

SPECIFICATIONS FOR BRIDGE CONSTRUCTION

SECTION 22

PAINTING

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22.1 General

This specification is for the field painting of structural steel bridges and for the shop painting of newly fabricated structural steel for bridges.

Where Standards and Standard Specifications are referenced, the version current at the time of tendering shall govern, unless a specific date is described. Metric versions are inferred, when available and relevant.

This specification describes requirements for several different methods of preparation and for several different approved coating systems which may be applied to bridge structures. Each painting contract shall have Special Provisions which delineate the applicable area of the structure and the coating system to be applied to it.

22.2 Standards

- Society for Protective Coatings (SSPC) "Standard Procedure for Evaluating the Qualifications of Painting Contractors" SSPC-QP1.
- Society for Protective Coatings (SSPC) "Standard Procedure for Evaluating the Qualifications of Painting Contractors to Remove Hazardous Paint" SSPC-QP2
- Society for Protective Coatings (SSPC) Guide 6-Guide for Containing Debris Generated During Paint Removal Operations.
- Society for Protective Coatings (SSPC) SP 1 Solvent Cleaning.
- Society for Protective Coatings (SSPC) SP 6 Commercial Blast Cleaning.
- Society for Protective Coatings (SSPC) SP 7 Brush-Off Blast Cleaning.
- Society for Protective Coatings (SSPC) SP 10 Near-White Blast Cleaning.
- Society for Protective Coatings (SSPC) SP 12 Surface Preparation and Cleaning of Steel and Other Hard Materials by High- and Ultrahigh-Pressure Water Jetting Prior to Re-coating.
- Alberta Fish and Wildlife Services "Fishery Habitat Protection Guidelines"
- Alberta Infrastructure and Transportation "Approved Paint Systems"

SSPC specifications are available from:

The Society of Protective Coatings Telephone: (412) 281-2331
40 - 24th Street, 6th Floor Website: <http://www.sspc.org>
Pittsburgh, PA 15222-4656
USA

Alberta Infrastructure and Transportation BRIDGE COATING SYSTEM (APPROVED PRODUCTS) are available on the internet at:

http://www.infratrans.gov.ab.ca/INFTRA_Content/doctype253/Production/BRCOATING.pdf

22.3 Contractor Qualifications

One of four levels of Contractor competency will be specified in the Special Provisions of the Contract. The levels of competency are as follows:

- CQ1** The Contractor and any subcontractors must have certification in good standing with the Society for Protective Coatings (SSPC) under SSPC-QP2.
- CQ2** The Contractor and any subcontractors must have certification in good standing with the Society for Protective Coatings (SSPC) under SSPC-QP1.
- CQ3** Contractor acceptance based on submission of documented experience which should include but not be limited to: The names of owners, projects and dates of previous bridge painting projects where containment and disposal of blasting spoil was practised, copies of any relevant environmental permits and any citations for failure to comply. A list of qualified personnel will be responsible for the actual paint removal and application. Once accepted no personnel changes shall be made without the Consultant's acceptance. Permission for the Consultant to interview the owners, environmental departments and personnel listed above. Falsifying information in the submission will be grounds for disqualification of the bid.
- CQ4** No specific pre-qualification requirements.

Only Contractors having the specified level of competency, at the time of closing tenders will be considered acceptable.

22.4 Materials

22.4.1 Supply

The painting Contractor shall supply all materials to satisfactorily complete the work.

22.4.2 Blasting Media

Contractors may choose the type of abrasive intended for use, taking into consideration the abrasive disposal and worker's health implications of each type.

Blasting grit shall be free of corrosion producing contaminants and shall be free of any moisture, oils, greases or other elements which will reduce the adhesion of paint coatings. The blast cleaning abrasive used shall produce the minimum surface profile required by the paint manufacturer.

The use of pre-treatment coatings, blasting media additives or treatment of blasting spoil prior to, or subsequent to, disposal must be acceptable to the Department and Consultant prior to closing of the tender.

22.4.3 Paint

The contractor shall use only the paint systems listed in the Alberta Infrastructure and Transportation "Approved Paint Systems" specified in the Special Provisions of the applicable painting contract. The material data sheets and material safety data sheets of the chosen paint system shall be submitted with the contractor's work procedure. Only one paint system shall be used throughout the project unless specified otherwise. The contractor shall not change to another approved system once the initial paint system has been applied to any portion of the structure.

For each batch, the Contractor shall carry out the necessary testing prior to usage, to ensure the paint being supplied meets Alberta Infrastructure and Transportation requirements for:

- colour
- gloss
- solids content
- IR (Infra red analysis for comparison with the original approval testing)
- EDXA (Energy dissipating x-ray analysis for comparison with the original approval testing)

The paint shall be delivered in sealed, original, labelled containers, bearing the manufacturer's name, type of paint, brand name, colour designation, batch number and instructions for mixing and/or reducing.

