DESIGN GENERAL PAINTING SPECIFICATION

POTASH HANDLING FACILITIES PROJECT

PACIFIC COAST TERMINALS

Revision 1 for final (November 26, 2014)

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 SCOPE

This Specification covers the painting requirements for exterior surfaces of aboveground equipment, piping, and structural steel made out of carbon steel and low alloys.

1.2 PURPOSE

The materials and procedures specified herein are provided to protect plant equipment from corrosion and to provide an aesthetically pleasing environment for operating personnel.

1.3 DEFINITIONS

For the purposes of this specification, the following definitions shall apply:

PCT:	Pacific Coast Terminals Co. Ltd.
SDE:	Sacré-Davey Engineering. PCT has commissioned SDE to consult on PCT's behalf. All communication related to this specification shall be via SDE
CONCESSION REQUEST:	A request for deviation of design outside the specifications of this package
PROJECT:	Potash Handling Facilities Project
CONTRACTOR:	Any person, firm, or company contracted to supply and/or install any material or service in connection with the Project

1.4 EXCLUSIONS

This Specification does not cover the materials and requirements for the internal lining (of piping, pressure vessels, tanks, or equipment); protection of concrete; or coatings for underground piping.

2.0 CODES AND STANDARDS

The following codes and standards shall, to the extent specified herein, form a part of this Specification. The edition in force at 1st November, 2011 shall apply.

CAN/CSA S16.1	Limit States Design of Steel Structures
Steel Structures Painting Council (SSPC)	Painting Manual Volumes I & II

3.0 DOCUMENT PRECEDENCE

The CONTRACTOR must notify SDE of any or all conflicts between the specification, all related data, the Codes and Standards and any other specifications noted herein. Resolution and/or interpretation precedence must be obtained from SDE in writing before proceeding with design and manufacture.

The order of precedence, to resolve conflicts in documentation, is as follows:

- Project Specifications
- Project Drawings
- Industry Codes and Standards

4.0 SPECIFICATION DEVIATION/CONCESSION CONTROL

Any technical deviations to this specification and its attachments must be sought by the CONTRACTOR through a CONCESSION REQUEST. A CONCESSION REQUEST requires the approval of PCT, prior to implementing any proposed changes.

5.0 QUALITY ASSURANCE/QUALITY CONTROL

The CONTRACTOR shall provide a Quality Assurance and Inspection Plan, including the specific Design Codes and Standards listed in the Codes and Standards section.

6.0 DOCUMENTATION

CONTRACTOR shall submit the type and quantity of details and documentation for SDE'S authorization or information as listed in the individual material requisitions and purchase orders.

Mutual agreement on scheduled submittal of details and engineering data shall be an integral part of any formal purchase order.

Make the following submittals in accordance with the General Requirements:

- Manufacturer's data sheets for coating materials proposed for the Work.
- The proposed schedule for the surface preparation, coating application, curing and handling of the steel.
- Description of the procedures to be followed and equipment to be employed.
- Name of coating organization, supervisor and inspector proposed for the Work.

7.0 SUBCONTRACTORS/SUBAPPLICATORS

All subcontractors and/or subvendors utilized by the CONTRACTOR shall be identified and approved by PCT. Any changes to subcontractors and/or subvendors must be approved in writing, prior, by PCT.

8.0 GENERAL WORK

8.1 RESPONSIBILITIES OF THE CONTRACTOR

The CONTRACTOR shall be responsible for:

- Supply and application of all paint materials, labour, supervision, coating equipment, inspection tools and each and every item of expense necessary for complete application of the paint system.
- Supply, erection and removal of scaffolding to perform the painting work.
- Removal of identification marks on bare or unfinished equipment, piping and structural steel and re-application of the identification marks on the finished surfaces. CONTRACTOR shall consult with SDE on the size of the markings.
- Full protection from abrasives and paints to items which shall not be painted
- Cleaning and application of painting systems on welded and damaged surfaces.
- Collection and disposal of all toxic waste materials from the work site as directed by SDE.
- Preparation of appropriate work planning and taking all precautions to avoid interference with the execution of work of other contractors.
- The earthing of abrasive blast cleaning and painting equipment and paint containers.
- Application of the paint systems to the extent stated in the procurement documents in accordance with this Specification and all other relevant documents such as site regulations, safety rules, etc.
- Providing qualified painting inspectors and testing tools for carrying out specified inspection and quality control measures.
- Maintenance of the paint work until completion of the contract. This shall include the repair of any damage caused by third parties.

