any paint removal work until the Engineer has accepted the submittals. The Contractor shall not construe Engineer acceptance of the submittals to imply approval of any particular method or sequence for conducting the work, or for addressing health and safety concerns. Acceptance of the submittals does not relieve the Contractor from the responsibility to conduct the work according to the requirements of Federal, State, or Local regulations, this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The Contractor remains solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.

xx. CONTRACTOR QUALIFICATIONS. The painting Contractor shall possess current SSPC-QP1 and SSPC-QP2 certifications and shall maintain certified status throughout the duration of the painting work under the Contract.

xx. QUALITY CONTROL (QC) INSPECTIONS. The Contractor shall perform first line, in progress QC inspections. The Contractor shall

implement the submitted and accepted QC Program to insure that the work accomplished complies with these specifications.

The Contractor's Quality Control Manager is responsible for managing the Contractor's QC Program and shall possess a minimum classification as a National Association of Corrosion Engineers (NACE) Coating Inspector Level 2 – Certified. Copies of the certification shall be provided.

The Quality Control Inspector shall possess a minimum classification as a National Association of Corrosion Engineers (NACE) Coating Inspector Level 1. Copies of the certification shall be provided. The Quality Control Inspector shall not participate in any production activities related to surface preparation or painting and shall be onsite full time during any operations that affect the quality of the coating system, including but not limited to surface preparation and chloride remediation, coating mixing and application, and evaluations between coats, and upon project completion. Completed daily reports for all quality control testing and observations shall be provided to the Engineer before work resumes the following day.

The personnel performing any QC tests shall be trained in coatings inspection and the use of the testing instruments. Documentation of training shall be provided. Painters shall perform wet film thickness measurements, with the Quality Control Inspector conducting random spot checks of the wet film. The Contractor shall not replace the QC personnel assigned to the project without advance notice to the Engineer, and acceptance of the replacement(s) by the Engineer.
Contractor QC inspections shall include, but not be limited to, the following:

(a) Suitability of protective coverings and the means employed to control project debris and paint spills, overspray, etc.

(b) Ambient conditions.

(c) Compressed air cleanliness.

(d) Surface preparation and surface profile (solvent cleaning, pressure washing, hand/power tool or abrasive blast cleaning, etc.).

(e) Chloride remediation.

(f) Coating application (materials verification, mixing, thinning, induction/sweat-in time, and wet/dry film thickness).

(g) Recoat times and cleanliness between coats.

(h) Coating continuity and coverage (freedom from runs, sags, overspray, dry spray, pinholes, shadow-through, skips, misses, etc.).

Records of Contractor QC inspections shall document the location on the structure and any applicable product batch numbers.

The following equipment shall be provided by the Contractor as necessary to perform QC inspections:

(a) Psychometer or comparable equipment for the measurement of dew point and relative humidity, together with all necessary weather bureau tables or psychrometric charts.

(b) Surface temperature Digital Spot Thermometer.

(c) SSPC Visual Standards VIS 1 - Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning; SSPC-VIS 3 - Visual Standard for Power and Hand-Tool Cleaned Steel; SSPC-VIS 4 - Guide and Reference Photographs for Steel Prepared by Water Jetting, and/or SSPC-VIS 5 - Guide and Reference Photographs for Steel Prepared by Wet Blast Cleaning, as applicable.

(d) Commercially available putty knife of a minimum thickness of 1 mm (40 mils) and a width between 25 and 75 mm (1 and 3 inches).

(e) Testex Press-O-Film Replica Tape (or approved equal) and Spring Micrometer.

(f) Latex cell (collection) - Quantab® Chloride Titrator Strip (testing) for chloride determinations, or approved equal.

(g) Wet Film Thickness Gage.

(h) Blotter paper for compressed air cleanliness checks.

(i) Type 2 Electronic Dry Film Thickness Gage per SSPC – PA2 Measurement of Dry Coating Thickness with Magnetic Gages.

(j) Calibration standards for dry film thickness gage.

(k) Light meter for measuring light intensity during paint removal, surface preparation, painting, and inspection activities.

(l) Printed copies of all applicable ASTM and SSPC Standards used for the work.

(m) SSPC Manual of Good Painting Practice, Volume 1.

The instruments shall be calibrated within 12 months of the date of project usage or according to the equipment manufacturer’s recommendations and the Contractor’s QC Program if they require a shorter duration.