Each batch of paint or coating will be sampled and tested by the Department and Consultant. Four (one litre) samples of paint will be removed and retained from a pail or barrel chosen at random by the Consultant. The samples will be tested to assure the paint complies with the original approval testing.

22.5 Examination of the Work

Before submitting a bid the Contractor is required to thoroughly examine the bridge structure, to become aware of the existing condition of the surfaces to be painted. He is to be completely familiar with every detail and intent of both this specification and the scope of the work to be performed, as detailed in the contract Special Provisions. Each bidder is to examine the site and the surrounding area and become familiar with any restrictions or possible restrictions, public traffic, and the property of others.

Bidders may conduct their own site testing to verify the blasting required and the lead content that may be expected in the blasting spoil. Any site testing must be pre-acceptable to Alberta Infrastructure and Transportation/Consultant.

22.6 Environmental Issues

22.6.1 Emission Levels

The percentage of blasting spoil that must be recovered and the Class of containment required shall be as specified in the contract Special Provisions and detailed in the SSPC-Guide 6.

Monitoring and acceptance criteria described in section 5.5 of the SSPC-Guide 6, methods A to F, to monitor the quantity of emissions escaping the enclosure shall be specified in the contract Special Provisions.

22.6.2 Environmental Regulations

The Contractor shall ensure that existing paint being removed, and any abrasive material used to accomplish the removal, is contained and properly and safely disposed of in accordance with the applicable law.

The Contractor shall comply with all Federal, Provincial, and Municipal, air, soil and water pollution control regulations, when cleaning and repainting the structural steel and when disposing of any waste generated. These specifications set forth minimum requirements necessary to protect the environment. The Contractor shall perform additional work or to otherwise modify containment or disposal procedures to ensure compliance with all applicable laws and regulations.

22.6.3 Fish Habitat

When working on structures over water inhabited by fish the Contractor shall conform to the requirements of the Alberta Fish and Wildlife Services' "Fishery Habitat Protection Guidelines". The Contractor shall ensure that deleterious material does not enter into waters frequented by fish.

22.6.4 Blasting Spoil Recovery

The containment system for the blast cleaning and painting shall be installed such that the minimum specified percentage of the blast spoil and paint removed, as listed in the Special Provisions, is contained.

22.6.5 Protection of Property

During cleaning and painting procedures, the Contractor shall take necessary precautions to fully protect the environment, the workers, traffic, parked vehicles, adjacent property, and other portions of the structures from damage caused by cleaning debris, blast cleaning materials, dirt, dust, equipment oils, solvents, acids, burning matter and paint drifts, drops, or spray and spatter.

22.6.6 Compliance

An Environmental Auditor may be retained by the Consultant to assure compliance with the requirements of the Environmental Permits and/or Screening Report and to monitor the performance of the containment system in particular and that of the Contractor in general.

22.6.7 Background Contamination Levels

Pollution of the environment shall be minimized at all times during the cleaning and painting of the bridge. The Contractor's work may be monitored by other agencies. The Contractor is advised to consider collection of background levels of possible previous air, water and soil contamination prior to commencing work at the site.

22.7 Permits

The Contractor shall obtain the necessary permits and approvals, and conform to all requirements of Environmental Screening Reports, Municipal bylaws, Provincial and Federal Environmental Protection laws, for all work carried out. The Contractor shall be familiar with and comply with all regulations, such as, but not limited to, Environmental permits, the Worker's Compensation Act, Workplace Safety and Insurance Act and the Occupational Health and Safety Act, Regulation and Code which control the exposure of workers to chemical hazards.

22.8 Work Proposal

The contractor shall submit his proposed work methods to the Consultant, for review two weeks prior to commencement of work. These methods shall include but not be limited to:

- Schedule
- Sequence of operations
- Traffic accommodation strategy
- Placement of equipment
- Storage, handling and disposal of new and contaminated blasting material
- Methods of weighing blasting material on and off the project
- Method of separating hazardous and non hazardous blasting spoil
- Sample documentation for tracking the disposal of hazardous waste
- The final destination of hazardous waste

Plans sealed by a Professional Engineer registered in Alberta, detailing the Contractor's containment structure, scaffolding, platforms, or swing stages to be employed, shall be submitted to the Consultant for review.

These drawings shall clearly indicate where and how the spent blasting media is collected, recovered, weighed and removed from the project. All scaffolding, platforms, swing stages and material collection equipment shall be designed and operated in accordance with the authority having jurisdiction.