8.2 DELIVERY, STORAGE AND HANDLING

Deliver all materials to the area of application in factory-sealed containers, clearly indicating the paint manufacturer's name, type, colour, identification number, expiry date and instructions for mixing and thinning as necessary.

Submit the coating manufacturer's data sheet with each shipment of material to the application area.

Adhere to all applicable safety regulations and manufacturers recommendations in storing, mixing and handling coatings products. Provide adequate mechanical ventilation to all areas in which coating products are mixed, applied or handled.

8.3 SCHEDULING OF THE WORK

Schedule surface preparation, coating, curing, and delivery for proper and timely execution of Work according to the PROJECT schedule.

Submit proposed schedule for coating all steel Work items.

8.4 **ALTERNATIVES**

Do not make substitutions for coating materials and procedures specified unless specifically approved in writing by SDE.

Alternative coating systems to those specified may be proposed by the CONTRACTOR. Details of any alternate coating system proposed shall be submitted for approval by SDE.

8.5 **COLOURS**

See paragraph 12. in this document

8.6 **SAFETY REQUIREMENTS**

All necessary precautions shall be taken to ensure the safety of personnel and property.

Rags and other waste material soiled with paints, thinners or solvents shall be kept in tightly closed metal containers while on the job or not in use. When working in confined areas, blowers or exhaust fans shall be used.

9.0 PRODUCTS

9.1 **MATERIALS**

Use premium quality coating materials supplied by national brand name manufacturers and approved by SDE. Do not use materials after the expiry date as marked on the container. Obtain all coating materials from a single manufacturer and ensure that all products are fully compatible within each coating system.

Use only products which are readily available from manufacturers stock and which, as far as can reasonably be foreseen, will be available for future repairs and recoatings.

Coating materials as detailed on the applicable coating system specified herein.

Acceptable manufacturers:

- International
- Ameron
- Carboline
- Devoe

9.2 **COATING SYSTEMS**

Coatings containing cadmium or lead or any toxic material to environment/personnel shall not be used.

Metal fabrications, Carbon Steel Piping, and Structural Steel:

Apply coating systems in accordance with the following:

Surface Preparation:	Commercial blast clean to SSPC SP6
Primer Coat:	2-3 mil zinc rich epoxy primer
Top Coat	12-16 mils high-build epoxy (to be applied in 2 or more layers as per product datasheet)

Touch-Up:

Immediately prior to repairing damaged or unpainted surfaces, and before the specified surface preparation is carried out, all grease, oil, dirt and foreign matter shall be removed.

Edges of sound remaining paint on the surface shall be feathered by sanding/grinding prior to painting.

Gloss paint surfaces shall be sanded or abraded to provide bond for successive coats.

The minimum coating requirements for spot coating repairs shall be as follows:

No corrosion, primer exposed:	Apply top coat to restore specified film thickness
No corrosion, primer damaged:	Clean area to substrate. Apply the required primer and top coats of the specified paint system to a DFT of similar Thickness to the original specification. The touch-up coatings have been specifically formulated to provide the best long term protection.
Rusted Areas:	Clean to the original standard of surface cleanliness. Prepare surface to SSPC-SP3. Apply the required primer and top coats of the specified paint system to a DFT of similar Thickness to the original specification. The touch-up coatings have been specifically formulated to provide the best long term protection.

All film thicknesses specified are dry film thicknesses.