If item 631.18 is not included in the Contract, the Contractor’s QC inspection equipment shall be made available to the Engineer for QA observations as requested.

xx. HOLD POINT. Specific inspection items throughout these specifications are designated as Hold Points. These Hold Points are for the Engineer to perform QA inspections. Unless other arrangements are made at the project site, the Contractor shall provide the Engineer with a minimum 4 hour notification before a Hold Point inspection will be reached. If the 4 hour notification is provided and the work is ready for inspection at that time, and the necessary QC inspections are performed, the Engineer will conduct the necessary observations. QA inspections will be performed only after a proper QC inspection by the Contractor. If the work is not ready at the appointed time, unless other arrangements are made, an additional 4 hour notification is required. Permission to proceed beyond a Hold Point without a QA inspection will be granted solely at the discretion of the Engineer, and only on a case-by-case basis.

If re-work is necessary as determined by a QA inspection, it shall be accomplished and a new Hold Point for the re-work shall be observed as defined above.

xx. QUALITY ASSURANCE (QA) OBSERVATIONS. The Engineer will conduct QA observations of any or all phases of the work. The presence or activity of Engineer observations in no way relieves the Contractor of the responsibility to provide all necessary daily QC inspections and to comply with all requirements of this specification.

The Engineer has the right to reject any work that was performed without adequate provision for QA observations.

xx. INSPECTION ACCESS AND LIGHTING. The Contractor shall facilitate the Engineer’s observations as required, including allowing ample time to view the work. The Contractor shall furnish, erect, and move scaffolding or other mechanical equipment to permit close observation of all surfaces to be cleaned and painted. This equipment shall be provided during all phases of the work. Examples of acceptable access structures include:

(a) Mechanical lifting equipment, such as scissor trucks, hydraulic booms, etc.

(b) Platforms suspended from the structure comprised of trusses or other stiff supporting members and including rails and kick boards.

(c) Simple catenary supports are permitted only if independent lifelines for attaching a fall arrest system according to VOSHA regulations are approved.

When the surface to be inspected is more than 1.8 m (6 feet) above the ground or water surface, and fall protection is not provided (e.g. railings), the Contractor shall provide the Engineer with a lifeline according to VOSHA regulations. The lifeline and attachment shall not direct the fall into oncoming traffic. The Contractor shall provide a method of attaching the lifeline to the structure independent of the inspection facility or any

support of the platform. When the inspection facility (e.g. platform) is more than 800 mm (2½ feet) above the ground, the Contractor shall provide a VOSHA compliant means of access onto the platform.

The Contractor shall provide artificial lighting in areas where natural light is inadequate, as determined by the Engineer, to allow proper cleaning, inspection, and painting. Illumination for inspection shall be at least 325 LUX (30 foot candles). Illumination for cleaning and painting, including the working platforms, access, and entryways shall be at least 215 LUX (20 foot candles).

xx. SURFACE PREPARATION AND PAINTING EQUIPMENT. All cleaning and painting equipment shall include gages capable of accurately measuring fluid and air pressures and shall have valves capable of regulating the flow of air, water, or paint as recommended by the equipment manufacturer. The equipment shall be maintained in proper working order.

Diesel or gasoline powered equipment shall be positioned or vented in a manner to prevent deposition of combustion contaminants on any part of the structure.

Hand tools, power tools, pressure washing, water jetting, abrasive blast cleaning equipment, brushes, rollers, and spray equipment shall be of suitable size and capacity to perform the work required. All power tools shall be equipped with vacuums and High Efficiency Particulate Air (HEPA) filtration. Appropriate filters, traps, and dryers shall be provided for the compressed air used for abrasive blast cleaning and conventional spray application. Paint pots shall be equipped with air operated continuous agitation devices unless prohibited by the coating manufacturer. The air discharge from power tools and air motors shall be directed away from steel surfaces; if this is not possible a filtering device shall be appropriately placed.

xx. PRE-PAINT MEETING (HOLD POINT). A meeting shall be held after the acceptance of all submittals related to the structural steel painting. The purpose of the meeting shall be to review all aspects of the cleaning and painting of the steel and containment and disposal of lead paint cleaning residues, if included in the Contract.

Individuals attending the meeting representing the Contractor shall be the Project Superintendent, Quality Control Manager, and the Quality Control Inspector. If the Contract requires containment and disposal of lead paint cleaning residues, the Quality Control Inspector for the containment system shall also attend. A qualified manufacturer’s technical representative for the coating system shall also attend.