22.9 Work Site Health and Safety

The Contractor is fully responsible for the protection of his employees and any sub-contractor's personnel, from exposure to lead. The Contractor shall develop and implement a Lead Health and Safety Program (LHASP) that meets all the requirements of the Occupational Health and Safety Act and Regulations (Attention is drawn to OH&S Bulletin MSB-06 and in particular the chemical requirements) and all other Municipal, Provincial or Federal Regulations that may apply when working in a hazardous environment.

The Contractor shall provide shower and change facilities for the work force in accordance with governing regulations and ordinances. The facilities shall be freely available for use by all personnel associated with the Contract.

Respirators shall be furnished by the Contractor and used when such equipment is necessary to protect the health of employees. Respirators shall be donned before entering the work area and shall not be removed until the worker has left the work area or has entered a decontamination area. Selection of the respirator type shall be based on the ability of the respirator to adequately filter air which is at the maximum air-lead level monitored in the locations where the worker may be exposed.

Extra clean respirators shall be kept on the job for use by visitors wishing to access the work site. No visitors shall be allowed without adequate protection.

The Contractor shall supply employees, who are potentially exposed to lead, with clean, dry, protective work clothing and equipment, and with appropriate changing facilities. Appropriate protective work clothing can include coveralls or similar full body work clothing, gloves, hats, shoes or disposable shoe coverlets, face shields or vented goggles and, if applicable, blasting helmets.

Extra protective clothing shall be available for use by visitors to the work site.

The Contractor shall designate a Health and Safety officer, to act as the primary on site monitor of the program and to ensure that the LHASP is implemented on a daily basis and that all work on the site is in compliance with the LHASP.

22.10 Protection of Surfaces

The Contractor shall protect and maintain the painted surfaces until acceptance of the entire project.

The Contractor shall take due precaution against damaging or disfiguring any portion of the bridge with: spatter, spray fog, splashes, smirches of paint or associated painting materials including the fuel and lubricants used with his equipment.

Tarps, polyethylene or other covering material shall be used to protect deck, sidewalks, piers, abutments, slope protection and other portions of the structure adjacent to areas being painted and subject to paint or other damage.

Any inadvertent damage or disfigurement which may occur by reason of the contractors operations shall immediately be repaired to the satisfaction of the Consultant at the contractor's expense.

22.11 Areas Not To Be Painted

The following surfaces shall not be painted:

- Surfaces which will be cast into concrete such as the top and sides of the top flange of girders or the side of expansion joints in contact with concrete.
- Sliding metal to metal contact bearing surfaces and mating surfaces of spherical bearings.
- Galvanized surfaces.
- Concrete surfaces adjacent to painted steel surfaces such as sidewalks and the underside of bridge decks. Where painted items such as girder flanges are cast into concrete the paint applied to the flange may overlap the concrete by up to 25mm on condition that this shall be a

uniform straight line as produced by masking the remainder of the concrete surface. Any paint inadvertently applied to the concrete shall be removed immediately.

22.12 Work Execution

22.12.1 Temporary Attachments

To reduce the possibility of damaging the existing bridge components, any clamps or other devices attached to the structure shall be padded or designed such that they do not mark the steel to which they are attached.

No welding or tack welding to the structure will be permitted.

The removal and replacement of any bolts from the structure must be acceptable to the Consultant. No holes may be placed in the structure.

22.12.2 Containment System

The containment system's purpose is to prevent the debris generated during surface preparation from entering into the environment and to facilitate the controlled collection of debris for disposal.

The containment system and its operation shall meet or exceed the class of containment specified in the Special Provisions. When abrasive blast cleaning is used to clean and prepare the steel surfaces, the Contractor shall contain the paint chips, abrasive particles, and debris resulting from the operation. The containment system includes but is not limited to, such articles as cover panels, screens, tarps, scaffolds, supports, shrouds and ground sheets used to enclose the entire work area or a paint removal tool.

The materials used for screens shall be of a commercial brand designed specifically for the purpose of containing and facilitating collection of blasting and painting debris. If woven screens are used, the material shall contain not more than 15% voids with a mesh opening not exceeding 20 mils (500 microns). If monitoring detects leakage of dust through the woven screens, exceeding the allowable, then the screens shall be replaced with ones of a tighter weave which will meet the recovery requirements.

All materials used for screens shall be adequately reinforced to prevent tearing or displacement when subjected to construction, wind or other environmental loads and their related conditions. The Contractor shall engage a Professional Engineer, licenced to practice in Alberta, who shall identify any loadings imposed on the bridge during the Work including but not limited to any containment system, scaffolding, platforms or swing stages, personnel, equipment and wind loads. The Contractor's Engineer shall determine where to transfer the loads to the bridge, and shall evaluate the ability of the bridge to accommodate the loads.