9.3 **PRE-APPROVED COATING SYSTEMS**

The following coating systems shall be pre-approved for metal fabrications and Structural Steel:

International:

Primer Coat:	Interzinc 52
	Zinc Rich Epoxy
	2-3 mils, DFT
Top Coat:	Interzone 954
	High-Build Epoxy
	12-16 mils, DFT
	(to be applied in 2 or more layers as per product datasheet)

10.0 EXECUTION

10.1 **PREPARATION**

Inspect the Work prior to carrying out coating application and report any deficiencies or defects to SDE.

Remove all weld, burning, or cutting splatter, ensure that welds are free from significant porosity or defects and grind smooth uniformly profiled surface to receive coatings.

Perform all Work in strict accordance with the specifications and the coating manufacturer's current product data sheets. Ensure that all Work is performed in a safe and workmanlike manner. All phases of the Work shall be available to SDE or a representative for observation or inspection at any time.

Prepare all surfaces to be coated in a workmanlike manner with the objective of obtaining a clean, dry and properly prepared substrate, as detailed below and in accordance with the coating manufacturer's current data sheets.

Clean all surfaces to be coated and remove all rust, scale, dirt, or other foreign matters. Remove grease and oil by washing with solvents to SSPC-SP1.

Power wire brush all weld areas to SSPC-SP3 and remove harmful electrode deposits by scrubbing with a 5% phosphoric acid solution to SSPC-SP1.

Abrasive blast all steel surfaces to completely remove all mill scale, rust and other foreign matter to SSPC-SP6. The anchor pattern blasted into the surface shall not be in excess of 1/3 of the total coating (dry film) thickness to be applied.

Do not blast clean more steel than can be prime coated on the same day.

10.2 **COATING APPLICATION**

Store all coating materials in areas with ambient temperatures within the range specified by the paint manufacturer's current data sheet. Thoroughly mix all coating materials before use and allow drying agents to "sweat-in" for the period specified by the manufacturer after mixing and prior to application.

Adhere to manufacturer's recommendations and all applicable safety regulation in the mixing, handling, application and curing of coating materials.

Refer to the coating manufacturer's most recent printed data sheet to determine necessary information in surface preparation (i.e., to determine anchor pattern depth). Such instructions are deemed part of this specification.

Apply all coatings under shop conditions using qualified experience applicators and knowledgeable field supervisors. Shop shall be equipped with temperature and humidity control as required to obtain proper application conditions in accordance with the manufacturer's recommendations.

Spray apply the paint/coating by airless spray equipment, with a minimum pressure ratio of 28:1.

Maintain all coating equipment in good working order. Equipment shall be comparable to that described in the coating manufacturer's most recent data sheet. Thoroughly clean and inspect equipment daily. Regularly replace worn spray nozzles, tips, etc. Use oil and water separators on all air lines.

Do not apply coatings when the air temperature or surface temperature of the steel is outside the range of the coating manufacturer's current data sheet. Do not apply coating to wet or damp surfaces or within 3 °C (37 °F) of the dew point, except in accordance with information supplied by the coating manufacturer.

Mask any area within 50 mm to be field welded before coating. After field welding, clean surface as specified before coating welded area.

Spray apply coating materials to the specified thicknesses using even controlled movements of the spray fun to obtain a uniform coating thickness free from runs, sage, pinholes, holidays, shadowing or other defects. Spray apply coatings in strict accordance with the manufacturer's recommendations.

Prime coat all cleaned metal as specified, after being inspected, and within eight hours of cleaning, to prevent new rusting or oxidation of cleaned surfaces. If more than one day passes between subsequent coats, prepare these contaminated areas by either brush-off blast, or steam cleaning.

Dry time between coats shall be as per the coating manufacturer's current data sheets. Schedule cleaning and coating so that dust, overspray and other contaminants from the coating process will not fall on wet, newly coated surfaces.

Provide adequate curing time and temperature in shops where Steel Work or equipment is being painted so that a minimum of damage to the coating is incurred in handling, shipping and erection. Protect coated steel from overspray and drift due to adjacent coating operations.