The Engineer will notify the Contractor a minimum of 7 days in advance of the meeting.

xx. TEST SECTIONS (HOLD POINT). Prior to surface preparation, the Contractor shall prepare a test section(s) on each structure to

be painted in a location(s) which the Engineer considers to be representative of the existing surface condition and steel type for the structure as a whole. More than one test section may be needed to represent the various design configurations of the structure. The purpose of the test section(s) is to demonstrate the use of the tools and degree of cleaning required (cleanliness and profile) for each method of surface preparation that will be used on the project. Each test section shall be approximately 0.93 square meters (10 square feet). The test section(s) shall be prepared using the same equipment, materials, and procedures as the production operations. The Contractor shall prepare the test section(s) to the specified level of cleaning according to the appropriate SSPC visual standards, modified as necessary to comply with the requirements of these specifications. The written requirements of these specifications prevail in the event of a conflict with the SSPC visual standards. Only after the test section(s) have been approved shall the Contractor proceed with surface preparation operations.

The test section shall be preserved and sealed with a clear coat. At the conclusion of painting activities the test section shall be re-blasted and the specified coating system applied.

For the production cleaning operations, these specifications and written definitions, the test section(s), and the SSPC visual standards shall be used, in that order, for determining compliance with Contract Document requirements.

Additional compensation will not be allowed the Contractor for preparation of the test section(s).

xx. AMBIENT CONDITIONS. Surfaces to be painted after cleaning shall remain free of moisture and other contaminants. The Contractor shall control operations to insure that dust, dirt, or moisture does not come in contact with surfaces cleaned or painted that day. The following ambient conditions shall be met:

(a) The surface and ambient temperatures shall be at least 3ºC (5ºF) above the dew point during final surface preparation operations.

(b) The surface and ambient temperatures shall be a minimum of 40ºF, at least 5ºF above dew point, and the maximum relative humidity shall be ≤ 85% during the application and cure/dry time of each coat of the paint system. If the manufacturer's published literature is more restrictive it shall be followed for specific temperature, dew point, and humidity conditions during the application cure/dry of each coat. The cure/dry time shall be measured as the time following application when the ambient conditions are within the ranges above.

(c) If the Contractor proposes to control the weather conditions inside containment, proposed methods and equipment for heating and/or dehumidification shall be included in the Surface Preparation/Painting Plan submitted for the Engineer's review. Any heating/dehumidification

proposals reviewed by the Engineer shall be implemented at no additional cost to the Agency.

(d) Cleaning and painting shall be performed between April 15th and October 31st, inclusive, unless otherwise authorized in writing by the Engineer.

If the weather conditions are forecasted to be outside the limits above during surface preparation, application, and/or the curing/drying period, then work shall not proceed.

The Contractor shall monitor and document temperature, dew point, and relative humidity at the beginning of each work day and every 4 hours during surface preparation and coating application, in the specific areas where the work is being performed. The frequency of monitoring shall increase if weather conditions are changing. If the weather conditions are forecast to be borderline relative to the limits established by the manufacturer, monitoring shall continue at a minimum of 4 hour intervals throughout the curing/drying period. The Engineer has the right to reject any work that was performed under unfavorable weather conditions. Rejected work shall be removed, re-cleaned, and repainted at the Contractor's expense.

xx. COMPRESSED AIR CLEANLINESS. Prior to using compressed air for abrasive blast cleaning, blowing down the surfaces, and painting with conventional spray, the Contractor shall verify that the compressed air is free of moisture and oil contamination in accordance with the requirements of ASTM D 4285. The tests shall be conducted at least one time each shift for each compressor system in operation. If air contamination is evident, the Contractor shall change filters, clean traps, add moisture separators or filters, or make other adjustments as necessary to achieve clean, dry air. The Contractor shall also examine the work performed since the last acceptable test for evidence of defects or contamination caused by the compressed air. Affected work shall be repaired at the Contractor's expense.

xx. LOW PRESSURE WATER CLEANING AND SOLVENT CLEANING (HOLD POINT). The Contractor shall notify the Engineer 24 hours in advance of beginning surface preparation operations.

(a) Water Cleaning/Debris Removal Prior to Total Coating Removal. The Contractor shall thoroughly clean the surfaces scheduled for coating work as specified below. All water and debris shall be collected for proper disposal.

Washing shall involve the use of chlorine free potable water at a minimum of 7 MPa (1000 psi) and less than 34 MPa (5000 psi) pressure, in accordance with "Low Pressure Water Cleaning" of SSPC-SP12. Paint spray equipment shall not be used to perform the water cleaning. The cleaning shall be performed in such a manner as to remove dust, dirt, chalk, insect and animal nests, bird droppings, loose paint, and other foreign matter prior to solvent cleaning. The water, debris, and any loose paint removed by water cleaning shall

be collected for proper disposal. The washing shall be completed no more than 2 weeks prior to surface preparation.