The Contractor shall submit a report, stamped by the Contractor's Engineer, which clearly identifies the loads, where the loads will be transferred to the bridge, and the Engineer's assessment of the ability of the bridge to accommodate these loads. The report shall be submitted to the Consultant as part of the Contractor's Work Proposal.

All costs associated with the preparation of the report, including wind loading analysis, will be considered incidental to the Work and no separate or additional payment will be made.

The Contractor shall supply auxiliary lighting to improve visibility where necessary within the enclosure.

22.12.3 Abrasive Blasting Spoil Recovery Monitoring

(1) Conventional Abrasive Blasting

Blasting debris containment must provide a minimum percentage of recovery and emission control effectiveness as specified in the Special Provisions. The Contractor shall monitor the blasting spoil recovery by weighing the blasting material delivered to the job and the blasting spoil removed from the job. An enclosure which does not meet the specified criteria must be modified at the contractor's expense. No blasting shall be performed using an unmodified containment that does not recover the required percentage of the blasting spoil. The Contractor shall maintain a documented reporting system to provide gross weights, tare of containers and the calculated weight of the material provided to and removed from the structure. The blasting spoil shall be protected from absorbing any moisture. Contaminated blasting spoil shall be in a dry condition prior to making the recovery calculation.

The recovery efficiency is to be calculated as follows:

- (a) Determine the dry weight of abrasive (W_a) used to blast clean the entire structure or monitored portions thereof.
- (b) Determine the weight of paint debris (W_p) for the same area.
- (c) Determine the weight of abrasive and paint debris removed (W_d) after blast cleaning the designated area, or the whole structure.
- (d) Calculate the recovery efficiency (RE) as follows: $RE = \frac{W_d}{W_a + W_p} \times 100\%$
- (e) Recovery efficiency reports shall be submitted to the Consultant on a weekly basis and for the entire project at the end of the project.

If the wind velocity is too excessive to effectively contain the blast debris within the enclosure, the Contractor shall suspend blast cleaning operations and protect the existing blasting spoil from the wind.

The Contractor shall take whatever measures are necessary to prevent the release of dust or spent material from the ground tarpaulins and other components of the containment enclosure during moving or removal. Debris collected on temporary work platforms or ground cloths shall be removed each workday with a vacuum system equipped with high efficiency particulate air (HEPA) filters adequately sized to collect all spent material.

Where the bridge extends over the waterway, the Contractor shall contain all debris and waste materials as described herein and shall also provide a temporary platform located directly underneath the area enclosed for surface preparation cleaning, power tool cleaning, or blast cleaning and paint application. The platform shall be adequately sized to contain and/or filter debris, wash water and paint during the cleaning or application operation. The containment enclosure shall extend down to the level of the platform and shall be secured to prevent release of other than filtered material. The surface of the platform shall be constructed to ensure collection and filtration of spent waste materials or shall be designed to collect, funnel and discharge the spent waste materials into waste containers.

For bridges located over a navigable waterway the location of platforms, scaffolding, floating booms or other equipment shall not interfere with navigation.

The containment system must be properly maintained while work is in progress and shall not deviate from the approved working drawings without prior acceptance of the Consultant. If, at any time during execution of the work, the containment system fails to function properly, the Contractor shall immediately suspend surface preparation until modifications can be made to correct the deficiency.

Containment meeting these requirements may not necessarily provide adequate emission control or abrasive recovery rate. The Contractor may have to provide a higher containment standard to meet these other requirements.

(2) Water Blasting

When High or Ultra High Pressure Water Jetting is specified the filtration or collection and treatment of water used in the cleaning shall be as specified in the Special Provisions. The recovery of a certain volume of spoil will not be specified, but the waste water may have to be filtered through a cloth system of specified porosity and when the cleaning is completed the cloth filters shall be carefully folded to contain the debris collected and shall be disposed of as outlined in section 22.16 of this specification. The Contractor is responsible to perform additional work or to otherwise modify containment or disposal procedures to ensure compliance with all applicable laws and regulations.

22.12.4 Ventilation System

The ventilation system used shall be as specified in the Special Provisions and described in the SSPC-Guide 6. The use of the minimum ventilation system as described herein does not assure control of emissions to the required level nor will it assure worker safety. Revisions to the ventilating system may be necessary and will be required to meet the health and emission requirements.