Permit each coat to completely dry before application of the next coat. If any coated surface becomes damaged or contaminated during curing, clean the area and prepare and recoat to these specifications.

Carry out repair Work to defects, omissions, shipping and erection damage in such a manner so as to produce a uniform continuous coating equal to, or better than, the original coating.

10.3 **INSPECTION**

The CONTRACTOR shall appoint and pay for an independent testing and inspection agency to perform testing and inspection of the Painting Work. The testing agency shall be approved by SDE:

Employ qualified inspectors acceptable to SDE to continuously inspect the Work and prepare inspection and progress reports. All reports shall be submitted weekly to SDE. These reports shall be submitted for both shop and site-applied coatings.

The CONTRACTOR's inspectors shall clearly define on the inspection reports the areas inspected. The inspection reports shall be written so that they clearly relate to identifiable surfaces. The CONTRACTOR's inspectors shall recommend any corrective remedy for a problem and indicate the corrective action to be taken by SDE.

Inspect all cleaned surfaces prior to the application of coating. Tests to be performed and equipment require are as follows:

Sling Psychrometer:	Use to determine percent of relative humidity and dew point temperature.
Surface Temperature Gauge:	Use in conjunction with the sling psychrometer to determine temperature of substrates prior to coating.
Elcometer Surface Profile Gauge:	Use to measure in mils the profile depth, from peaks to valleys, of abrasive blasted surfaces.
Wet Film Thickness:	A film gauge of steel or aluminum, calibrated to read in mils the film thickness of a wet coating. When using the gauge, divide the desired dry film thickness by the volume solids of the coating as expressed in a decimal (taking into account the amount of thinning done) to yield the necessary wet film thickness.

Dry Film Thickness:	Use an Elcometer Paint Inspector, Microtest or similar approved gauge to measure the thickness to the nearest mil. It must be accompanied by a set of standard shims against which it can be calibrated at least once per week in standard job site conditions. Use SSPC PA 2-73T or ASTM D1186-53 as method for measurement.

Inspect newly coated surfaces when the coating has thoroughly dried and immediately after the coated member has been removed from the paint shop for storage or shipment. The coated surfaces will be considered with respect to lack of uniformity, continuity and soundness and may be rejected if any of the following defects are apparent, and in SDE's judgement, believes the coating performance and life may be impaired by these conditions:

- Runs, sags, holidays, pinholes or shadowing caused by insufficient applications methods.
- Evidence of poor coverage at plate edges, pipe weld areas, lap joints, crevices, pockets, or corners.
- Damage to shop coat due to handling before the coating is sufficiently cured, or other contributory cause.

Check surface preparation using pictorial standards per SSPC-Vis-67T and actual samples sealed in plastic supplied by SSPC.

If any of the areas covered in the reports are found to be in error, repair or recoat defective areas.

Make good all coated surfaces rejected by SDE. Small affected areas may be touched up; large affected areas or where insufficient dry film thickness has been attained shall involve the application of another complete shop coat at the CONTRACTOR's expense. Remove runs, sags or coating damaged.

If the tests reveal unsatisfactory paint coating, the steel shall be repainted at no expense to PCT.

10.4 **HANDLING**

Handle surfaces that have been coated to the above specifications using the following:

Use clamps, slings or sorting hooks but no wire-rope chokers for handling steel after the prime coat has been applied.

After the finish coat has been applied, use only nylon ropes or rubber-covered slings for handling steel, both in the fabricator's shop, during loading or shipment and during unloading and erection at the Site. No bare steel cables or strapping will be permitted.

After paint has been applied, take special precautions in handling and shipping to prevent damage to the coating. For shipment, strap smaller members into bundles. Use wood softeners to prevent all metal to metal contact between pieces. Load and secure the steel to prevent movement while in transit. Use wood softeners also when stacking steel for storage at the Site and provide wood blocking between the steel and the ground surface.