If detergents or additives are added to the water, the detergents/additives shall be included in the submittals and not used until accepted by the Engineer. When detergents or additives are used, the surface shall be rinsed with chlorine free potable water before the detergent water dries.

After washing has been accepted by the Engineer, all traces of asphaltic cement, oil, grease, diesel fuel deposits, and other soluble contaminants which remain on the steel surfaces to be painted shall be removed by solvent cleaning in accordance with SSPC-SP1, supplemented with scraping (e.g. to remove large deposits of asphaltic cement or grease coatings) as required.

The tops of pier caps and abutments shall be cleaned free of dirt, paint chips, insect and animal nests, bird droppings, and other foreign matter and the debris collected for proper disposal.

(b) Water Cleaning Between Coats. When foreign matter has accumulated on a previously applied coat, washing shall be performed prior to the application of subsequent coats. The water does not need to be collected unless it contacts existing lead containing coatings. Washing shall involve the use of non-chlorinated potable water at a minimum of 7 MPa (1000 psi) and less than 34 MPa (5000 psi) pressure, in accordance with “Low

(c) “Pressure Water Cleaning” of SSPC-SP12. Paint spray equipment shall not be used to perform the water cleaning.

xx. STRUCTURAL STEEL MATING SURFACES. All laminar, stratified, or pack rust that has formed on or between the existing steel surfaces shall be removed as follows:

(a) Disassembled Mating Surfaces. When the Contract requires existing mating surfaces to be disassembled, the Contractor shall clean and prepare the mating surface as a faying surface. Faying surfaces for all steel connections shall be abrasive blast cleaned and prime coated only as specified herein prior to being re-assembled.

(b) Assembled Mating Surfaces. Pack rust formed along the perimeter of mating surfaces of connected plates or shapes of structural steel shall be removed to the extent feasible without mechanically detaching the mating surface. Pack rust between mating surfaces shall be removed to a level equal to or below the level of mating surfaces between which the rust is packed. Any pack rust remaining after cleaning the mating surfaces shall be tight and intact when examined using a dull putty knife. The tools used to remove these corrosion products shall be identified in the

submittals and accepted by the Engineer. If the surface preparation or removal of rust results in nicks or gouges, the work shall be suspended, and the damaged areas repaired at the Contractor's expense to the satisfaction of the Engineer. The Contractor shall also demonstrate that they have made the necessary adjustments to prevent a reoccurrence of the damage prior to resuming work.

As approved by the Engineer, epoxy penetrating sealer and sealant caulk shall be applied to pack rusted mating surfaces which have been addressed as specified above. The sealer shall be applied in the 25 to 50 micron (1 to 2 mils) dry film thickness range.

xx. SURFACE PREPARATION (HOLD POINT). The following methods of surface preparation shall be used. The method specified applies to the entire surface, including areas that may be concealed by the containment connection points. In each case, as part of the surface preparation process, soluble salts shall be remediated as specified under SOLUBLE SALT REMEDIATION (HOLD POINT) of this Section. The Contractor shall also note that the surface of the steel beneath the existing coating system may contain corrosion and/or mill scale. Removal of said corrosion and/or mill scale shall be considered included in this work and no extra compensation will be allowed.

(a) Limited Access Areas. A best effort with the specified methods of cleaning shall be performed in limited access areas, such as the backsides of rivets inside built up box members. The equipment being used for the majority of the cleaning may need to be supplemented with other commercially available equipment, such as angle nozzles, to properly clean the limited access areas. The acceptability of the best effort cleaning in these areas is at the sole discretion of the Engineer.

(b) "Near-White Metal Blast Cleaning". This surface preparation shall be accomplished in accordance with the requirements of SSPC-SP10 "Near-White Metal Blast Cleaning". The designated surfaces shall be prepared by dry abrasive blast cleaning.

"Near-White Metal Blast Cleaned" surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining.

Random staining shall be limited to no more than 5 percent of each 58 square centimeters (9 square inches) of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. With the exception of crevices as defined below, surface discoloration is considered to be a residue that must be removed, rather than a stain, if it possesses enough mass

or thickness that it can be removed as a powder or in chips when scraped with a pocketknife.

A surface profile shall be created on the steel as defined in SURFACE PROFILE (HOLD POINT) of this Section.