The minimum air movement specified in the Special Provisions, for inside the Containment system may not be adequate for visibility of the work surface and may or may not be adequate for protection of the workers from health hazards such as lead. The Contractor may have to provide a higher standard of air movement to meet these requirements.

22.12.5 Assessing Emissions

Methods for Assessing the Quantity of Emissions shall be as specified in the Special Provisions and as described in the SSPC - Guide 6.

The Contractor shall have monitoring equipment to ensure that the containment is performing to the required level.

22.13 Bridge Washing

Before any blast cleaning operations commence, the Contractor shall carry out surface cleaning operations on all steel designated to receive a coating system. All organic materials such as bird droppings, nests and any other non-structural items or pollutants attached to the steel are to be removed by hand cleaning operations.

All oil, grease and road tar shall be removed manually with solvent cleaning as per SSPC Specification SP1. Any area contaminated with oil or grease shall be cleaned with an approved biodegradable detergent. The detergent is to be environmentally friendly and non toxic to fish. The Contractor shall supply copies of the applicable MSDS sheets to the Consultant prior to using the material.

The entire area to be coated shall be washed clean of road spatter, chlorides and other surface contaminants using water of sufficient pressure and volume to flush the chlorides free of the structure.

Cleaning will be inspected by testing for the chloride levels on the cleaned steel and by testing the run off water at the lower extremities of the steel being cleaned. Chloride contamination of the cleaned surface shall be less than that specified in the Special Provision prior to blast cleaning.

Wash water shall be filtered through a suitable fabric, to remove any coarse paint particles which may have been loosened and washed from the structure. Wash water may be filtered through a woven screen material containing not more than 15% voids with a mesh opening not exceeding 20 mils (500 microns). No restriction will be imposed on disposal of water passing through a woven screen meeting the above requirements.

22.14 Surface Preparation

22.14.1 Abrasive Blast Cleaning

All compressed air sources shall have oil and moisture separators, attached and functional, properly designed and sized to allow delivered air at the blasting or painting nozzle to be free of oil and moisture and of sufficient pressure to accomplish the associated work efficiently and effectively. The tanks on the air compressors and the moisture separators shall, as a minimum, be drained at the end of each working shift. Prior to abrasive blast cleaning, the Contractor shall demonstrate to the Consultant that the air is moisture free. Air driven power tools shall be properly lubricated in accordance with the respective manufacturer's instructions, but in such a manner that lubrication is not deposited onto the surface being prepared.

Blast cleaning of steel surfaces in preparation for painting, shall be in accordance with the SSPC Surface Preparation Standards specified in the Special Provisions.

Surface Preparation Standard SSPC-SP6 requires that the cleaned surface be free of all visible oil, grease, dirt, dust, mill scale, rust and paint.

Surface Preparation Standard SSPC-SP7 requires the removal of all loose coating, loose rust and loose mill scale. Mill scale, rust and paint are considered to be tightly adhered if they cannot be lifted with a dull putty knife.

The anchor pattern in the blasted steel shall be that specified by the manufacturer of the coating.

As work progresses a 150 mm wide strip of uncoated blasted steel shall be left between the newly coated surface and the non blasted surfaces of the structure.

The Contractor shall grind all burs and sharp edges to the satisfaction of the Consultant. This requirement shall be measured using an "L" shaped metal gauge with a $\frac{1}{32}$ " (1.0 mm) radius at the point of intersection of the two 90° arms. The member will require grinding if the radius touches the member when both arms are in tight contact with the surfaces of the member.

The Contractor shall prepare only as much surface as can be coated with primer the same day. If unusual circumstances occur which prevent all prepared surfaces from being primed the same day, a light blast cleaning will be required over all unprimed surfaces prior to recommencement of painting.

Care shall be exercised to prevent contamination of blast-cleaned or coated surfaces prior to over coating. Compressed air cleaning of the members before coating application will generally be accepted. At the discretion of the Consultant, this operation may be requested in any area before the application of any coat of paint. The degree of surface preparation specified shall exist immediately prior to the coating material being applied. Paint shall be protected from contamination by blasting debris until it has cured sufficiently. Paint contaminated with blasting grit shall be removed and re-applied.

Prepared surfaces shall be kept clean at all times, before coating and between coats.

22.15 Pack Rust

Pack rust is the term used for the condition where two areas of steel have been held tightly together by rivets or bolts, and subsequent crevice corrosion has forced these areas apart with a build up of corrosion products between them. Pack rust that forces plates or structural sections apart to form a gap of 2mm or greater shall be cleaned to a depth of one half of the gap width, to a maximum depth of 6.0 mm, treated with an approved penetrant and caulked to form a water tight seal along the top edge and the two sides of plate involved. The bottom edge or lowest edge of the plate or member shall not be caulked.