10.5 **FIELD TOUCH-UP**

Touch-up and repair all abrasions, cuts, scuffs, and other defects in coatings and field coat all connections including bolts, welds, anchor bolts and all uncoated areas as required to provide a complete, continuous integral coating system on all steel surfaces in accordance with these specifications.

Touch-up and repair of field coatings shall be as in this specification and in accordance with the manufacturers' recommendations. Submit description of materials and repair procedures proposed prior to commencing the Work.

Carry out field coating repairs only when air temperature and relative humidity are within paint manufacturers' permissible range and will reasonably remain so during film drying time.

Protect adjacent Work of the trades by masking or using protective sheets as required during field coating operations.

Touch-up areas shall be inspected by the CONTRACTOR's coating inspector before, during, and after touch-up to confirm compliance with the specifications.

10.6 **CONTROL OF OVERSPRAY**

Implement strict program to control and eliminate overspray and drift of paint onto surfaces and equipment specified to remain unpainted.

Designate key person on site to monitor paint overspray during the PROJECT and to ensure that adequate protection is installed.

Mask or cover all surfaces and equipment with protective sheeting not specified to receive field touch-up and repair coatings.

Closely monitor prevailing wind intensities and direction to assess effect on paint drift. Suspend operations during conditions where paint drift cannot be adequately controlled.

Take all practical precautions to minimize overspray during coating operations. Use equipment and procedures designed to minimize overspray. Apply coatings by brush where size of member being coated would result in excessive overspray beyond coated surface.

10.7 **CLEANING**

Clean all coated surfaces of scuffs, dirt or foreign material prior to completion of the Work.

Do not attempt solvent cleaning of any surfaces without written consent of SDE and compatibility test of solvent.

10.8 **COMPLETION**

On completion of the Work on this section, remove all protection erected in conjunction with the coatings Work. Make good all damage to this Work and adjoining Work and remove all surplus materials, debris, tools plant and equipment from the Site. Leave site in condition satisfactory to SDE.

11.0 KSPC / PCT Potash Handling Facility Adjustments

11.1 **General**

KSPC means the K+S Potash Canada.
Wherever PCT is mentioned in this specification, PCT needs to be substituted with KSPC / PCT
Wherever SDE is mentioned in this specification, SDE needs to be substituted with CH2M Hill.
Tbd means to be discussed and approved by KSPC / PCT prior application

11.2 **Technical**

All faying surfaces (bearing and slip critical connections) are primed only using approved slip critical primer. The in 9.3 pre-approved coating system needs to be adjusted accordingly.

On connection external surfaces, areas within 50 mm of any location where a bolt head, nut or washer will be in contact with the member shall be primed only during the fabrication.

All galvanized bolts will be touched-up w/ two coats after final torqueing.

Maximum electrical resistance for steel structures shall be 0.1 Ω.

12.0 Color Coding

Description	Color	RAL Code
Fuel Oil, Hydraulic Oil & Lube Oil Lines	Jet Black	RAL 9005
Instrument Air Lines	Signal Blue	RAL 5005
Structural Steel	Tele Grey	RAL 7046
Ladders, Handrails, Guards & Monorails, Bollards	Rape Yellow	RAL 1021
Fire Water, Fire Stations and Guards	Traffic Red	RAL 3020
Dust Collection Pipes	Stone Grey	RAL 7030
Doors & Door Frames Transfer Towers	Tele Grey	RAL 7046
Roof Cladding Transfer Towers	Tele Grey	RAL 7046
Cladding Transfer Towers	Tele Grey	RAL 7046
Flashings Transfer Towers	Tele Grey	RAL 7046
Rotating Equipment eg:, pumps, gear boxes, motors, pulleys etc.	Sky Blue	RAL 5015
Non-Rotating Equipment eg: chutes, vibration feeder, hopper etc.	Light Green	RAL 6027
Conveyor Covers, C42-tubular enveloping structure	Tele Grey	RAL 7046
Gutters, Downspouts	Tele Grey	RAL 7046