At the discretion of the Engineer, after a best effort cleaning, slight traces of existing coating may be permitted to remain within crevices such as those created between rivets, bolts, and plates, and the underlying steel. When traces of coating are permitted to remain, the coating shall be tightly bonded when examined by probing with a dull putty knife. The traces of coating shall be confined to the bottom portion of the crevices only, and shall not extend onto the surrounding steel or plate or onto the outer surface of the rivets or bolts. Pitted steel is excluded from exemption considerations and shall be cleaned in accordance with SSPC-SP10.

If hackles or slivers are visible on the steel surface after cleaning, the Contractor shall remove them by grinding followed by re-blast cleaning. At the discretion of the Engineer, the use of power tools to clean the localized areas after grinding, and to establish a surface profile acceptable to the coating manufacturer, can be used in lieu of blast cleaning.

If the surfaces are prepared using wet abrasive methods, attention shall be paid to tightly configured areas to assure that the preparation is thorough. After surface preparation is completed, the surfaces, surrounding steel, and containment materials/scaffolding shall be rinsed to remove abrasive dust and debris. Non-chlorinated potable water shall be used for all operations. An inhibitor may be added to the supply water and/or rinse water to prevent flash rusting. If a rust inhibitor is proposed, the Contractor shall provide a sample of the proposed inhibitor together with a letter from the coating manufacturer indicating that the inhibitor is suitable for use with their products. The surfaces shall be allowed to completely dry before the application of any coating.

(c) Condition of Edges/Corners. All existing sharp edges and corners, such as those generated by torch cutting, shearing, milling, and/or drilling shall be rounded to a radius between 1.6 and 3.2 mm (1/16 and 1/8 inch). The inspection of all edges will be tactile and/or visually assessed and document that the edges/corners were appropriately rounded.

xx. ABRASIVES. Abrasive blast cleaning shall be performed using either expendable abrasives (other than silica sand) or recyclable steel grit abrasives. Expendable abrasives shall be used one time and disposed of. Abrasive suppliers shall certify that the expendable abrasives meet the requirements of SSPC-AB1 and that recyclable steel grit abrasives meet the requirements of SSPC-AB3. On a daily basis, the Contractor shall verify that

recycled abrasives are free of oil contamination by conducting oil content tests in accordance with SSPC-AB2.

All surfaces prepared with abrasives not meeting the SSPC-AB1, AB2, or AB3 requirements, as applicable, shall be solvent cleaned or low pressure water cleaned as directed by the Engineer, and re-blast cleaned at the Contractor's expense.

When metallic abrasives are used, extra care shall be given to recovering all of the abrasive from joints, horizontal surfaces, and hard to access areas to prevent rust bleed caused by fugitive abrasives.

xx. SURFACE PROFILE (HOLD POINT). The abrasives used for blast cleaning shall have a gradation such that the abrasive will produce a uniform surface profile of 38 to 114 microns (1.5 to 3.5 mils). If the profile requirements of the coating manufacturer are more restrictive, the Contractor shall advise the Engineer and comply with the more restrictive requirements. For recycled abrasives, an appropriate operating mix shall be maintained in order to control the profile within these limits.

The surface profile produced by the Contractor's surface preparation procedures shall be determined by replica tape and spring micrometer at the beginning of the work, and each day that the surface preparation is performed. Areas having unacceptable measurements shall be further tested to determine the limits of the deficient area. The replica tape shall be attached to the daily report.

When unacceptable profiles are produced, work shall be suspended. The Contractor shall submit a plan for the necessary adjustments to insure that the correct surface profile is achieved on all surfaces. The Contractor shall not resume work until the new profile is verified by the QA observations and the Engineer confirms that the profile is acceptable.

xx. SOLUBLE SALT REMEDIATION (HOLD POINT). The Contractor shall implement surface preparation procedures and processes that will remove chloride from the surfaces. Surfaces that may be contaminated with chloride include, but are not limited to, expansion joints and all areas that are subject to roadway spray or run-off such as fascia beams and stringers.

Methods of chloride removal shall be determined by the Contractor. If steam or water cleaning methods of chloride removal are utilized over surfaces where the coating has been completely removed, and the water does not contact any lead containing coatings, the water does not have to be collected. The Contractor shall provide the proposed procedures for chloride remediation in the Surface Preparation/Painting Plan.