The type of penetrant and caulking used must be compatible with the paint system used and shall be applied according to the manufacturers instructions. No penetrant or caulking shall be used which has not been accepted by the Consultant. When caulking joints where only one plate edge is exposed, a fillet of caulking shall be formed which is not less than 3 mm or the width of the pack rust gap. The fillet is not required where there is no separation of the plates due to pack rust.

Regardless of whether pack rust is evident or not, all connection plates shall be treated with an approved penetrant and caulked as described. All costs associated with the penetrant treatment and caulking will be considered incidental to the Work and no separate or additional payment will be made.

22.16 Disposal of Blasting Spoil

The collection, storage and disposal of blasting residue shall be carried out in compliance with federal, provincial and municipal laws.

All waste residue collected during the surface preparation process shall be stored at the site in containers acceptable to the Consultant. The waste containers shall be stored in an acceptable area and shall be protected at all times with water-proof covers. Waste residues collected and stored in the waste containers will be sampled and tested by the Contractor in accordance with the Toxic Characteristic Leachate Procedure (TCLP) test. The test results will characterize the waste residue as a hazardous or non-hazardous material and the Contractor shall dispose of the blast residue accordingly. The representative test results, for each batch of blasting residue collected shall be provided to both the consultant and the Department before disposal of waste can be undertaken.

It is the Contractor's responsibility to provide documentation to the Consultant that all hazardous waste was disposed of in conformance with all applicable regulations governing the disposal of such materials. Acceptable documentation shall consist of a certificate of disposal that will provide information such as the quantity of material, truck manifests, way bills, and other information necessary to clearly document the transportation of, and the final disposal method and disposal site used.

22.17 Priming and Painting

22.17.1 Stripe Painting

Stripe painting is a process whereby an extra layer of paint is applied to all sharp edges of the structure being painted. When stripe painting is specified in the Special Provisions, the edges of plates and rolled sections with a sharp profile and all bolt heads shall be striped with a coat applied to increase the mil thickness of the coating around the sharp edge. It may be applied prior to the prime coat or after the prime coat to aid in preservation of the blast cleaned surface. All drying time and recoat conditions must be complied with as with other coats of paint. Paint systems using an intermediate coat shall also be stripe painted after each intermediate but not after the top coat. Stripe coats when applied over the primer or intermediate coat shall be tinted to contrast with the underlying coat.

22.17.2 Paint Application

- (1) Paint shall be applied in accordance with the manufacturer's instructions. When required the coating manufacturer's representative shall be available at the site, to provide guidance and solve problems.
- (2) Paint shall not be applied when the air and/or steel temperatures are at or below 4°C, nor when the metal has absorbed sufficient heat (above 50°C) to cause the paint to blister and produce a porous paint film, nor when it is possible the air temperature may drop below 0°C before the paint is dry. Variances from these requirements, due to paint supplier's recommendations or requirements, require the Consultants acceptance prior to usage.
- (3) Paint shall not be applied to damp or frosty surfaces, nor applied to surfaces when there is a risk of dew. Painting shall not commence unless the dry bulb temperature exceeds the wet bulb temperature by more than 5°C and the ambient temperature is rising.
- (4) Only the anticipated quantity of paint required for one day's work is to be opened on that day. Left over paint shall not be left exposed to air. Any paint that becomes oxidized, thickened, ropy, lumpy or dirty shall be discarded.
- (5) The paint shall be mixed in a manner which will ensure breaking up of all lumps, complete dispersion of settled pigment, and provide a uniform composition. The paint shall be agitated often enough during application to keep the pigment in suspension.
- (6) Paint shall not remain in spray pots, painter's buckets, etc., overnight. Multi component paints which have been mixed for the duration of the manufacturer's recommended pot life shall be discarded in a safe manner.
- (7) Paint shall be safely stored by the Contractor, in a location which keeps its temperature in the range of 10°C to 25°C.
- (8) Paint shall be applied by spraying, brushing, rolling or a combination of these methods. On all surfaces which are inaccessible for brushes or rollers and where spraying cannot be employed, the paint may be applied with sheepskin mitts specifically manufactured for this purpose.
- (9) Finish coat paint shall not be applied over touched up primer which is not dry.
- (10) No portion of the paint shall be less than the specified film thickness(es). The film thickness(es) shall not be so great that either the appearance or service life of the paint will be detrimentally affected. Bolts, rivets, edges of members and other changes in surface contour shall also receive the specified film thickness(es).
- (11) To ensure that the proper dry film thickness is obtained, the wet film thickness shall be checked at the time the paint is applied. The minimum wet film thickness shall be equal to the dry film thickness divided by the percentage (expressed as a decimal) of solids in the paint used, with the result rounded up to the next full mil. Each painter shall have his own wet film thickness gauge and do frequent checks of the paint film as it is applied.