Upon completion of the chloride remediation steps, the Contractor shall use Latex cell (collection) - Quantab® Chloride Titrator Strip (testing), or approved equal, to test representative surfaces that were previously rusted (e.g. pitted steel) for the presence of remaining chlorides. Remaining chloride levels shall be no greater than 7 ug/square centimeters (0.2 millionth ounce/0.155 square inches) as read directly from the surface without any multiplier applied to the results. The testing must be performed, and the results must be acceptable, prior to painting each day.

A minimum of 5 tests per 93 square meters (1000 square feet), or fraction thereof completed in a given day, shall be conducted at project start up. If any results of greater than 7 ug/square centimeters (0.2 millionth ounce/0.155 square inches) are detected, the surfaces shall be re-cleaned and re-tested at the same frequency. If acceptable results are achieved on three consecutive days in which testing is conducted, the test frequency may be reduced to 1 test per 93 square meters (1000 square feet) prepared each day, provided the chloride remediation process remains unchanged. If unacceptable results are encountered, or the methods of chloride remediation are changed, the Contractor shall resume testing at a frequency of 5 tests per 93 square meters (1000 square feet). The Engineer shall approve of the actual location of the chloride tests prior to them being performed.

Following successful chloride testing, the chloride test areas shall be cleaned. Commercial Grade Power Tool Cleaning can be used to clean the test locations when the specified degree of cleaning is in accordance with SSPC-SP10.

xx. SURFACE CONDITION PRIOR TO PAINTING (HOLD POINT). Prepared surfaces shall meet the specified degrees of cleaning immediately prior to painting, and shall be painted before rusting appears on the surface. If rust appears or bare steel remains unpainted for more than 8 hours, the affected area shall be prepared again at the expense of the Contractor.

All loose paint and surface preparation cleaning residue on bridge steel surfaces, scaffolding and platforms, containment materials, and tops of abutments and pier caps shall be removed prior to painting. When lead paint is being disturbed, cleaning shall be accomplished by HEPA vacuuming.

The quality of surface preparation and cleaning of surface dust and debris must be accepted by the Engineer prior to painting. The Engineer has the right to reject any work that was performed without adequate provision for QA observations to accept the degree of cleaning. Rejected coating work shall be removed and replaced at the Contractor’s expense.

xx. GENERAL PAINT REQUIREMENTS. Paint storage, mixing, and application shall be accomplished according to these specifications and as specified in the paint manufacturer’s written instructions and product data sheets for the paint system used. In the event of a conflict between these specifications

and the coating manufacturer's instructions and data sheets, the Contractor shall advise the Engineer and comply with the most restrictive requirements.

Unless noted otherwise, if a new concrete deck or repair to an existing deck is required, painting, except primer painting of surfaces exposed by deck repairs, shall be done after the deck is placed and the forms have been removed.

(a) Paint Storage and Mixing. All paint shall be stored according to the manufacturer's published instructions, including handling, minimum and maximum temperatures, and warming as required prior to mixing. All coatings shall be supplied in sealed containers bearing the manufacturer's name, product designation, batch number, and mixing/thinning instructions. Leaking containers shall not be used. The paint shall be stored in a secure fireproof location.

Mixing shall be performed according to the manufacturer's instructions. Thinning shall be performed using thinner provided by the manufacturer, and only to the extent allowed by the manufacturer's written instructions. In no case shall thinning be permitted that would cause the coating to exceed the local Volatile Organic Compound (VOC) emission restrictions. For multiple component paints, only complete kits shall be mixed and used. Partial mixing is not allowed.

The ingredients in the containers of paint shall be thoroughly mixed by mechanical power mixers according to the manufacturer's instructions, in the original containers before use or mixing with other containers of paint. The paint shall be mixed in a manner that will break up all lumps, completely disperse pigment, and result in a uniform composition. Paint shall be carefully examined after mixing for uniformity and to verify that no unmixed pigment remains on the bottom of the container.

Excessive skinning or partial hardening due to improper or prolonged storage will be cause for rejection of the paint, even though it may have been previously inspected and accepted. Manufacturer recommended induction/sweat-in times and temperature of mixed coatings shall be observed.

Multiple component coatings shall be discarded after the expiration of the pot life. Single component paint shall not remain in spray pots, paint buckets, etc. overnight and shall be stored in a covered container and remixed before use.

The Engineer reserves the right to sample and test field paint (individual components and/or the mixed material). If the paint does not meet the product requirements due to excessive thinning or because of other field problems, the coating shall be removed from that section of the structure

and replaced as directed by the Engineer at no additional cost to the Agency.