22.18 Quality Control

To ensure that the work done meets the requirements of this specification, the Contractor shall have an experienced quality control person actively monitoring and correcting the work of his employees whenever cleaning, surface preparation and coating application is taking place. The Consultant will provide a NACE certified quality assurance inspector to monitor and accept the work. The Contractor shall provide him and all other representatives of the Consultant and Alberta Infrastructure and Transportation, at their request, safe free access to all areas of the work in all stages of completion.

There shall be no application of coating materials until the cleaning, and surface preparation have been inspected and accepted by the Consultant. Failure to follow this requirement will necessitate the complete removal, by blast cleaning, of all coating placed over surfaces not inspected and accepted by the Consultant. Each coat must be thoroughly dry and the mil thickness of each coat accepted by the Consultant prior to applying an additional coat.

22.19 Authority of the Consultant

Non-compliance with any portion of this specification may result in the Consultant suspending the work until the infraction has been corrected. There will be no alteration to the completion date, lane charge dates and site occupancy as applicable due to this suspension of work.

22.20 Acceptance

Any newly painted surfaces will be considered to lack uniformity, continuity and soundness, and will be rejected, if any of the following defects are apparent.

- (1) Runs, sags, holidays or shadowing caused by inefficient application methods.
- (2) Evidence of poor coverage at bolts, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.
- (3) Surfaces which have been struck, scraped, spotted by rain or otherwise damaged.
- (4) Surfaces which exhibit an objectionable texture such as orange peel, mud cracking, fish eyes, etc.
- (5) Surfaces damaged by over spray.

22.21 Repair

Repair areas, as determined by the Consultant, shall be cleaned of all damaged paint and the system re-applied using all coats typical to the original paint system. Each coat shall be thoroughly dry before applying subsequent coats. The Contractor shall carry out all repairs at no additional cost to the Department.

22.22 Site Clean-Up

The Contractor shall leave the entire site in a neat and tidy condition with all paint cans, masking materials and other debris removed from the site and disposed of in an acceptable manner.

22.23 Estimated Areas

The estimate of painted areas contained in the Special Provisions is presented as a convenience to the Contractor bidding the work. The areas shown will be used in pro-rating the value of work completed to date, during the course of the project. While it is believed that the areas are a good representation of the actual painted area of the structure, the Consultant makes no claim as to the accuracy of the values and in no way can be held responsible for the use of these values for any purpose whatsoever.

22.24 Payment

22.24.1 Surface Preparation and Painting

Payment for **Surface Preparation and Painting** will be made on the basis of the lump sum price bid, which shall include full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work.

Progress payments will be made on a monthly basis and will be based on the percentage of the total estimated area satisfactorily cleaned and coated as determined by the Consultant. Payment will not be made for areas which do not have the specified number of coats for the paint system used nor for areas which are complete but have designated repairs outstanding.

22.24.2 Protection of the Environment

Payment for **Protection of the Environment** will be made on the basis of the lump sum price bid, which shall include full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work.

The lump sum payment for protection of the environment will be made in stages. An initial payment of 25% of the lump sum price bid will be made at the time all containment structures and equipment are acceptably erected on the bridge and the Contractor is prepared to commence surface preparation and painting operations. An additional 50% of the lump sum price bid will be paid, on a pro-rated basis, as portions of the bridge are acceptably painted. The final 25% of the lump sum price bid will be paid when the work is acceptably completed; all blasting spoil material has been accounted for, removed from the bridge site and a disposal site owner's acceptance has been received by the Consultant.

22.25 Joint Warranty

- (1) When required in the Special Provisions of the contract, the Coating Manufacturer, the General Contractor and the Painting Contractor shall jointly warrant the coating and its application against all defects in material and workmanship for a period of five years. The warranty period will commence on the date of the final acceptance of the completed painting contract.

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- (2) The Contractor and the Manufacturer shall jointly execute the form entitled, "Agreement to Provide a 5 Year Bridge Painting Warranty". The completed form shall be provided, prior to award of contract.
 - (3) During the warranty period the Consultant or Alberta Infrastructure and Transportation will inspect the coating system, at least sixty days prior to warranty expiration, and will advise the Contractors, the Manufacturer, and the Surety in writing of any defects or repairs that are required. Intermediate inspections may be made and warranty repairs claimed and completed by the Contractor each year of the five year warranty period.
 - (4) Failure of the coating system shall include but not be limited to: Any de-bonding or failure of adhesion of the coating either to the structural steel or lack of inter-coat adhesion; the appearance of any rust stains on the structure due to loss of paint or due to leaking from joints between structural members; any loss of normal gloss or rapid change of colour of the coating. Damage to the coating due to vehicle impact or snow removal equipment will not constitute failure of the system.
 - (5) Repair under warranty includes the cost to supply material, labour, and equipment necessary to restore the coating to acceptable condition as judged by the Department.
 - (6) Warranty repairs shall be completed within 45 days of notification, or if this would place the repair work in winter weather conditions, by May 30 of the following year.

AGREEMENT TO PROVIDE 5 YEAR BRIDGE PAINTING WARRANTY

(Name of Paint Manufacturer)

manufacturer of

(Paint System Name)

and

(Contractor/Applicator's Company Name)

who is an approved paint Applicator of the paint system, hereby certify that in the event that the Contractor is awarded the painting contract for

(Contract Number)

(Bridge File Number and Name)

the undersigned parties jointly agree to provide a 5 year warranty for the work. Warranty period will commence at the completion of the work. The Warranty shall include all repair costs needed within the 5 year period.

MANUFACTURER:

(Name of Company Officer) (Corporate Position) (Signature of Company Officer)

(Name of Witness) (Signature of Witness) (Date)

CONTRACTOR/APPLICATOR:

(Name of Company Officer) (Corporate Position) (Signature of Company Officer)

(Name of Witness) (Signature of Witness) (Date)

22.26 Shop Coating of Structural Steel for Bridges

22.26.1 Fabrication Paint Shop

Paint shops or areas of fabrication shops where painting is performed shall be well lit, free of dust and drafts and maintained at the correct temperature and relative humidity for the coating being applied.

Compressed air for cleaning and painting shall be free of moisture and oil contamination.

22.26.2 Pre-Surface Preparation

Surfaces to be coated shall be free of weld spatter, welding flux and cutting slag. All sharp corners and edges shall be lightly ground to a 1.0 mm chamfer to break the sharp edge and all holes shall be free of burrs and cutting chips. Oil and grease shall be solvent cleaned to meet the requirements of SSPC SP1 specification for solvent cleaning, prior to blast cleaning in preparation for coating.

22.26.3 Abrasives

Abrasives used in shop cleaning shall be free of chlorides and other contaminants which could affect the coating being applied, and shall produce the anchor pattern required by the coating system.

22.26.4 Blast Cleaning

Unless noted otherwise all fabricated surfaces shall be blast cleaned to meet the requirements of SSPC-SP10 Near White Blast Cleaning, which is a surface free of all visible oil, grease, dust, dirt, mill scale, rust, coating, oxides, corrosion products, and other foreign matter. The surface roughness of the cleaned surface shall be from 5 to 15 μm . No paint shall be applied until the Consultant has inspected and accepted the cleaned surface. Surfaces which have been painted without acceptance of the cleaning shall have the paint removed by blast cleaning and must be accepted by the Consultant before the paint can be applied again.

22.26.5 Masking

All no paint areas shall be masked prior to painting the work and portions of members which are to be field welded for a distance of 100 mm from the weld location shall not be painted. Unless noted otherwise, all faying surfaces and within 75 mm of open holes shall be masked to prevent application of coating. All clip angles and other detail material shall be applied after blast cleaning to assure a cleaned faying surface.

22.26.6 Paint

Unless otherwise noted on the drawings shop primer shall be Zinga, organic zinc rich primer.

22.26.7 Paint Application

Paint shall be applied to the specified Dry Film Thickness (DFT) of 35 to 45 μm (100 -120 μm wet

film thickness). Painters shall be equipped with wet film thickness gauges to assure proper application thickness. DFT shall be checked and accepted by the Consultant prior to shipping the work.

22.26.8 Intercoat Cleanliness

The initial blast cleaned surface and subsequent coats of paint shall be kept free of dust, dry spray, overspray, oil and grease prior to application of subsequent coats or shipping.

22.26.9 Recoat Time

The maximum and minimum recoat time for the coating system being applied shall be observed and required conditioning agents or surface roughing between coats shall be done. Zinga primer may be recoated with itself after 2 hours, with other top coats after 48 hours. If a Zinga primed surface is left for more than 14 days without top coating, it must be water washed to remove zinc salts which will have formed on the surface.

22.26.10 Shipping Inspection

No product is to be shipped until the Consultant has inspected and accepted the coating. Section 22.20 shall apply. Material shipped without inspection by the Consultant, may be inspected at the receiving point with all costs of this inspection charged to the Fabricator.

22.26.11 Shipping

The coating shall be protected from damage during shipping.