(b) Application Methods. Unless prohibited by the coating manufacturer's written instructions, paint may be applied by spray methods, rollers, or brushes. If applied with conventional or airless spray methods, paint shall be applied in a uniform layer with overlapping at the edges of the spray pattern.

The painters shall monitor the wet film thickness of each coat during application. The wet film thickness shall be calculated based on the specified dry film thickness using the solids by volume of the material and the amount of thinner added.

When brushes or rollers are used to apply the coating, additional applications may be required to achieve the specified thickness per layer.

Primer coatings shall be applied to all bare metal surfaces. Faying surfaces for disassembled mating surfaces for steel connections shall receive a primer coating that will remain in the assembled connection. If disassembled faying surfaces are slip critical, an inorganic zinc rich primer with an appropriate slip/creep co-efficient shall be applied to the surfaces.

(c) Re-coating and Film Continuity (Hold Point for Each Coat). Paint shall be considered dry for re-coating according to the re-coat time/temperature/humidity criteria provided in the manufacturer's instructions and when an additional coat can be applied without the development of film irregularities such as lifting, wrinkling, or loss of adhesion of the under coat. If surfaces are contaminated, washing shall be accomplished prior to intermediate and final coats. Wash water does not have to be collected unless the water contacts existing lead containing coatings.

Painting shall be done in a neat and workmanlike manner. Each coat of paint shall be applied as a continuous film of uniform thickness free of defects including, but not limited to, runs, sags, overspray, dry spray, pinholes, voids, skips, misses, and shadow-through. Defects such as runs and sags shall be brushed out immediately during application.

xx. PAINT SYSTEM. The paint system listed below shall be applied as specified.

The paint manufacturer's relative humidity, dew point, and material, surface, and ambient temperature restrictions shall be provided with the submittals and shall be strictly followed. Written recommendations from the paint manufacturer for the length of time each coat must be protected from cold or inclement weather (e.g. exposure to rain) during the drying period shall be

included in the submittals. Upon acceptance by the Engineer, these times shall be used to govern the duration that protection must be maintained during drying.

The manufacturer's technical representative shall be on the project for the first 48 hours of paint application and after that time be available to be back on project with 24 hour notice.

Unless indicated otherwise in the Contract, the Contractor shall apply an additional stripe coat to edges, rivets, bolts, crevices, welds, and similar surface irregularities. The stripe coat shall be applied by brush such that the coating is thoroughly worked into or on the irregular surfaces, and shall extend onto the surrounding steel a minimum of 25 mm (1 inch) in all directions. The purpose of the stripe coat is to build additional thickness and to assure complete coverage of these areas. The stripe coat is in addition to the requirement for penetrating sealer.

The stripe coat shall not be applied as part of the application of the full coat. The stripe coat shall be applied and dried separately according to the manufacturer's recommended drying times. Also, the stripe coat shall be color contrasting to the full coat.

In the case of the prime coat, the full coat shall be applied first to protect the steel, followed by the stripe coat after the full coat has dried. In the case of the intermediate or top coat, the stripe coat shall be applied first and allowed to dry before applying the intermediate or top coat.

Amine blush is a residue that can form on newly applied epoxy coating films under certain conditions. Amine blush often appears as a yellowish milky and/or a blotchy residue on the coating surface and is a deterrent to the adhesion of subsequently applied coating layers. If amine blush is detected, the Contractor shall provide the Engineer with written procedures from the coating manufacturer for complete removal prior to the application of additional coating layers.

(a) System 1 – OZ/E/U – for Bare Steel. System 1 shall consist of the application of a full coat of organic (epoxy) zinc-rich primer, a full intermediate coat of epoxy, and a full finish coat of aliphatic urethane. Stripe coats of the prime and intermediate coats shall be applied. The film thicknesses of the full coats shall be as follows, as measured in accordance with SSPC-PA2:

(1) One full coat of organic zinc-rich primer between 90 and 125 microns (3.5 and 5.0 mils) dry film thickness. The prime coat shall be tinted to a color that contrasts with the steel surface.

(2) One full intermediate coat of epoxy between 75 and 150 microns (3.0 and 6.0 mils) dry film thickness. The intermediate coat shall be a contrasting color to both the first coat and the finish coat.

(3) One full finish coat of aliphatic urethane between 65 and 100 microns (2.5 and 4.0 mils) dry film thickness. Finish coat color shall be according to Contract Documents.

The total dry film thickness for this system, exclusive of areas receiving the stripe coats or penetrating sealer, shall be between 225 and 375 microns (9.0 and 15.0 mils).

xx. REPAIR OF DAMAGE TO NEW COATING SYSTEM AND AREAS CONCEALED BY CONTAINMENT. The Contractor shall repair all damage to the newly installed coating system and areas concealed by the containment/protective covering attachment points, at no cost to the Agency. If the damage extends to the substrate and the original preparation involved abrasive blast cleaning, the damaged areas shall be prepared to Power Tool Cleaning - Commercial Grade. If the original preparation was other than blast cleaning or the damage does not extend to the substrate, the loose, fractured paint shall be cleaned to Power Tool Cleaning – Modified SP3.

The surrounding coating at each repair location shall be feathered for a minimum distance of 40 mm (1½ inches) to achieve a smooth transition between the prepared areas and the existing coating.

If the bare steel is exposed, all coats shall be applied to the prepared area. If only the intermediate and finish coats are damaged, the intermediate and finish coats shall be applied. If only the finish coat is damaged, the finish coat shall be applied.

All Hold Points and specifications are applicable to the repair of damaged areas and areas concealed by containment.

Damage to vehicles and property caused by Contractor painting and/or surface preparation activities shall be the Contractor’s expense. The Contractor shall ensure that all areas not scheduled for paint will be protected against overspray. All areas accidentally painted will be cleaned at the Contractor’s expense.

xx. SPECIAL INSTRUCTIONS.

(a) At the completion of the work, the Contractor shall stencil the painting date and the paint code on the bridge. The letters shall be capitals, not less than 50 mm (2 inches) and not more than 75 mm (3 inches) in height.

The stencil shall contain the following wording: “PAINTED BY (Insert the name of the Contractor)” and shall show the month and year in which the painting was completed, followed by the appropriate code for the coating material applied, all stenciled on successive lines.

Coding shall be as follows:

CODE LA (for full lead abatement)

CODE Z (for field applied System 1)

This information shall be stenciled on the cover plate of a truss end post near the top of the railing, or on the inside face of an outside beam/girder near one end of the bridge, or at some equally visible surface near the end of the bridge, as designated by the Engineer.

(b) All surfaces painted inadvertently shall be cleaned immediately to the satisfaction of the Engineer.

(c) The paint used for stenciling shall be compatible with the top coat.

The cost of all work outlined above for stenciling is included in the cost of painting existing steel, and no extra compensation will be allowed.

xx. GREASE COATING. A coat of grease rustproofing compound shall be uniformly applied by brush or spray at an approximate rate of 1.86 m^2/3.785 liters (20 ft^2/gal) after the final coat of paint has fully cured. A fully cured condition has occurred when a thumbnail driven into the coating surface does not leave an impression and when a thumb firmly pushed against the surface and twisted does not disturb the coating.

Unless otherwise specified in the Contract, the length of beams or girders to be grease coated (at the ends) shall be equal to the end depth of the member, e.g. a 1.2 m (4 feet) deep girder shall be coated from its end to a length of 1.2 m (4 feet) from the point of bearing, including all exposed surface areas of attachments or members within this distance.

Surfaces adjacent to areas being grease coated shall be protected against over-spray. Non-metallic and stainless steel surfaces shall not be coated.

xx. METHOD OF MEASUREMENT. The quantity of Special Provision (QC/QA Clean and Paint Existing Steel Structures, Bare Steel) at the location specified to be measured for payment will be on a lump sum basis in the complete and accepted work.

xx. BASIS OF PAYMENT. The accepted quantity of Special Provision (QC/QA Clean and Paint Existing Steel Structures, Bare Steel) will be paid for at the Contract lump sum price. Payment will be full compensation for performing all work specified and for furnishing all labor, tools, equipment, and incidentals to complete the work.

Payment will be made as follows:

(a) Fifteen (15) percent of the Contract unit price will be paid when all submittal requirements have been met and

accepted by the Agency, and the Contractor is fully mobilized to begin work.

(b) An additional seventy-five (75) percent of the Contract unit price will be paid when all cleaning and painting work is complete.

(c) The final ten (10) percent of the Contract unit price will be paid when the Contractor has fully demobilized and all equipment and waste have been removed from the project site to the satisfaction of the Engineer.

Payment will be made under:

Pay Item	Pay Unit
900.645 Special Provision (QC/QA Clean and Paint Existing Steel Structures, Bare Steel)	Lump Sum
900.645 Special Provision (QC/QA Clean and Paint Existing Steel Structures, Bare Steel) (Route - Br. No. xx)(For multiple structure contracts)	Lump Sum